

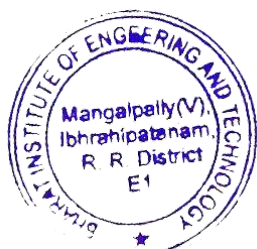
BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

Mangalpally (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Telangana-501510

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

Summery Sheet for Last 5 years

Academic year/Branch	CSE	Civil	ECE	EEE	Mech	IT	H&S	MBA	M.Tech	Total
2018-19	35	22	28	27	28	9	10	4	78	241
2017-18	33	23	29	21	26	6	13	5	78	234
2016-17	13	19	27	25	24	18	7	10	77	220
2015-16	31	22	24	26	28	9	10	10	96	256
2014-15	34	25	29	22	27	17	5	8	96	263
Total	146	111	137	121	133	59	45	37	425	1214



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BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

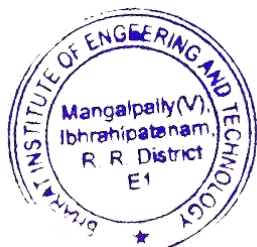
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1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

B.Tech-Civil ENGINEERING

2018-19

S. No.	Regulations	No. of Course	Year of Study
1.	R16	16	II & III Year I & II Semesters
2.	R15	6	IV year I & II Semesters



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JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.Tech. 1st Year Syllabus (w.e.f AY 2018-19)****Common for Civil, ME, AE, ME (M), MME, Mining & Petroleum Engg.****I YEAR I SEMESTER**

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics - I	3	1	0	4
2	PH102BS	Engineering Physics	3	1	0	4
3	CS103ES	Programming for Problem Solving	3	1	0	4
4	ME104ES	Engineering Graphics	1	0	4	3
5	PH105BS	Engineering Physics Lab	0	0	3	1.5
6	CS106ES	Programming for Problem Solving Lab	0	0	3	1.5
7	*MC109ES	Environmental Science	3	0	0	0
		Induction Programme				
		Total Credits	13	3	10	18

I YEAR II SEMESTER

S. No.	Course Code	Course Title	L	T	P	Credits
1	MA201BS	Mathematics - II	3	1	0	4
2	CH202BS	Chemistry	3	1	0	4
3	ME203ES	Engineering Mechanics	3	1	0	4
4	ME205ES	Engineering Workshop	1	0	3	2.5
5	EN205HS	English	2	0	0	2
6	CH206BS	Engineering Chemistry Lab	0	0	3	1.5
7	EN207HS	English Language and Communication Skills Lab	0	0	2	1
		Total Credits	12	3	8	19.0

***MC – Satisfied/Unsatisfied**

MA101BS: MATHEMATICS - I**B.Tech. I Year I Sem.**

L	T	P	C
3	1	0	4

Course Objectives: To learn

- Types of matrices and their properties.
- Concept of a rank of the matrix and applying this concept to know the consistency and solving the system of linear equations.
- Concept of Eigen values and eigenvectors and to reduce the quadratic form to canonical form
- Concept of Sequence.
- Concept of nature of the series.
- Geometrical approach to the mean value theorems and their application to the mathematical problems
- Evaluation of surface areas and volumes of revolutions of curves.
- Evaluation of improper integrals using Beta and Gamma functions.
- Partial differentiation, concept of total derivative
- Finding maxima and minima of function of two and three variables.

Course Outcomes: After learning the contents of this paper the student must be able to

- Write the matrix representation of a set of linear equations and to analyse the solution of the system of equations
- Find the Eigen values and Eigen vectors
- Reduce the quadratic form to canonical form using orthogonal transformations.
- Analyse the nature of sequence and series.
- Solve the applications on the mean value theorems.
- Evaluate the improper integrals using Beta and Gamma functions
- Find the extreme values of functions of two variables with/ without constraints.

UNIT-I: Matrices

Matrices: Types of Matrices, Symmetric; Hermitian; Skew-symmetric; Skew-Hermitian; orthogonal matrices; Unitary Matrices; rank of a matrix by Echelon form and Normal form, Inverse of Non-singular matrices by Gauss-Jordan method; System of linear equations; solving system of Homogeneous and Non-Homogeneous equations. Gauss elimination method; Gauss Seidel Iteration Method.

UNIT-II: Eigen values and Eigen vectors

Linear Transformation and Orthogonal Transformation: Eigen values and Eigenvectors and their properties: Diagonalization of a matrix; Cayley-Hamilton Theorem (without proof); finding inverse and power of a matrix by Cayley-Hamilton Theorem; Quadratic forms and Nature of the Quadratic Forms; Reduction of Quadratic form to canonical forms by Orthogonal Transformation

UNIT-III: Sequences & Series

Sequence: Definition of a Sequence, limit; Convergent, Divergent and Oscillatory sequences.

Series: Convergent, Divergent and Oscillatory Series; Series of positive terms; Comparison test, p-test, D-Alembert's ratio test; Raabe's test; Cauchy's Integral test; Cauchy's root test; logarithmic test. Alternating series: Leibnitz test; Alternating Convergent series: Absolute and Conditionally Convergence.

UNIT-IV: Calculus

Mean value theorems: Rolle's theorem, Lagrange's Mean value theorem with their Geometrical Interpretation and applications, Cauchy's Mean value Theorem. Taylor's Series. Applications of definite integrals to evaluate surface areas and volumes of revolutions of curves (Only in Cartesian coordinates), Definition of Improper Integral: Beta and Gamma functions and their applications.

UNIT-V: Multivariable calculus (Partial Differentiation and applications)

Definitions of Limit and continuity.

Partial Differentiation; Euler's Theorem; Total derivative; Jacobian; Functional dependence & independence, Maxima and minima of functions of two variables and three variables using method of Lagrange multipliers.

TEXTBOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

REFERENCES:

1. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.
2. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11th Reprint, 2010.

PH102BS: ENGINEERING PHYSICS**B.Tech. I Year I Sem.**

L	T	P	C
3	1	0	4

Course Objectives:

- The course aims at making students to understand the basic concepts of Principles of Physics in a broader sense with a view to lay foundation for the various engineering courses.
- Students will be able to demonstrate competency and understanding of the concepts found in Mechanics, Harmonic Oscillations, Waves in one dimension, wave Optics, Lasers, Fiber Optics and a broad base of knowledge in physics.
- The main purpose of this course is to equip engineering undergraduates with an understanding of the scientific method, so that they may use the training beneficially in their higher pursuits.
- Today the need is to stress principles rather than specific procedures, to select areas of contemporary interest rather than of past interest, and to condition the student to the atmosphere of change he will encounter during his carrier.

Course outcomes: Upon graduation, the graduates will have:

- The knowledge of Physics relevant to engineering is critical for converting ideas into technology.
- An understanding of Physics also helps engineers understand the working and limitations of existing devices and techniques, which eventually leads to new innovations and improvements.
- In the present course, the students can gain knowledge on the mechanism of physical bodies upon the action of forces on them, the generation, transmission and the detection of the waves, Optical Phenomena like Interference, diffraction, the principles of lasers and Fibre Optics.
- Various chapters establish a strong foundation on the different kinds of characters of several materials and pave a way for them to use in at various technical and engineering applications.

UNIT-I: Introduction to Mechanics

Transformation of scalars and vectors under Rotation transformation, Forces in Nature, Newton's laws and its completeness in describing particle motion, Form invariance of Newton's second law, Solving Newton's equations of motion in polar coordinates, Problems including constraints and friction, Extension to cylindrical and spherical coordinates.

UNIT-II: Harmonic Oscillations

Mechanical and electrical simple harmonic oscillators, Complex number notation and phasor representation of simple harmonic motion, Damped harmonic oscillator: heavy, critical and light damping, Energy decay in a damped harmonic oscillator, Quality factor, Mechanical

and electrical oscillators, Mechanical and electrical impedance, Steady state motion of forced damped harmonic oscillator, Power observed by oscillator.

UNIT-III: Waves in one dimension

Transverse wave on a string, The wave equation on a string, Harmonic waves, Reflection and transmission of waves at a boundary, Impedance matching, Standing waves and their Eigen frequencies, Longitudinal waves and the wave equations for them, Acoustic waves and speed of sound, Standing sound waves.

UNIT-IV: Wave Optics

Huygen's principle, Superposition of waves and interference of light by wave front splitting and amplitude splitting, Young's double slit experiment, Newton's rings, Michelson's interferometer, Mach-Zehnder interferometer, Frunhofer diffraction from a single slit and circular aperture, Diffraction grating- resolving power.

UNIT-V: Lasers and Fibre Optics

Lasers: Introduction to interaction of radiation with matter, Coherence, Principle and working of Laser, Population inversion, Pumping, Types of Lasers: Ruby laser, Carbon dioxide (CO₂) laser, He-Ne laser, Applications of laser. Fibre Optics: Introduction, Optical fibre as a dielectric wave guide, Total internal reflection, Acceptance angle, Acceptance cone and Numerical aperture, Step and Graded index fibres, Losses associated with optical fibres, Applications of optical fibres.

TEXT BOOKS:

1. Engineering Mechanics, 2nd ed.- MK Harbola, Cengage Learning
2. I. G. Main, "Vibrations and waves in physics", 3rd Edn, Cambridge University Press, 2018.
3. Ajoy Ghatak, "Optics", McGraw Hill Education, 2012

REFERENCES:

1. H. J. Pain, "The physics of vibrations and waves", Wiley, 2006
2. O. Svelto, "Principles of Lasers"
3. "Introduction to Mechanics", M.K.Verma, Universities Press

CS103ES/CS203ES: PROGRAMMING FOR PROBLEM SOLVING**B.Tech. I Year I Sem.**

L	T	P	C
3	1	0	4

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in program development.
- To learn the syntax and semantics of C programming language.
- To learn the usage of structured programming approach in solving problems.

Course Outcomes: The student will learn

- To write algorithms and to draw flowcharts for solving problems.
- To convert the algorithms/flowcharts to C programs.
- To code and test a given logic in C programming language.
- To decompose a problem into functions and to develop modular reusable code.
- To use arrays, pointers, strings and structures to write C programs.
- Searching and sorting problems.

Unit - 1: Introduction to Programming

Introduction to components of a computer system: disks, primary and secondary memory, processor, operating system, compilers, creating, compiling and executing a program etc., Number systems

Introduction to Algorithms: steps to solve logical and numerical problems. Representation of Algorithm, Flowchart/Pseudo code with examples, Program design and structured programming

Introduction to C Programming Language: variables (with data types and space requirements), Syntax and Logical Errors in compilation, object and executable code, Operators, expressions and precedence, Expression evaluation, Storage classes (auto, extern, static and register), type conversion, The main method and command line arguments

Bitwise operations: Bitwise AND, OR, XOR and NOT operators

Conditional Branching and Loops: Writing and evaluation of conditionals and consequent branching with if, if-else, switch-case, ternary operator, goto, Iteration with for, while, do-while loops

I/O: Simple input and output with scanf and printf, formatted I/O, Introduction to stdin, stdout and stderr.

Command line arguments

Unit - II: Arrays, Strings, Structures and Pointers:

Arrays: one and two dimensional arrays, creating, accessing and manipulating elements of arrays

Strings: Introduction to strings, handling strings as array of characters, basic string functions available in C (strlen, strcat, strcpy, strstr etc.), arrays of strings

Structures: Defining structures, initializing structures, unions, Array of structures

Pointers: Idea of pointers, Defining pointers, Pointers to Arrays and Structures, Use of Pointers in self-referential structures, usage of self referential structures in linked list (no implementation)

Enumeration data type

Unit - III: Preprocessor and File handling in C:

Preprocessor: Commonly used Preprocessor commands like include, define, undef, if, ifdef, ifndef

Files: Text and Binary files, Creating and Reading and writing text and binary files, Appending data to existing files, Writing and reading structures using binary files, Random access using fseek, ftell and rewind functions.

Unit - IV: Function and Dynamic Memory Allocation:

Functions: Designing structured programs, Declaring a function, Signature of a function, Parameters and return type of a function, passing parameters to functions, call by value, Passing arrays to functions, passing pointers to functions, idea of call by reference, Some C standard functions and libraries

Recursion: Simple programs, such as Finding Factorial, Fibonacci series etc., Limitations of Recursive functions

Dynamic memory allocation: Allocating and freeing memory, Allocating memory for arrays of different data types

Unit - V: Introduction to Algorithms:

Algorithms for finding roots of a quadratic equations, finding minimum and maximum numbers of a given set, finding if a number is prime number, etc.

Basic searching in an array of elements (linear and binary search techniques),

Basic algorithms to sort array of elements (Bubble, Insertion and Selection sort algorithms),

Basic concept of order of complexity through the example programs

TEXT BOOKS:

1. Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
2. B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)

REFERENCE BOOKS:

1. Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice
2. Hall of India
3. R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
4. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
5. Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

ME104ES/ME204ES: ENGINEERING GRAPHICS**B.Tech. I Year I Sem.**

L	T	P	C
1	0	4	3

Pre-requisites: Nil**Course objectives:**

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

Course Outcomes: At the end of the course, the student will be able to:

- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid, Scales – Plain & Diagonal.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines, Projections of Plane regular geometric figures.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views - Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere

UNIT – IV

Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone, Intersection of Solids: Intersection of – Prism vs Prism- Cylinder Vs Cylinder

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views –Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions

Introduction to CAD: (For Internal Evaluation Weightage only):

Introduction to CAD Software Package Commands.- Free Hand Sketches of 2D- Creation of 2D Sketches by CAD Package

TEXTBOOKS:

1. Engineering Drawing N.D. Bhatt / Charotar
2. Engineering Drawing / N. S. Parthasarathy and Vela Murali/ Oxford

REFERENCE BOOKS:

1. Engineering Drawing / Basant Agrawal and McGraw/ McGraw Hill
2. Engineering Drawing/ M. B. Shah, B.C. Rane / Pearson.
3. Computer Aided Engineering Drawing – K Balaveera Reddy et al – CBS Publishers

PH105BS: ENGINEERING PHYSICS LAB**B.Tech. I Year I Sem.**

L	T	P	C
0	0	3	1.5

List of Experiments:

1. Melde's experiment:
To determine the frequency of a vibrating bar or tuning fork using Melde's arrangement.
2. Torsional pendulum:
To determine the rigidity modulus of the material of the given wire using torsional pendulum.
3. Newton's rings:
To determine the radius of curvature of the lens by forming Newton's rings.
4. Diffraction grating:
To determine the number of lines per inch of the grating.
5. Dispersive power:
To determine the dispersive power of prism by using spectrometer.
6. Coupled Oscillator:
To determine the spring constant by single coupled oscillator.
7. LCR Circuit:
To determine quality factor and resonant frequency of LCR circuit.
8. LASER:
To study the characteristics of LASER sources.
9. Optical fibre:
To determine the bending losses of Optical fibres.
10. Optical fibre:
To determine the Numerical aperture of a given fibre.

Note: Any 8 experiments are to be performed

CS106ES/CS206ES: PROGRAMMING FOR PROBLEM SOLVING LAB**B.Tech. I Year I Sem.**

L	T	P	C
0	0	3	1.5

*[Note: The programs may be executed using any available Open Source/ Freely available IDE
Some of the Tools available are:*

CodeLite: <https://codelite.org/>

Code::Blocks: <http://www.codeblocks.org/>

DevCpp : <http://www.bloodshed.net/devcpp.html>

Eclipse: <http://www.eclipse.org>

This list is not exhaustive and is NOT in any order of preference]

Course Objectives: The students will learn the following:

- To work with an IDE to create, edit, compile, run and debug programs
- To analyze the various steps in program development.
- To develop programs to solve basic problems by understanding basic concepts in C like operators, control statements etc.
- To develop modular, reusable and readable C Programs using the concepts like functions, arrays etc.
- To Write programs using the Dynamic Memory Allocation concept.
- To create, read from and write to text and binary files

Course Outcomes: The candidate is expected to be able to:

- formulate the algorithms for simple problems
- translate given algorithms to a working and correct program
- correct syntax errors as reported by the compilers
- identify and correct logical errors encountered during execution
- represent and manipulate data with arrays, strings and structures
- use pointers of different types
- create, read and write to and from simple text and binary files
- modularize the code with functions so that they can be reused

Practice sessions:

- Write a simple program that prints the results of all the operators available in C (including pre/ post increment , bitwise and/or/not , etc.). Read required operand values from standard input.
- Write a simple program that converts one given data type to another using auto conversion and casting. Take the values form standard input.

Simple numeric problems:

- Write a program for fiend the max and min from the three numbers.
- Write the program for the simple, compound interest.

- c. Write program that declares Class awarded for a given percentage of marks, where mark $<40\%$ = Failed, 40% to $<60\%$ = Second class, 60% to $<70\%$ = First class, $\geq 70\%$ = Distinction. Read percentage from standard input.
- d. Write a program that prints a multiplication table for a given number and the number of rows in the table. For example, for a number 5 and rows = 3, the output should be:
 - e. $5 \times 1 = 5$
 - f. $5 \times 2 = 10$
 - g. $5 \times 3 = 15$
- h. Write a program that shows the binary equivalent of a given positive number between 0 to 255.

Expression Evaluation:

- a. A building has 10 floors with a floor height of 3 meters each. A ball is dropped from the top of the building. Find the time taken by the ball to reach each floor. (Use the formula $s = ut + (1/2)at^2$ where u and a are the initial velocity in m/sec ($= 0$) and acceleration in m/sec^2 ($= 9.8 \text{ m/s}^2$)).
- b. Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators $+$, $-$, $*$, $/$, $\%$ and use Switch Statement)
- c. Write a program that finds if a given number is a prime number
- d. Write a C program to find the sum of individual digits of a positive integer and test given number is palindrome.
- e. A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- f. Write a C program to generate all the prime numbers between 1 and n , where n is a value supplied by the user.
- g. Write a C program to find the roots of a Quadratic equation.
- h. Write a C program to calculate the following, where x is a fractional value.
 - i. $1 - x/2 + x^2/4 - x^3/6$
- j. Write a C program to read in two numbers, x and n , and then compute the sum of this geometric progression: $1 + x + x^2 + x^3 + \dots + x^n$. For example: if n is 3 and x is 5, then the program computes $1 + 5 + 25 + 125$.

Arrays and Pointers and Functions:

- a. Write a C program to find the minimum, maximum and average in an array of integers.
- b. Write a functions to compute mean, variance, Standard Deviation, sorting of n elements in single dimension array.
- c. Write a C program that uses functions to perform the following:
 - d. Addition of Two Matrices
 - e. ii. Multiplication of Two Matrices

- f. iii. Transpose of a matrix with memory dynamically allocated for the new matrix as row and column counts may not be same.
- g. Write C programs that use both recursive and non-recursive functions
- h. To find the factorial of a given integer.
- i. ii. To find the GCD (greatest common divisor) of two given integers.
- j. iii. To find x^n
- k. Write a program for reading elements using pointer into array and display the values using array.
- l. Write a program for display values reverse order from array using pointer.
- m. Write a program through pointer variable to sum of n elements from array.

Files:

- a. Write a C program to display the contents of a file to standard output device.
- b. Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
- c. Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command line arguments.
- d. Write a C program that does the following:
It should first create a binary file and store 10 integers, where the file name and 10 values are given in the command line. (hint: convert the strings using atoi function)
Now the program asks for an index and a value from the user and the value at that index should be changed to the new value in the file. (hint: use fseek function)
The program should then read all 10 values and print them back.
- e. Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).

Strings:

- a. Write a C program to convert a Roman numeral ranging from I to L to its decimal equivalent.
- b. Write a C program that converts a number ranging from 1 to 50 to Roman equivalent
- c. Write a C program that uses functions to perform the following operations:
- d. To insert a sub-string in to a given main string from a given position.
- e. ii. To delete n Characters from a given position in a given string.
- f. Write a C program to determine if the given string is a palindrome or not (Spelled same in both directions with or without a meaning like madam, civic, noon, abcba, etc.)
- g. Write a C program that displays the position of a character ch in the string S or – 1 if S doesn't contain ch.
- h. Write a C program to count the lines, words and characters in a given text.

Miscellaneous:

- a. Write a menu driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices

are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.

- b. Write a C program to construct a pyramid of numbers as follows:

```

1          *          1          1          *
1 2        * *        2 3        2 2        * *
1 2 3      * * *      4 5 6      3 3 3      * * *
                                   4 4 4 4      * *
                                           *
```

Sorting and Searching:

- Write a C program that uses non recursive function to search for a Key value in a given
- list of integers using linear search method.
- Write a C program that uses non recursive function to search for a Key value in a given
- sorted list of integers using binary search method.
- Write a C program that implements the Bubble sort method to sort a given list of
- integers in ascending order.
- Write a C program that sorts the given array of integers using selection sort in descending order
- Write a C program that sorts the given array of integers using insertion sort in ascending order
- Write a C program that sorts a given array of names

Suggested Reference Books for solving the problems:

- Byron Gottfried, Schaum's Outline of Programming with C, McGraw-Hill
- B.A. Forouzan and R.F. Gilberg C Programming and Data Structures, Cengage Learning, (3rd Edition)
- Brian W. Kernighan and Dennis M. Ritchie, The C Programming Language, Prentice Hall of India
- R.G. Dromey, How to solve it by Computer, Pearson (16th Impression)
- Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
- Herbert Schildt, C: The Complete Reference, Mc Graw Hill, 4th Edition

MC109ES: ENVIRONMENTAL SCIENCE*B.Tech. I Year I Sem.**

L	T	P	C
3	0	0	0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures.
- Understanding the environmental policies and regulations

Course Outcomes:

- Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT-I

Ecosystems: Definition, Scope, and Importance of ecosystem. Classification, structure, and function of an ecosystem, Food chains, food webs, and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics

of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Issues and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol, and Montréal Protocol. NAPCC-GoI Initiatives.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development Goals, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela. 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.
6. Introduction to Environmental Science by Y. Anjaneyulu, BS.Publications.

MA201BS: MATHEMATICS - II**B.Tech. I Year II Sem.**

L	T	P	C
3	1	0	4

Course Objectives: To learn

- Methods of solving the differential equations of first and higher order.
- Evaluation of multiple integrals and their applications
- The physical quantities involved in engineering field related to vector valued functions
- The basic properties of vector valued functions and their applications to line, surface and volume integrals

Course Outcomes: After learning the contents of this paper the student must be able to

- Identify whether the given differential equation of first order is exact or not
- Solve higher differential equation and apply the concept of differential equation to real world problems
- Evaluate the multiple integrals and apply the concept to find areas, volumes, centre of mass and Gravity for cubes, sphere and rectangular parallelopiped
- Evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I: First Order ODE

Exact, linear and Bernoulli's equations; Applications : Newton's law of cooling, Law of natural growth and decay; Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

UNIT-II: Ordinary Differential Equations of Higher Order

Second order linear differential equations with constant coefficients: Non-Homogeneous terms of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$ and $xV(x)$; method of variation of parameters; Equations reducible to linear ODE with constant coefficients: Legendre's equation, Cauchy-Euler equation.

UNIT-III: Multivariable Calculus (Integration)

Evaluation of Double Integrals (Cartesian and polar coordinates); change of order of integration (only Cartesian form); Evaluation of Triple Integrals: Change of variables (Cartesian to polar) for double and (Cartesian to Spherical and Cylindrical polar coordinates) for triple integrals.

Applications: Areas (by double integrals) and volumes (by double integrals and triple integrals), Centre of mass and Gravity (constant and variable densities) by double and triple integrals (applications involving cubes, sphere and rectangular parallelopiped).

UNIT-IV: Vector Differentiation

Vector point functions and scalar point functions. Gradient, Divergence and Curl. Directional derivatives, Tangent plane and normal line. Vector Identities. Scalar potential functions. Solenoidal and Irrotational vectors.

UNIT-V: Vector Integration

Line, Surface and Volume Integrals. Theorems of Green, Gauss and Stokes (without proofs) and their applications.

TEXT BOOKS:

1. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010
2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006
3. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

REFERENCES:

1. Paras Ram, Engineering Mathematics, 2nd Edition, CBS Publishes
2. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

CH102BS/CH202BS: CHEMISTRY**B.Tech. I Year II Sem.**

L	T	P	C
3	1	0	4

Course Objectives:

- To bring adaptability to the concepts of chemistry and to acquire the required skills to become a perfect engineer.
- To impart the basic knowledge of atomic, molecular and electronic modifications which makes the student to understand the technology based on them.
- To acquire the knowledge of electrochemistry, corrosion and water treatment which are essential for the Engineers and in industry.
- To acquire the skills pertaining to spectroscopy and to apply them for medical and other fields.
- To impart the knowledge of stereochemistry and synthetic aspects useful for understanding reaction pathways

Course Outcomes: The basic concepts included in this course will help the student to gain:

- The knowledge of atomic, molecular and electronic changes, band theory related to conductivity.
- The required principles and concepts of electrochemistry, corrosion and in understanding the problem of water and its treatments.
- The required skills to get clear concepts on basic spectroscopy and application to medical and other fields.
- The knowledge of configurational and conformational analysis of molecules and reaction mechanisms.

Unit - I:

Molecular structure and Theories of Bonding: Atomic and Molecular orbitals. Linear Combination of Atomic Orbitals (LCAO), molecular orbitals of diatomic molecules, molecular orbital energy level diagrams of N₂, O₂ and F₂ molecules. π molecular orbitals of butadiene and benzene.

Crystal Field Theory (CFT): Salient Features of CFT – Crystal Field Splitting of transition metal ion d- orbitals in Tetrahedral, Octahedral and square planar geometries. Band structure of solids and effect of doping on conductance.

Unit - II:

Water and its treatment: Introduction – hardness of water – Causes of hardness - Types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Potable water and its specifications. Steps involved in treatment of water – Disinfection of water by chlorination and ozonization. Boiler feed water and its treatment – Calgon conditioning, Phosphate conditioning and Colloidal conditioning. External treatment of water – Ion exchange process. Desalination of water – Reverse osmosis. Numerical problems.

Unit - III:

Electrochemistry and corrosion: Electro chemical cells – electrode potential, standard electrode potential, types of electrodes – calomel, Quinhydrone and glass electrode. Nernst equation Determination of pH of a solution by using quinhydrone and glass electrode. Electrochemical series and its applications. Numerical problems. Potentiometric titrations. Batteries – Primary (Lithium cell) and secondary batteries (Lead – acid storage battery and Lithium ion battery).

Causes and effects of corrosion – theories of chemical and electrochemical corrosion – mechanism of electrochemical corrosion, Types of corrosion: Galvanic, water-line and pitting corrosion. Factors affecting rate of corrosion, Corrosion control methods- Cathodic protection – Sacrificial anode and impressed current cathodic methods. Surface coatings – metallic coatings – methods of application. Electroless plating of Nickel.

Unit - IV:

Stereochemistry, Reaction Mechanism and synthesis of drug molecules: Introduction to representation of 3-dimensional structures, Structural and stereoisomers, configurations, symmetry and chirality. Enantiomers, diastereomers, optical activity and Absolute configuration. Conformation analysis of n- butane.

Substitution reactions: Nucleophilic substitution reactions: Mechanism of S_N1 , S_N2 reactions. Electrophilic and nucleophilic addition reactions: Addition of HBr to propene. Markownikoff and anti Markownikoff's additions. Grignard additions on carbonyl compounds. Elimination reactions: Dehydro halogenation of alkylhalides. Saytzeff rule. Oxidation reactions: Oxidation of alcohols using $KMnO_4$ and chromic acid.

Reduction reactions: reduction of carbonyl compounds using $LiAlH_4$ & $NaBH_4$. Hydroboration of olefins. Structure, synthesis and pharmaceutical applications of Paracetamol and Aspirin.

Unit - V:

Spectroscopic techniques and applications: Principles of spectroscopy, selection rules and applications of electronic spectroscopy. vibrational and rotational spectroscopy. Basic concepts of Nuclear magnetic resonance Spectroscopy, chemical shift. Introduction to Magnetic resonance imaging.

Suggested Text Books:

1. Physical Chemistry, by P.W. Atkins
2. Engineering Chemistry by P.C.Jain & M.Jain; Dhanpat Rai Publishing Company (P) Ltd., New Delhi.
3. Fundamentals of Molecular Spectroscopy, by C.N. Banwell
4. Organic Chemistry: Structure and Function by K.P.C. Volhardt and N.E.Schore, 5th Edition.
5. University Chemistry, by B.M. Mahan, Pearson IV Edition.
6. Engineering Chemistry (NPTEL Web-book), by B.L. Tembe, Kamaluddin and M.S. Krishnan

ME203ES: ENGINEERING MECHANICS**B.Tech. I Year II Sem.**

L	T	P	C
3	1	0	4

Course Objectives: The objectives of this course are to

- Explain the resolution of a system of forces, compute their resultant and solve problems using equations of equilibrium
- Perform analysis of bodies lying on rough surfaces.
- Locate the centroid of a body and compute the area moment of inertia and mass moment of inertia of standard and composite sections
- Explain kinetics and kinematics of particles, projectiles, curvilinear motion, centroidal motion and plane motion of rigid bodies.
- Explain the concepts of work-energy method and its applications to translation, rotation and plane motion and the concept of vibrations

Course Outcomes: At the end of the course, students will be able to

- Determine resultant of forces acting on a body and analyse equilibrium of a body subjected to a system of forces.
- Solve problem of bodies subjected to friction.
- Find the location of centroid and calculate moment of inertia of a given section.
- Understand the kinetics and kinematics of a body undergoing rectilinear, curvilinear, rotatory motion and rigid body motion.
- Solve problems using work energy equations for translation, fixed axis rotation and plane motion and solve problems of vibration.

UNIT-I:

Introduction to Engineering Mechanics - Force Systems :Basic concepts, Particle equilibrium in 2-D & 3-D; Rigid Body equilibrium; System of Forces, Coplanar Concurrent Forces, Components in Space – Resultant- Moment of Forces and its Application; Couples and Resultant of Force System, Equilibrium of System of Forces, Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems; Static Indeterminacy

UNIT-II:

Friction: Types of friction, Limiting friction, Laws of Friction, Static and Dynamic Friction; Motion of Bodies, wedge friction, screw jack & differential screw jack;
Centroid and Centre of Gravity -Centroid of Lines, Areas and Volumes from first principle, centroid of composite sections; Centre of Gravity and its implications. – Theorem of Pappus

UNIT-III:

Area moment of inertia- Definition, Moment of inertia of plane sections from first principles, Theorems of moment of inertia, Moment of inertia of standard sections and composite sections; Product of Inertia, Parallel Axis Theorem, Perpendicular Axis Theorem

Mass Moment of Inertia : Moment of Inertia of Masses - Transfer Formula for Mass Moments of Inertia – Mass moment of inertia of composite bodies.

UNIT-IV:

Review of particle dynamics- Rectilinear motion; Plane curvilinear motion (rectangular, path, and polar coordinates). 3-D curvilinear motion; Relative and constrained motion; Newton's 2nd law (rectangular, path, and polar coordinates). Work-kinetic energy, power, potential energy. Impulse-momentum (linear, angular); Impact (Direct and oblique).

UNIT-V:

Kinetics of Rigid Bodies -Basic terms, general principles in dynamics; Types of motion, Instantaneous centre of rotation in plane motion and simple problems; D'Alembert's principle and its applications in plane motion and connected bodies; Work Energy principle and its application in plane motion of connected bodies; Kinetics of rigid body rotation

TEXT BOOKS:

1. Shames and Rao (2006) , Engineering Mechanics, Pearson Education
2. Reddy Vijay Kumar K. and J. Suresh Kumar (2010), Singer's Engineering Mechanics – Statics & Dynamics

REFERENCE BOOKS:

1. Timoshenko S.P and Young D.H., "Engineering Mechanics", McGraw Hill International Edition, 1983.
2. Andrew Pytel, Jaan Kiusalaas, "Engineering Mechanics", Cengage Learning, 2014.
3. Beer F.P & Johnston E.R Jr. Vector, "Mechanics for Engineers", TMH, 2004.
4. Hibbeler R.C & Ashok Gupta, "Engineering Mechanics", Pearson Education, 2010.
5. Tayal A.K., "Engineering Mechanics – Statics & Dynamics", Umesh Publications, 2011.
6. Basudeb Bhattacharyya, "Engineering Mechanics", Oxford University Press, 2008.
7. Meriam. J. L., "Engineering Mechanics", Volume-II Dynamics, John Wiley & Sons, 2008.

ME105ES/ME205ES: ENGINEERING WORKSHOP**B.Tech. I Year II Sem.**

L	T	P	C
1	0	3	2.5

Pre-requisites: Practical skill**Course Objectives:**

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes: At the end of the course, the student will be able to:

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:**At least two exercises from each trade:**

- I. Carpentry – (T-Lap Joint, Dovetail Joint, Mortise & Tenon Joint)
- II. Fitting – (V-Fit, Dovetail Fit & Semi-circular fit)
- III. Tin-Smithy – (Square Tin, Rectangular Tray & Conical Funnel)
- IV. Foundry – (Preparation of Green Sand Mould using Single Piece and Split Pattern)
- V. Welding Practice – (Arc Welding & Gas Welding)
- VI. House-wiring – (Parallel & Series, Two-way Switch and Tube Light)
- VII. Black Smithy – (Round to Square, Fan Hook and S-Hook)

2. TRADES FOR DEMONSTRATION & EXPOSURE:

Plumbing, Machine Shop, Metal Cutting (Water Plasma), Power tools in construction and Wood Working

TEXT BOOKS:

1. Workshop Practice /B. L. Juneja / Cengage
2. Workshop Manual / K. Venugopal / Anuradha.

REFERENCE BOOKS:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ SciTech
2. Workshop Manual / Venkat Reddy/ BSP

EN105HS/EN205HS: ENGLISH**B.Tech. I Year II Sem.**

L	T	P	C
2	0	0	2

INTRODUCTION

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic, communicative and critical thinking competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts leading to reading comprehension and different passages may be given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind, for example, newspaper articles, advertisements, promotional material etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills in various contexts and cultures.*

Learning Objectives: The course will help to

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively and critically using the theoretical and practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students should be able to

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in various contexts and different cultures.
- Acquire basic proficiency in English including reading and listening comprehension, writing and speaking skills.

SYLLABUS**UNIT –I**

‘The Raman Effect’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary Building: The Concept of Word Formation --The Use of Prefixes and Suffixes.

Grammar: Identifying Common Errors in Writing with Reference to Articles and Prepositions.

Reading: Reading and Its Importance- Techniques for Effective Reading.

Basic Writing Skills: Sentence Structures -Use of Phrases and Clauses in Sentences- Importance of Proper Punctuation- Techniques for writing precisely – **Paragraph writing** – Types, Structures and Features of a Paragraph - Creating Coherence-Organizing Principles of Paragraphs in Documents.

UNIT –II

‘Ancient Architecture in India’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Synonyms and Antonyms.

Grammar: Identifying Common Errors in Writing with Reference to Noun-pronoun Agreement and Subject-verb Agreement.

Reading: Improving Comprehension Skills – Techniques for Good Comprehension

Writing: Format of a Formal Letter-**Writing Formal Letters** E.g., Letter of Complaint, Letter of Requisition, Job Application with Resume.

UNIT –III

‘Blue Jeans’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Acquaintance with Prefixes and Suffixes from Foreign Languages in English to form Derivatives-Words from Foreign Languages and their Use in English.

Grammar: Identifying Common Errors in Writing with Reference to Misplaced Modifiers and Tenses.

Reading: Sub-skills of Reading- Skimming and Scanning

Writing: Nature and Style of Sensible Writing- **Defining- Describing** Objects, Places and Events – **Classifying-** Providing Examples or Evidence

UNIT –IV

‘What Should You Be Eating’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Standard Abbreviations in English

Grammar: Redundancies and Clichés in Oral and Written Communication.

Reading: Comprehension- Intensive Reading and Extensive Reading

Writing: Writing Practices--Writing Introduction and Conclusion - Essay Writing-Précis Writing.

UNIT –V

‘How a Chinese Billionaire Built Her Fortune’ from the prescribed textbook ‘English for Engineers’ published by Cambridge University Press.

Vocabulary: Technical Vocabulary and their usage

Grammar: Common Errors in English

Reading: Reading Comprehension-Exercises for Practice

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports

Formats- Structure of Reports (Manuscript Format) -Types of Reports - Writing aReport.

Prescribed Textbook:

1. **Sudarshana, N.P. and Savitha, C. (2018). English for Engineers. Cambridge University Press.**

References:

1. Swan, M. (2016). Practical English Usage. Oxford University Press.
2. Kumar, S and Lata, P.(2018). Communication Skills. Oxford University Press.
3. Wood, F.T. (2007).Remedial English Grammar. Macmillan.
4. Zinsser, William. (2001). On Writing Well. Harper Resource Book.
5. Hamp-Lyons, L. (2006).Study Writing. Cambridge University Press.
6. Exercises in Spoken English. Parts I –III. CIEFL, Hyderabad. Oxford University Press.

CH106BS/CH206BS: ENGINEERING CHEMISTRY LAB**B.Tech. I Year II Sem.**

L	T	P	C
0	0	3	1.5

Course Objectives: The course consists of experiments related to the principles of chemistry required for engineering student. The student will learn:

- Estimation of hardness and chloride content in water to check its suitability for drinking purpose.
- To determine the rate constant of reactions from concentrations as a function of time.
- The measurement of physical properties like adsorption and viscosity.
- To synthesize the drug molecules and check the purity of organic molecules by thin layer chromatographic (TLC) technique.

Course Outcomes: The experiments will make the student gain skills on:

- Determination of parameters like hardness and chloride content in water.
- Estimation of rate constant of a reaction from concentration – time relationships.
- Determination of physical properties like adsorption and viscosity.
- Calculation of R_f values of some organic molecules by TLC technique.

List of Experiments:

1. Determination of total hardness of water by complexometric method using EDTA
2. Determination of chloride content of water by Argentometry
3. Estimation of an HCl by Conductometric titrations
4. Estimation of Acetic acid by Conductometric titrations
5. Estimation of HCl by Potentiometric titrations
6. Estimation of Fe^{2+} by Potentiometry using $KMnO_4$
7. Determination of rate constant of acid catalysed hydrolysis of methyl acetate
8. Synthesis of Aspirin and Paracetamol
9. Thin layer chromatography calculation of R_f values. eg ortho and para nitro phenols
10. Determination of acid value of coconut oil
11. Verification of freundlich adsorption isotherm-adsorption of acetic acid on charcoal
12. Determination of viscosity of castor oil and ground nut oil by using Ostwald's viscometer.
13. Determination of partition coefficient of acetic acid between n-butanol and water.
14. Determination of surface tension of a given liquid using stalagmometer.

References

1. Senior practical physical chemistry, B.D. Khosla, A. Gulati and V. Garg (R. Chand & Co., Delhi)
2. An introduction to practical chemistry, K.K. Sharma and D. S. Sharma (Vikas publishing, N. Delhi)
3. Vogel's text book of practical organic chemistry 5th edition
4. Text book on Experiments and calculations in Engineering chemistry – S.S. Dara

EN107HS/EN207HS: ENGLISH LANGUAGE AND COMMUNICATION SKILLS LAB

B.Tech. I Year II Sem.

L	T	P	C
0	0	2	1

The **Language Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- ✎ To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- ✎ To sensitize students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✎ To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- ✎ To improve the fluency of students in spoken English and neutralize their mother tongue influence
- ✎ To train students to use language appropriately for public speaking and interviews

Learning Outcomes: Students will be able to attain

- 👉 Better understanding of nuances of English language through audio- visual experience and group activities
- 👉 Neutralization of accent for intelligibility
- 👉 Speaking skills with clarity and confidence which in turn enhances their employability skills

Syllabus

English Language and Communication Skills Lab (ELCS) shall have two parts:

- a. Computer Assisted Language Learning (CALL) Lab
- b. Interactive Communication Skills (ICS) Lab

Listening Skills

Objectives

1. To enable students develop their listening skills so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation
2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills

Objectives

1. To involve students in speaking activities in various contexts
2. To enable students express themselves fluently and appropriately in social and professional contexts
 - Oral practice: Just A Minute (JAM) Sessions
 - Describing objects/situations/people
 - Role play – Individual/Group activities

- **The following course content is prescribed for the English Language and Communication Skills Lab based on Unit-6 of AICTE Model Curriculum 2018 for B.Tech First English. As the syllabus is very limited, it is required to prepare teaching/learning materials by the teachers collectively in the form of handouts based on the needs of the students in their respective colleges for effective teaching/learning and timesaving in the Lab)**

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers of Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants.

ICS Lab:

Understand: Communication at Work Place- Spoken vs. Written language.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress and Rhythm– Weak Forms and Strong Forms in Context.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms in Context.

ICS Lab:

Understand: Features of Good Conversation – Non-verbal Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Intonation-Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences in British and American Pronunciation.

ICS Lab:

Understand: How to make Formal Presentations.

Practice: Formal Presentations.

Exercise – IV**CALL Lab:**

Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks.

Practice: Making a Short Speech – Extempore.

Exercise – V**CALL Lab:**

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

ICS Lab:

Understand: Interview Skills.

Practice: Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:**1. Computer Assisted Language Learning (CALL) Lab:**

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

- i) Computers with Suitable Configuration
- ii) High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public-Address System, a LCD and a projector etc.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.TECH. CIVIL ENGINEERING****COURSE STRUCTURE & SYLLABUS (2016-17)****II YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics - IV	4	1	0	4
2	CE302ES	Strength of Materials - I	4	1	0	4
3	CE303ES	Fluid Mechanics - I	4	1	0	4
4	CE304ES	Building Material, Construction and Planning	3	0	0	3
5	CE305ES	Surveying	3	0	0	3
6	CE306ES	Strength of Material Lab	0	0	3	2
7	CE307ES	Computer Aided Design – I Lab	0	0	3	2
8	CE308ES	Surveying lab - I	0	0	3	2
9	*MC300HS	Gender Sensitization Lab	0	0	3	0
		Total Credits	18	3	12	24

II YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CE401ES	Strength of Material - II	4	1	0	4
2	CE402ES	Fluid Mechanics - II	4	1	0	4
3	CE403ES	Structural Analysis	4	1	0	4
4	CV404ES	Engineering Geology	3	0	0	3
5	SM405MS	Business Economic and Financial Analysis	3	0	0	3
6	CE406ES	Fluid Mechanics Lab	0	0	3	2
7	CE408ES	Surveying - II Lab	0	0	3	2
8	CV407ES	Engineering Geology Lab	0	0	3	2
9	*MC400ES	Environmental Science and Technology	3	0	0	0
		Total Credits	21	3	9	24

***Satisfactory/ Unsatisfactory**

MA301BS: MATHEMATICS - IV
(Complex Variables and Fourier Analysis)

B.Tech. II Year I Sem.

L	T/P/D	C
4	1/0/0	4

Prerequisites: Foundation course (No Prerequisites).

Course Objectives: To learn

- differentiation and integration of complex valued functions
- evaluation of integrals using Cauchy's integral formula
- Laurent's series expansion of complex functions
- evaluation of integrals using Residue theorem
- express a periodic function by Fourier series and a non-periodic function by Fourier transform
- to analyze the displacements of one dimensional wave and distribution of one dimensional heat equation

Course Outcomes: After learning the contents of this paper the student must be able to

- analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
- find the Taylor's and Laurent's series expansion of complex functions
- the bilinear transformation
- express any periodic function in term of sines and cosines
- express a non-periodic function as integral representation
- analyze one dimensional wave and heat equation

UNIT-I

Functions of a complex variable: Introduction, Continuity, Differentiability, Analyticity, properties, Cauchy, Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions-Milne-Thompson method

UNIT-II

Complex integration: Line integral, Cauchy's integral theorem, Cauchy's integral formula, and Generalized Cauchy's integral formula, Power series: Taylor's series- Laurent series, Singular points, isolated singular points, pole of order m – essential singularity, Residue, Cauchy Residue theorem (Without proof).

UNIT-III

Evaluation of Integrals: Types of real integrals:

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_c^{c+2\pi} f(\cos \theta, \sin \theta)d\theta$

Bilinear transformation- fixed point- cross ratio- properties- invariance of circles.

UNIT-IV

Fourier series and Transforms: Introduction, Periodic functions, Fourier series of periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half range sine and cosine series.

Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine, transforms, properties, inverse transforms, Finite Fourier transforms.

UNIT-V

Applications of PDE: Classification of second order partial differential equations, method of separation of variables, Solution of one dimensional wave and heat equations.

TEXT BOOKS:

1. A first course in complex analysis with applications by Dennis G. Zill and Patrick Shanahan, Johns and Bartlett Publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

REFERENCES:

1. Fundamentals of Complex Analysis by Saff, E. B. and A. D. Snider, Pearson.
2. Advanced Engineering Mathematics by Louis C. Barrett, McGraw Hill.

CE302ES: STRENGTH OF MATERIALS - I

B.Tech. II Year I Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Engineering Mechanics

Course Objectives: The subject provide the knowledge of simple stress strains flexural stresses in members, shear stresses and deflection in beams so that the concepts can be applied to the Engineering problems.

Course Outcomes: At the end of the course, the student will be able to:

- Analyze the statically determinate and indeterminate problems.
- Determine the stresses and strains in the members subjected to axial, bending.
- Evaluate the slope and deflection of beams subjected to loads.
- Determine the principal stresses and strains in structural members.

UNIT – I

Simple Stresses and Strains: Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Elastic constants.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

Shear Force and Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT – IV

Deflection of Beams:

Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load-Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

Conjugate Beam Method: Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

UNIT – V

Principal Stresses and Strains : Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Maximum shear stress theory- Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

TEXT BOOKS:

1. Strength of Materials by R. K. Bansal, Lakshmi Publications House Pvt. Ltd.
2. Strength of Materials by R. Subramanian, Oxford University Press.
3. Strength of Materials by W.A Nash, MC Graw Hills 2014 6th edition.
4. Mechanics of Materials by James M Gere and Barry J Goodno Cengage Learning India Pvt. Ltd Eight edition.

REFERENCES:

1. Strength of Materials by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd.
2. Mechanics of Structures Vol –I by H. J. Shah and S. B. Junnarkar, Charotar Publishing House Pvt. Ltd.
3. Strength of Materials by S. S. Rattan, McGraw Hill Education Pvt. Ltd.
4. Fundamentals of Solid Mechanics by M. L. Gambhir, PHI Learning Pvt. Ltd.
5. Strength of Materials and Structures by John Case *et al.*, Butterworth-Heinemann.
6. Strength of Materials by Dr.Sadhu Singh Khanna Publishers 11th edition 2015.

CE303ES: FLUID MECHANICS - I

B.Tech. II Year I Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Engineering Mechanics

Course Objectives: Students who take this class can expect to

- Develop an appreciation for the properties of Newtonian fluids.
- Study analytical solutions to variety of simplified problems.
- Understand the dynamics of fluid flows and the governing non-dimensional parameters.
- Apply concepts of mass, momentum and energy conservation to flows.
- Grasp the basic ideas of turbulence.

Course Outcomes: At the end of the course, the student will be able to:

- Apply conservation laws to derive governing equations of fluid flows.
- Compute hydrostatic and hydrodynamic forces.
- Analyze and design simple pipe systems.
- Apply principles of dimensional analysis to design experiments.
- Compute drag and lift coefficients.

UNIT - I

Introduction: Dimensions and units – Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers. Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT – II

Buoyancy and floatation: stability of bodies, meta centre, liquids in relative equilibrium.

Fluid Kinematics: Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, circulation and vorticity, flownet analysis.

UNIT – III

Fluid Dynamics and Measurement of Flow: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier – stokes equations (Explanatory) Momentum equation and its application – forces on pipe bend. Pitot tube,

Venturi meter, and orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches - –Broad crested weirs.

UNIT - IV

Closed Conduit Flow: Reynold's experiment – Characteristics of Laminar & Turbulent flows. Laws of Fluid friction – Darcy's equation, variation of friction factor with Reynold's number – Moody's Chart, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line. Pipe network problems Flow between parallel plates, Flow through long tubes, flow through inclined tubes, water hammer.

UNIT – V

Boundary Layer Theory: Approximate Solutions of Navier Stokes Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers (no derivations) BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

TEXT BOOKS:

1. Fluid Mechanics by F.M. White McGraw Hill Education (India) Pvt. Ltd, New Delhi, 2011
2. Fluid Mechanics by V.L. Streeter., E.B.Wylie and K.W. Bedford, McGraw Hill Education (India) Pvt. Ltd, New Delhi 2016.
3. Fluid Mechanics by P.N. Modi and S.M.Seth, Standard Book House, Delhi, 2011.

REFERENCES:

1. Mechanics of Fluids by Potter, M.C D.C Wiggers, B.H Ramdan Cengage, 2012.
2. Fluid Mechanics by J F Douglas, J M Gasiorek, J A Swaffield and L B Jack, Pearson 2015.
3. Fluid Mechanics and Fluid Machines by S. K. Som, Gautam Biswas and S. Chakraborty, McGraw Hill Education (India) Pvt. Ltd, New Delhi 2015.
4. Engineering Fluid Mechanics by K L Kumar, S Chand, Eurasia Publishing House, New Delhi, 2014.
5. Fluid Mechanics by Dr. A. K. Jain Khanna Publishers, twelfth edition 2014.

CE304ES: BUILDING MATERIALS, CONSTRUCTION AND PLANNING

B.Tech. II Year I Sem.

L	T/P/D	C
3	0/0/0	3

Course Objectives: To give the students a basic idea about the construction materials, building components and to introduce various.

Course Outcomes: At the end of the course, the student will be able to identify various building materials required for construction & planning.

UNIT - I

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing.

Bricks – Composition of Brick earth – manufacture and structural requirements, Fly ash, Ceramics.

Timber, Aluminum, Glass, Paints and Plastics: Wood - structure – types and properties – seasoning – defects; alternate materials for Timber – GI / fibre – reinforced glass bricks, steel & aluminum, Plastics.

UNIT - II

Cement & Admixtures: Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests.

Admixtures – mineral & chemical admixtures – uses.

UNIT - III

Building Components : Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ; foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

Building Services: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – Fire Hazards – Classification of fire resistant materials and constructions

UNIT - IV

Mortars, Masonry and Finishing's

Mortars: Lime and Cement Mortars

Brick masonry – types – bonds; Stone masonry – types; Composite masonry – Brick-stone composite; Concrete, Reinforced brick.

Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.

Form work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

UNIT – V

Building Planning: Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.
2. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.

REFERENCES:

1. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.
2. Building Materials by Duggal, New Age International.
3. Building Materials by P. C. Varghese, PHI.
4. Building Construction by PC Varghese PHI.
5. Construction Technology – Vol – I & II by R. Chubby, Longman UK.
6. Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; New Age Publications.

CE305ES: SURVEYING

B.Tech. II Year I Sem.

L	T/P/D	C
3	0/0/0	3

Course Objectives: The first step in engineering practice is surveying and the soundness of any civil engineering work is dependent on the reliability and accuracy of surveying. Therefore, it is imperative that a student of engineering should have good knowledge of surveying. To impart the knowledge of surveying and latest technologies in surveying it is necessary to introduce this subject in the curriculum.

Course Outcomes: At the end of the course, the student will be able to:

- Calculate angles, distances and levels
- Identify data collection methods and prepare field notes
- Understand the working principles of survey instruments
- Estimate measurement errors and apply corrections
- Interpret survey data and compute areas and volumes

UNIT - I

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, Scales, Shrinkage of Map, Conventional symbols and Code of Signals, Surveying accessories, phases of surveying.

Measurement of Distances and Directions

Linear distances- Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections, indirect methods- optical methods- E.D.M. method.

Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip.

UNIT - II

Levelling and Contouring

Leveling- Basics definitions, types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels- HI Method-Rise and Fall method, Effect of Curvature of Earth and Refraction.

Contouring- Characteristics and uses of Contours, Direct & Indirect methods of contour surveying, interpolation and sketching of Contours.

Computation of Areas and Volumes

Areas - Determination of areas consisting of irregular boundary and regular boundary (coordinates, MDM, DMD methods), Planimeter.

Volumes - Computation of areas for level section and two level sections with and without transverse slopes, determination of volume of earth work in cutting and embankments, volume of borrow pits, capacity of reservoirs.

UNIT - III

Theodolite Surveying: Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical levelling when base is accessible and inaccessible.

Traversing: Methods of traversing, traverse computations and adjustments, Gale's traverse table, Omitted measurements.

UNIT - IV

Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods of Tacheometry.

Curves: Types of curves and their necessity, elements of simple curve, setting out of simple Curves, Introduction to compound curves.

UNIT - V

Modern Surveying Methods: Total Station and Global Positioning System. : Basic principles, classifications, applications, comparison with conventional surveying. Electromagnetic wave theory - electromagnetic distance measuring system - principle of working and EDM instruments, Components of GPS – space segment, control segment and user segment, reference systems, satellite orbits, GPS observations. Applications of GPS.

TEXT BOOKS:

1. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi.
2. Chandra A M, "Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
3. Hoffman. B, H. Lichtenegga and J. Collins, Global Positioning System - Theory and Practice, Springer -Verlag Publishers, 2001.

REFERENCES:

1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill – 2000.
2. Arora K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004.
3. Surveying (Vol – 1, 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.
4. Chandra A M, "Plane Surveying", New Age International Pvt. Ltd., New Delhi, 2002.
5. Surveying by Bhavikatti; Vikas publishing house ltd.
6. Duggal S K, "Surveying (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.
7. Surveying and leveling by R. Agor Khanna Publishers 2015.

CE306ES: STRENGTH OF MATERIALS LAB

B.Tech. II Year I Sem.

L	T/P/D	C
0	0/3/0	2

Course Objectives: The objective of the course is to make the student understand the behavior of materials under different types of loading for different types structures

Course Outcomes: At the end of the course, the student will be able to:

- Conduct tension test on Materials like steel etc.
- Conduct compression tests on spring, wood and concrete
- Conduct flexural and torsion test to determine elastic constants
- Determine hardness of metals

List of Experiments:

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

List of Major Equipment:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauges.

CE307ES: COMPUTER AIDED DRAFTING LAB

B.Tech. II Year I Sem.

L	T/P/D	C
0	0/3/0	2

Course Objectives: The objective of this lab is to teach the student basic drawing fundamentals in various civil engineering applications, specially in building drawing.

Course Outcomes: At the end of the course, the student will be able to:

Master the usage of Autocad commands for drawing 2D & 3D building drawings required for different civil engg applications.

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different softwares
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
 - a) Single storied buildings
 - b) multi storied buildings
5. Developing sections and elevations for
 - a) Single storied buildings
 - b) multi storied buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD softwares
7. Exercises on development of working drawings of buildings

TEXT BOOKS:

1. Computer Aided Design Laboratory by M. N. Sessa Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

CE308ES: SURVEYING LAB – I

B.Tech. II Year I Sem.

L	T/P/D	C
0	0/3/0	2

Pre Requisites: Surveying Theory

Course Objectives: To impart the practical knowledge in the field, it is essential to introduce in curriculum. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

Course Outcomes: At the end of the course, the student will be able to:
Practically able to draw plans & maps to determine the areas before taking up any civil engineering works.

1. Surveying of an area by chain survey (closed traverse) & plotting.
2. Chaining across obstacles
3. Determine of distance between two inaccessible points with compass
4. Survey of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane table survey.
6. Two point and three point problems in plane table survey.
7. Levelling – Longitudinal and cross-section and plotting
8. Trigonometric leveling using theodolite
9. Height and distances using principles of tacheometric surveying
10. a) Measurement of Horizontal angle & vertical angle.
b) Distance between inaccessible point by theodolite

MC300HS: GENDER SENSITIZATION LAB

B.Tech. II Year I Sem.

L	T/P/D	C
0	0/3/0	2

Course Objectives:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Course Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT-I

UNDERSTANDING GENDER

Gender: Why Should We Study It? (*Towards a World of Equals*: Unit -1)

Socialization: Making Women, Making Men (*Towards a World of Equals*: Unit -2)

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT-II

GENDER AND BIOLOGY

Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4)
Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (*Towards a World of Equals*: Unit -10)

Two or Many? Struggles with Discrimination.

UNIT-III

GENDER AND LABOUR

Housework: the Invisible Labour (*Towards a World of Equals*: Unit -3)

“My Mother doesn’t Work.” “Share the Load.”

Women’s Work: Its Politics and Economics (*Towards a World of Equals*: Unit -7)

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT-IV

ISSUES OF VIOLENCE

Sexual Harassment: Say No! (*Towards a World of Equals*: Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “Chupulu”.

Domestic Violence: Speaking Out (*Towards a World of Equals*: Unit -8)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)

Blaming the Victim-“I Fought for my Life....” - Additional Reading: The Caste Face of Violence.

UNIT-V

GENDER: CO - EXISTENCE

Just Relationships: Being Together as Equals (*Towards a World of Equals*: Unit -12)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

TEXTBOOK

All the five Units in the Textbook, “*Towards a World of Equals: A Bilingual Textbook on Gender*” written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi, Hyderabad**, Telangana State in the year **2015**.

Note: Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

REFERENCE BOOKS:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. “*I Fought For My Life...and Won.*” Available online at:
<http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/>

CE401ES: STRENGTH OF MATERIALS – II

B.Tech. II Year II Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Strength of Materials - I

Course Objectives: Study of the subject provides the understanding of principal stress, strains, springs, columns, and structures.

Course Outcomes: At the end of the course, the student will be able to

- Determine stresses in the member subjected to Torsion
- Analyze columns and struts
- Understand the concept of direct and bending stresses
- Analyze and design springs, thin and thick cylinders
- Understand the concept of unsymmetrical bending.

UNIT – I

Torsion of Circular Shafts: Theory of pure torsion – Derivation of Torsion equations : $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – II

Columns and Struts: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

Beam Columns: Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT - III

Direct and Bending Stresses: Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis.

Beams Curved In Plan: Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semi-circular beam simply-supported on three equally spaced supports.

UNIT – IV

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells.

Thick Cylinders: Introduction - Lamé's theory for thick cylinders – Derivation of Lamé's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

UNIT – V

Unsymmetrical Bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis - Deflection of beams under unsymmetrical bending.

Shear Centre: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

TEXT BOOKS:

1. Mechanics of Materials Ferdinand P. Beer et al., Tata McGraw Hill Education Pvt. Ltd 5th edition 2009.
2. Strength of Materials R. Subramanian, Oxford University Press 2010
3. Strength of Materials by B.S. Basavarajaiah, B.S. Mahadevappa, Universities Press 3rd Edition 2015.

REFERENCES:

1. Fundamentals of Solid Mechanics by M. L. Gambhir, PHI Learning Pvt. Ltd
2. Introduction to Strength of Materials by U. C. Jindal, Galgotia Publications Pvt. Ltd.
3. Mechanics of Materials by R. C. Hibbeler, Pearson Education
4. Strength of Materials by S. S. Rattan, Tata McGraw Hill Education Pvt. Ltd.
5. Strength of Materials by R.K Rajput, S. Chand & Company Ltd.
6. Strength of Materials by S.S Bhavikatti, Vikas Publishing House Pvt. Ltd.

CE402ES: FLUID MECHANICS - II

B.Tech. II Year II Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Fluid Mechanics

Course Objectives: To understand basic concept of fluid flow and its application to chemical process industries including pipe flow, fluid machinery and agitation & mixing.

Course Outcomes: At the end of the course, the student will be able to:

- Understand the concepts of channel flows.
- Compute flow profiles in channel transitions and analyze hydraulic transients
- Design the working proportions of hydraulic machines

UNIT – I

Open Channel Flow: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow Stickler's formula for Mannings 'n' – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows. Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- for surface profiles -Rapidly varied flow, hydraulic jump, energy dissipation. Surges – Types

UNIT - II

Hydraulic Similitude: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations. Distorted and non-distorted models. Scale Effect.

UNIT – III

Basics of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines.

UNIT - IV

Hydraulic Turbines: Layout of a typical Hydropower installation – Heads and efficiencies-classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation and preventive measures

UNIT – V

Centrifugal Pump: installation details-classification-types work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitation.

Reciprocating pumps: Basics, types, air vessels, slip

Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS:

1. Open Channel flow by K. Subramanya, Tata McGraw Hill Education (India) Pvt Ltd.
2. Fluid Mechanics & Machinery by CSP Ojha, P.N. Chandramouli and R. Berndtsson Oxford University Press.
3. Hydraulic Machines by K. Subramanya McGraw Hill Education(India) Pvt Ltd, 2013

REFERENCES:

1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard Book House, New Delhi.
2. Elements of Open channel flow by Ranga Raju, McGraw Hill Education(India) Pvt Ltd, 2013
3. Flow Through Open Channels by Rajesh Srivastava, Oxford University Press, 2011
4. Open Channel flow Hydraulics by R.H. French, McGraw Book Company, New York, 1986.
5. Fluid Mechanics by Dr. A. K. Jain Khanna Publishers 2016

CE403ES: STRUCTURAL ANALYSIS

B.Tech. II Year II Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Strength of Materials –I

Course Objectives: To make the students to understand the principles of analysis of structures subjected to static and moving loads by various methods.

Course Outcomes: At the end of the course, the student will be able to:

- Analyze Perfect , Imperfect And Redundant Frames
- Formulate Equilibrium and compatibility equations for structural members
- Analyze one dimensional and two dimensional problems using classical methods
- Analyze indeterminate structures
- Analyze structures for gravity loads, moving loads and lateral loads

UNIT - I

Introduction to Structures and Indeterminacy: Equilibrium and compatibility equations - types of supports and reactions, types of joints and equilibrium equations, Static and kinematic indeterminacies of beams and frames. Effect of force releases like moment hinge, shear releases, link on static indeterminacy, Relative Merits of indeterminate structures over determinate structures.

Propped Cantilever and Fixed Beams: Types of props : Elastic and Rigid props, Determination of - Analysis of Propped cantilever and fixed beams, including the beams with different moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams-Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – II

Frames: Classification- plane and space frames, pin jointed and rigid jointed frames.

Analysis of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed frames, assumptions, transfer of load to joints from wind and other forces - Analysis of determinate pin jointed frames using method of joints and method of sections for vertical loads, horizontal loads and inclined loads.

UNIT – III

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem-Unit Load Method. Deflections of simple beams and pin- jointed plane trusses.

Three Hinged Arches – Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Three hinged arches. Normal Thrust and radial shear in an arch. Geometrical properties of parabolic and circular arch. Three hinged circular arch at different levels. Absolute maximum bending moment diagram for a three hinged arch.

UNIT – IV

Slope Deflection Method: Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve.

Moment Distribution Method: application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve.

UNIT – V

Moving Loads and Influence Lines: Introduction-applications to bridges (only description), Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section - Point loads, UDL longer than the span, UDL shorter than the span- maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load UDL longer than the span, UDL shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length. Influence lines for forces in members of deck and through type trusses like Pratt and Warren trusses. Equivalent uniformly distributed load. Focal length. Muller Breslau's principle for determinate and indeterminate beams (qualitative)

TEXT BOOKS:

1. Structural Analysis Vol –I & II by V. N. Vazirani and M. M. Ratwani, Khanna Publishers.
2. Structural Analysis Vol I & II by G. S. Pandit and S. P. Gupta, Tata McGraw Hill Education Pvt. Ltd.
3. Mechanics of Structures Vol – I and II by H. J. Shah and S. B. Junnarkar, Charotar Publishing House Pvt. Ltd.

REFERENCES:

1. Structural Analysis by R. C. Hibbeler, Pearson Education
2. Structural Analysis by Devdas Menon, Narosa Publishing House.
3. Basic Structural Analysis by C. S. Reddy., Tata McGraw Hill Education Pvt. Ltd.
4. Fundamentals of Structural Analysis by M. L. Gamhir, PHI Learning Pvt. Ltd
5. Structural Analysis -I by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd.

CV404ES: ENGINEERING GEOLOGY

B.Tech. II Year II Sem.

L	T/P/D	C
3	0/0/0	3

Course Objectives: The objectives of the course is to give the basic knowledge of Geology that is required for constructing various Civil Engineering Structures, basic Geology, Geological Hazardous and Environmental Geology which gives a complete picture on the Geological aspects that are to be considered for the planning and construction of major Civil Engineering projects

Course Outcomes: At the end of the course, the student will be able to:

- Understand weathering process and mass movement
- Distinguish geological formations
- Identify geological structures and processes for rock mass quality
- Identify subsurface information and groundwater potential sites through geophysical investigations
- Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels

UNIT - I

Introduction: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology, Petrology and Structural geology.

Weathering of Rocks : Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnels weathering of common rock like “Granite”

UNIT - II

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Chalcocite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

Petrology: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Macroscopic and microscopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Lignite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT - III

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types and case studies. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils. Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

UNIT - IV

Earth Quakes: Causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Landslides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and landslides.

Importance of Geophysical Studies: Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT - V

Geology of Dams, Reservoirs, and Tunnels: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs - Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (i.e. Tithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXT BOOKS:

1. Engineering Geology by N. Chennakesavulu, McMillan, India Ltd. 2005
2. Engineering Methods by D. Venkat Reddy; Vikas Publishers 2015.
3. Engineering Geology by S K Duggal, H K Pandey Mc Graw Hill Education Pvt Ltd 2014
4. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications

REFERENCES:

1. F.G. Bell, Fundamental of Engineering B.S. Publications, 2005.
2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution
3. Engineering Geology by Subinoy Gangopadhyay, Oxford university press.
4. Engineering Geology for Civil Engineers – P.C. Varghese PHI

SM405MS: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

B.Tech. II Year II Sem.

L	T/P/D	C
3	0/0/0	3

Course Objective: To learn the basic Business types, impact of the Economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.

Course Outcome: The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

UNIT – I

Introduction to Business and Economics:

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT – II

Demand and Supply Analysis:

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

UNIT- III

Production, Cost, Market Structures & Pricing:

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

Cost analysis: Types of Costs, Short run and Long run Cost Functions.

Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition.

Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis.

UNIT-IV

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts.

UNIT -V

Financial Analysis through Ratios:

Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems).

Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS:

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata Mc –Graw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt. Ltd. 2012.

REFERENCES:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013

CE406ES: FLUID MECHANICS LAB

B.Tech. II Year II Sem.

L	T/P/D	C
0	0/3/0	2

Pre Requisites: FM Theory

Course Objectives: To give the student an exposure to various hydraulic devices and Pipe Flow.

Course Outcomes: At the end of the course, the student will be able to:

- Determine coefficient of discharge for orifice and mouthpiece.
- Calibrate notches venturimeter orifice meters
- Determine minor losses in pipes

List of Experiments:

1. Determination of Coefficient of discharge for a small orifice.
2. Determination of Coefficient of discharge for a mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch / Triangular Notch/Trapezoidal Notch.
4. Determination of friction factor of a pipe
5. Calibration of Venturimeter
6. Calibration of Orifice meter
7. Determination of Coefficient for minor losses - Sudden Expansion
8. Determination of Coefficient for minor losses- Sudden Contraction
9. Verification of Bernoulli's equation.
10. Study of Water Hammer due to sudden Closure of valve.

CE408ES: SURVEYING - II LAB

B.Tech. II Year II Sem.

L	T/P/D	C
0	0/3/0	2

Course Objective: To impart the practical knowledge in the field to set out any Civil Engineering work

Course Outcome: Perform surveying on any civil engineering work

1. Determine of area using total station
2. Traversing using total station
3. Contouring using total station
4. Determination of remote height using total station
5. Stake out using total station
6. Distance, gradient, differential height between two inaccessible points using total station.
7. Curve settling using total station
8. Resection using total station
9. Setting out works for buildings and pipe lines
10. Finding position of stations using G.P.S

CV407ES: ENGINEERING GEOLOGY LAB

B.Tech. II Year II Sem.

L	T/P/D	C
0	0/3/0	2

Pre Requisites: Engineering Geology Theory

Course Objectives: The object of this lab is that to provide practical knowledge about physical properties of minerals, rocks, drawing of geological maps, showing faults, uniformities etc.

Course Outcomes: At the end of the course, the student will be able to:
Identify the various rocks, minerals depending on geological classifications

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic description and identification of rocks referred under theory.
3. Microscopic study of rocks.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.
6. Electrical resistivity meter.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.
5. Microscopic identification of rocks.

MC400ES: ENVIRONMENTAL SCIENCE AND TECHNOLOGY

B.Tech. II Year II Sem.

L	T/P/D	C
3	0/0/0	0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures
- Understanding the environmental policies and regulations

Course Outcomes: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which in turn helps in sustainable development

UNIT-I

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: **Environmental Pollution:** Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela . 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.TECH. CIVIL ENGINEERING
III YEAR COURSE STRUCTURE & SYLLABUS (R16)****Admitted From 2016-17 Admitted Batch****III YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	CE501PC	Concrete Technology	4	0	0	4
2	CE502PC	Design of Reinforced Concrete Structures	4	1	0	4
3	CE503PC	Water Resources Engineering	4	0	0	4
4	SM504MS	Fundamentals of Management	3	0	0	3
5		Open Elective –I	3	0	0	3
6	CE505PC	Concrete Technology Lab	0	0	3	2
7	CE506PC	Geographical Information Systems Lab	0	0	3	2
8	CE507PC	Hydraulics and Hydraulic Machinery Lab	0	0	3	2
9	*MC500HS	Professional Ethics	3	0	0	0
		Total Credits	21	1	9	24

III YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CE601PC	Design of Steel Structures	4	1	0	4
2	CE602PC	Environmental Engineering	4	0	0	4
3	CE603PC	Soil Mechanics	4	0	0	4
4		Open Elective-II	3	0	0	3
5		Professional Elective-I	3	0	0	3
6	CE604PC	Soil Mechanics Lab	0	0	3	2
7	CE605PC	Computer Aided Drafting - II Lab	0	0	3	2
8	EN606HS	Advanced English Communication Skills Lab	0	0	3	2
		Total Credits	18	1	9	24

During Sumer Vacation between III and IV Years: Industry Oriented Mini Project*Professional Elective - I**

CE611PE	Air Pollution and Control.
CE612PE	Advanced Structural Analysis.
CE613PE	Ground Water Development and Management.
CE614PE	Earth and Rock fill Dams and Slope Stability.

***Open Elective** subjects' syllabus is provided in a separate document.

***Open Elective** – Students should take Open Electives from The List of Open Electives Offered by Other Departments/Branches Only.

Ex: - A Student of Mechanical Engineering can take Open Electives from all other departments/branches except Open Electives offered by Mechanical Engineering Dept.

CONCRETE TECHNOLOGY

B.Tech. III Year I Sem.
Course Code: CE501PC

L T/P/D C
4 0/0/0 4

Pre Requisites: Building Materials

Course Objectives: Concrete is the basic construction material in the advancement present construction industry. Lot of advances are taking place in the concrete technology on par with development taking place in the engineering. The present day industry needs the knowledge of concrete technology thoroughly. The subject is designed to give the basic knowledge as well as latest developments in concrete technology.

Course Outcomes: At the end of the course, the student will be able to:

- Identify Quality Control tests on concrete making materials
- Understand the behavior of fresh and hardened concrete
- Design concrete mixes as per IS and ACI codes
- Understand the durability requirements of concrete
- Understand the need for special concretes

UNIT - I

Cement: Portland cement – chemical composition – Hydration, Setting of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement. Admixtures: Types of admixtures – mineral and chemical admixtures.

UNIT - II

Aggregates: Classification of aggregate – Particle shape & texture –, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – III

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT - IV

Hardened Concrete : Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compressive & tensile strength - Curing.

Testing Of Hardened Concrete: Compression tests – Tension tests– Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods – codal provisions for NDT.

Elasticity, Creep & Shrinkage – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – V

Mix Design: Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by– BIS method and ACI mix design.

Special Concretes: Introduction to light weight concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete – High performance concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A. M. Neville Pearson 5th edition Education ltd 2016.
2. Concrete Technology by M. S. Shetty. – S. Chand & Co. 2004
3. Concrete Technology by Job Thomas -Cengage learning India Pvt Ltd 2015.

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
2. Concrete: Micro structure, Properties and Materials – P. K. Mehta and J. M. Monteiro, McGraw Hill Publishers

DESIGN OF REINFORCED CONCRETE STRUCTURES

B.Tech. III Year I Sem.
Course Code: CE502PC

L T/P/D C
4 1/0/0 4

Pre-Requisites: Structural Analysis I & II

Course Objectives: Structural elements are subjected to different loading to with stand the structures, for external loading we need to design the structures for its safety and serviceability.

Course Outcomes: At the end of the course, the student will be able to:

- Design RC Structural elements
- Design the Reinforced Concrete beams using limit state Design
- Design Reinforced Concrete slabs
- Design the Reinforced Concrete Columns and footings
- Design structures for serviceability
- Design staircases, canopy

UNIT – I

Concepts of RC. Design – Working Stress Method - Limit State method – Material Stress-Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS – 456 – 2000. **Beams:** Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections

UNIT – II

Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing; Design of canopy.

UNIT – III

Short and Long columns – under axial loads, uniaxial bending and biaxial bending – I S Code provisions.

UNIT – IV

Footings: Different types of footings – Design of isolated, square, rectangular, circular footings and combined footings.

UNIT - V

Design of one way slab, Two-way slabs and continuous slab Using I S Coefficients Limit state design for serviceability for deflection, cracking and codal provision. Design of dog-legged staircase.

TEXT BOOKS:

1. Reinforced concrete design by S. Unnikrishna Pillai & Devdas Menon, Tata McGraw Hill, New Delhi.
2. Reinforced concrete design by N. Subrahmanian Oxford University Press.
3. Limit state designed of reinforced concrete – P. C. Varghese, Prentice Hall of India, New Delhi.

REFERENCES:

1. Design of Reinforced Concrete Structures by I. C. Syal and A. K. Goel, S. Chand & company.
2. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers
3. Design of concrete structures – Arthus H. Nilson, David Darwin, and Chorles W. Dolar, Tata McGraw-Hill, 3rd Edition, 2005.

WATER RESOURCES ENGINEERING

B.Tech. III Year I Sem.
Course Code: CE503PC

L T/P/D C
4 1/0/0 4

Pre-Requisites: Fluid Mechanics & HHM

Course Objectives: The objectives of the course is to study the concepts of

- Engineering Hydrology and its applications like Runoff estimation, estimation of design discharge and flood routing.
- Irrigation Engineering – Water utilization for crop growth and their designs.

Course Outcomes: At the end of the course, the student will be able to:

- Analyze hydro-meteorological data
- Estimate abstractions from precipitation
- Compute yield from surface and subsurface basin
- Develop rainfall-runoff models
- Formulate and solve hydrologic flood routing models
- Estimate runoff, design discharge from catchment

UNIT - I

Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data - Adjustment of record -Rainfall Double Mass Curve. Runoff- Factors affecting Runoff – Runoff over a Catchment- Empirical and Rational Formulae.

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices..

UNIT - II

Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow- Base Flow Separation - Direct Runoff Hydrograph Unit pulse and Unit step function - Unit Hydrograph, definition, limitations and applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph, Synthetic Unit Hydrograph.

UNIT - III

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of wells,- Well Construction – Well Development.

UNIT - IV

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility –Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design

discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies-Water Logging.

UNIT - V

Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining.

Design Discharge over a catchment, Computation of design discharge-rational formulae etc.

TEXT BOOKS:

1. Engineering Hydrology by K. Subramanya McGraw Education (India) Pvt Ltd, 2014.
2. Engineering Hydrology by Jayarami Reddy, Laxmi publications pvt. Ltd., New Delhi
3. Irrigation and Water Resources & Water Power by P. N. Modi, Standard Book House

REFERENCES:

1. Engineering Hydrology by CSP Ojha, R. Brendtsson and P. Bhunya Oxford University Press, 2010
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications Pvt. Ltd., New Delhi
3. Applied hydrology by V.T. Chow, D.R. Maidment and L. W Mays McGraw Education (India) Pvt Ltd, 2014.
4. Hydrology in Practice by E. M. Shaw, K. J. Beven, CRC Press, 2015.

FUNDAMENTALS OF MANAGEMENT

B.Tech. III Year I Sem.
Course Code: SM504MS

L T/P/D C
3 0/0/0 3

Course Objective: To understand the Management Concepts, applications of Concepts in Practical aspects of business and development of Managerial Skills.

Course Outcome: The students understand the significance of Management in their Profession. The various Management Functions like Planning, Organizing, Staffing, Leading, Motivation and Control aspects are learnt in this course. The students can explore the Management Practices in their domain area.

UNIT - I

Introduction to Management: Definition, Nature and Scope, Functions, Managerial Roles, Levels of Management, Managerial Skills, Challenges of Management; Evolution of Management- Classical Approach- Scientific and Administrative Management; The Behavioral approach; The Quantitative approach; The Systems Approach; Contingency Approach, IT Approach.

UNIT – II

Planning and Decision Making: General Framework for Planning - Planning Process, Types of Plans, Management by Objectives; Development of Business Strategy. Decision making and Problem Solving - Programmed and Non Programmed Decisions, Steps in Problem Solving and Decision Making; Bounded Rationality and Influences on Decision Making; Group Problem Solving and Decision Making, Creativity and Innovation in Managerial Work.

UNIT - III

Organization and HRM: Principles of Organization: Organizational Design & Organizational Structures; Departmentalization, Delegation; Empowerment, Centralization, Decentralization, Recentralization; Organizational Culture; Organizational Climate and Organizational Change.

Human Resource Management & Business Strategy: Talent Management, Talent Management Models and Strategic Human Resource Planning; Recruitment and Selection; Training and Development; Performance Appraisal.

UNIT - IV

Leading and Motivation: Leadership, Power and Authority, Leadership Styles; Behavioral Leadership, Situational Leadership, Leadership Skills, Leader as Mentor and Coach, Leadership during adversity and Crisis; Handling Employee and Customer Complaints, Team Leadership.

Motivation - Types of Motivation; Relationship between Motivation, Performance and Engagement, Content Motivational Theories - Needs Hierarchy Theory, Two Factor Theory, Theory X and Theory Y.

UNIT - V

Controlling: Control, Types and Strategies for Control, Steps in Control Process, Budgetary and Non- Budgetary Controls. Characteristics of Effective Controls, Establishing control systems, Control frequency and Methods.

TEXT BOOKS:

1. Management Fundamentals, Robert N Lussier, 5e, Cengage Learning, 2013.
2. Fundamentals of Management, Stephen P. Robbins, Pearson Education, 2009.

REFERENCES:

1. Essentials of Management, Koontz Kleihrich, Tata Mc - Graw Hill.
2. Management Essentials, Andrew DuBrin, 9e, Cengage Learning, 2012.

CONCRETE TECHNOLOGY LAB

B.Tech. III Year I Sem.
Course Code: CE505PC

L T/P/D C
0 0/3/0 2

Pre-Requisites: Concrete Technology Theory

Course Objectives: The objectives of the course is to gain the practical knowledge of properties of concrete materials, behavior of concrete properties of fresh and hardened concrete

Course Outcomes: At the end of the course, the student will be able to:
 Understand properties of concrete material, behavior of concrete & properties of fresh & hardened concrete

I. Test on Cement

1. Normal Consistency and fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity of cement
4. Soundness of cement.
5. Compressive strength of cement.
6. Workability test on concrete by compaction factor, slump and Vee-bee.

II. Test on Aggregate

1. Sieve Analysis and gradation chairs
2. Bulking of sand.
3. Bulk and compact densities of fine and coarse aggregates

III. Test on Fresh Concrete

1. Slump test
2. CF (compact factor stress)
3. Vee-bee Test
4. Flow Table Test

Self Compacting Concrete

1. Slump cone
2. V funnel
3. L Box

IV. Test on hardened concrete

1. compression test on cubes & Cylinders
2. flexure test
3. Splitting Tensile Test
4. Modulus of Elasticity

V. Non Destructive test of concrete

1. Rebound hammer
2. Ultrasound pulse Velocity (UPV)

TEXT BOOK:

1. Concrete Technology by M.S. Shetty – S. Chand & Co.
2. Concrete Manual by M.L. Gambhir, Dhanpat Rai & Sons

GEOGRAPHICAL INFORMATION SYSTEMS LAB

B.Tech. III Year I Sem.
Course Code: CE506PC

L T/P/D C
0 0/3/0 2

Prerequisites: Surveying

Course Objectives: To Develop GIS interface to field problems through geofencing.

Course Outcomes: At the end of the course, the student is exposed to spatial technologies, mapping the field problems and solution convergence through GIS.

UNIT - I

Development of georeferencing of maps either from cadastral or AutoCAD based map.

UNIT - II

Identification of best locations of ground control points and mosaicing the different sources of maps of information like topo sheets & satellite data and other drawings.

UNIT - III

Digitization and GIS coordination.

UNIT - IV

GIS interface and features using open Source Software QGIS.

UNIT - V

Case example on mapping like water distinguish, Road alignment road network etc.,

TEXT BOOKS:

1. Lo, C.P. & Yeung A.K.W., Concepts and Techniques of Geographic Information Systems, Prentice Hall of India, New Delhi, 2002.
2. Burrough, P.A., Principles of Geographical Information Systems, Oxford Publication, 1998.
3. Clarke, K., Getting Started with Geographic Information Systems, Prentice Hall, New Jersey, 2001.
4. DeMers, M.N., Fundamentals of Geographic Information Systems, John Wiley & Sons, New York, 2000.
5. Geo Information Systems – Applications of GIS and Related Spatial Information Technologies, ASTER Publication Co., Chestern (England), 1992.

HYDRAULICS AND HYDRAULIC MACHINERY LAB

B.Tech. III Year I Sem.
Course Code: CE507PC

L	T/P/D	C
0	0/3/0	2

Pre Requisites: HHM Theory

Course Objectives: To give the student an exposure to various hydraulic machines.

Course Outcomes: Hydraulics & Hydraulic Machinery

- Compute drag coefficients
- Test the performance of pumps and turbines
- Determine Manning's and Chezy's coefficients for smooth and rough channels
- Determine Energy loss in Hydraulic jump and Calibrate standing wave flume

1. Impact of jet on vanes
2. Study of Hydraulic jump in Open Channel.
3. Performance test on Pelton wheel turbine.
4. Performance test on Francis turbine.
5. Performance test on Kaplan turbine.
6. Performance characteristics of a single stage centrifugal pump.
7. Performance characteristics of a multi-stage centrifugal pump.
8. Performance characteristics of a reciprocating pump.
9. Study of Flow in Open Channel (Applying Chezy's and Manning's equations).
10. Determination of Coefficient of discharge for the given Weir (Sharp crested /Broad crested / Cippoletti weir).

PROFESSIONAL ETHICS

B.Tech. III Year I Sem.
Course Code: MC500HS

L	T/P/D	C
3	0/0/0	0

Course Objective: To enable the students to imbibe and internalize the Values and Ethical Behaviour in the personal and Professional lives.

Course Outcome: The students will understand the importance of Values and Ethics in their personal lives and professional careers. The students will learn the rights and responsibilities as an employee, team member and a global citizen.

UNIT - I

Introduction to Professional Ethics: Basic Concepts, Governing Ethics, Personal & Professional Ethics, Ethical Dilemmas, Life Skills, Emotional Intelligence, Thoughts of Ethics, Value Education, Dimensions of Ethics, Profession and professionalism, Professional Associations, Professional Risks, Professional Accountabilities, Professional Success, Ethics and Profession.

UNIT - II

Basic Theories: Basic Ethical Principles, Moral Developments, Deontology, Utilitarianism, Virtue Theory, Rights Theory, Casuist Theory, Moral Absolution, Moral Rationalism, Moral Pluralism, Ethical Egoism, Feminist Consequentialism, Moral Issues, Moral Dilemmas, Moral Autonomy.

UNIT - III

Professional Practices in Engineering: Professions and Norms of Professional Conduct, Norms of Professional Conduct vs. Profession; Responsibilities, Obligations and Moral Values in Professional Ethics, Professional codes of ethics, the limits of predictability and responsibilities of the engineering profession.

Central Responsibilities of Engineers - The Centrality of Responsibilities of Professional Ethics; lessons from 1979 American Airlines DC-10 Crash and Kansas City Hyatt Regency Walk away Collapse.

UNIT - IV

Work Place Rights & Responsibilities, Ethics in changing domains of Research, Engineers and Managers; Organizational Complaint Procedure, difference of Professional Judgment within the Nuclear Regulatory Commission (NRC), the Hanford Nuclear Reservation.

Ethics in changing domains of research - The US government wide definition of research misconduct, research misconduct distinguished from mistakes and errors, recent history of attention to research misconduct, the emerging emphasis on understanding and fostering responsible conduct, responsible authorship, reviewing & editing.

UNIT - V

Global issues in Professional Ethics: Introduction – Current Scenario, Technology Globalization of MNCs, International Trade, World Summits, Issues, Business Ethics and Corporate Governance, Sustainable Development Ecosystem, Energy Concerns, Ozone Deflection, Pollution, Ethics in Manufacturing and Marketing, Media Ethics; War Ethics; Bio Ethics, Intellectual Property Rights.

TEXT BOOKS:

1. Professional Ethics: R. Subramanian, Oxford University Press, 2015.
2. Ethics in Engineering Practice & Research, Caroline Whitbeck, 2e, Cambridge University Press 2015.

REFERENCES:

1. Engineering Ethics, Concepts Cases : Charles E Harris Jr., Michael S Pritchard , Michael J Rabins, 4e , Cengage learning, 2015.
2. Business Ethics concepts & Cases: Manuel G Velasquez, 6e, PHI, 2008.

DESIGN OF STEEL STRUCTURES

B.Tech. III Year II Sem.
Course Code: CE601PC

L	T/P/D	C
4	1/0/0	4

Pre-Requisites: Structural Analysis I & II

Course Objectives: The objective of the course is to make the student conversant with the design principles of steel structural elements as per IS Codal provisions

Course Outcomes: At the end of the course, the student will be able to

- Design tension and compression members
- Design beams and beam columns
- Design bolt and weld connections
- Design built up members and Column base
- Design of plate girders and Roof Trusses

UNIT – I

Materials – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads – and combinations local buckling behavior of steel. Concept of limit State Design – Limit States – Design Strengths- deflection limits – serviceability – stability check. Bolted connections – Riveted connections – IS – 800 – 2007 - specifications – Design strength – efficiency of joint – prying action. Welded connections – Types of welded joints – specifications - design requirements.

UNIT – II

Design of tension members – Design strength – Design procedure splice - lug angle.
 Design of compress in members – Buckling class – slenderness ratio / strength design – laced – battened columns – splice – column base – slab base.

UNIT – III

Plastic Theory, Plastic hinge, Theorems of plastic Analysis Classifications of beams as per I.S 800-2007.

Design of Beams – Plastic moment – Bending and shear strength / buckling – Built up sections – laterally / supported beams - Design of eccentric connections – Framed – stiffened / seat connection.

UNIT – IV

Design of plate girders – elements – economical depth – design of main section – connections between web and flange – design of stiffness bearing – intermediate stiffeners – Design of Websplca & Flange splca.

UNIT – V

Design of roof trusses – Types of roof trusses, loads on trusses – purlin design – truss design, Design of joints and end bearings.

TEXT BOOKS:

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010

REFERENCES:

1. Fundamental of Structural Steel Design by M L Gambhir MC Graw Hill Education Pvt Ltd 2013
2. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt. Ltd.
3. Design of steel structures, S.S. Bhavikatti, IK International Publication House, New Delhi, 2010.
4. Structural Design and Drawing by N. Krishna Raju, Universities Press.
5. Design of Steel structures by K.S. Sai Ram, Person Education.

ENVIRONMENTAL ENGINEERING

B.Tech. III Year II Sem.
Course Code: CE602PC

L T/P/D C
4 0/0/0 4

Course Objectives: This subject provides the knowledge of water sources, water treatment, design of distribution system waste water treatment, and safe disposal methods. The topics of characteristics of waste water, sludge digestion are also included.

Course Outcomes: At the end of the course, the student will be able to:

- Analyze characteristics of water and wastewater
- Estimate the quantity of drinking water and domestic wastewater generated
- Design components of water supply systems Design sewerage system

UNIT – I

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – types of water demand – factors affecting – fluctuations – fire demand – water quality and testing – drinking water standards: sources of water - Comparison from quality and quantity and other considerations – intakes – infiltration galleries.

UNIT – II

Layout and general outline of water treatment units – sedimentation – principles – design factors – coagulation-flocculation clarifier design – coagulants - feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation - comparison of filters – disinfection – theory of chlorination, chlorine demand - other disinfection practices- Miscellaneous treatment methods.

UNIT – III

Distribution systems requirement –method and layouts -Design procedures- Hardy Cross and equivalent pipe methods pipe – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house - Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow

UNIT - IV

characteristics of sewage – cycles of decay – decomposition of sewage, examination of sewage – B.O.D. Equation – C.O.D. Design of sewers – shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing – ultimate disposal of sewage – sewage farming – dilution.

UNIT – V

Waste water treatment plant – Flow diagram - primary treatment Design of screens – grit chambers – skimming tanks – sedimentation tanks – principles of design – Biological treatment – trickling filters – standard and high rate – Construction and design of oxidation ponds. Sludge digestion – factors effecting – design of Digestion tank – Sludge disposal by drying – septic tanks working principles and design – soak pits.

TEXT BOOKS:

1. Environmental Engineering by H.S Peavy, D. R. Rowe, G. Tchobanog lous, McGraw Hill Education (India) Pvt Ltd, 2014
2. Environmental Engineering by D. P. Sincero and G.A Sincero, Pearson 2015.
3. Water Supply & Environmental Engineering by A.K. Chatterjee.
4. Water Supply and sanitary Engineering by G.S. Bindi, Dhanpat Rai & Sons Publishers.

REFERENCES:

1. Water and Waste Water Technology by Steel, Wiley
2. Waste water engineering by Metcalf and Eddy, McGraw Hill, 2015.
3. Water and Waste Water Engineering by Fair Geyer and Okun, Wiley, 2011
4. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.Wiley, 2007.

SOIL MECHANICS

B.Tech. III Year II Sem.
Course Code: CE603PC

L T/P/D C
4 0/0/0 4

Pre-Requisites: Engineering Geology, Applied Mechanics, Fluid Mechanics

Course Objectives: To enable the student to study the properties of soil and to determine the behaviour soil under various conditions and loads.

Course Outcomes: At the end of the course, the student will be able to:

- Understand the mechanism Behaviour of Soil for different loads
- and from Soil Condition will be able to determine properties of soil

UNIT – I

Introduction: Soil formation and structure – moisture content – Mass- volume relationship – Relative density.

Index Properties Of Soils: Grain size analysis – Sieve–

UNIT – II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting permeability – laboratory determination of coefficient of permeability –Permeability of layered soils – In-situ permeability tests (Pumping in & Pumping out test).

Effective Stress & Seepage Through Soils: Total, neutral and effective stress – principle of effective stress - quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT – III

Stress Distribution In Soils: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

Compaction: Mechanism of compaction – factors affecting compaction effects of compaction on soil properties – Field compaction Equipment – compaction quality control.

UNIT – IV

Consolidation: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log(p) curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement.

UNIT - V

Shear Strength Of Soils: Importance of shear strength – Mohr's– Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelopes – Shear strength of sands - dilatancy – critical void ratio.

TEXT BOOKS:

1. Principals of Geotechnical Engineering by Braja M. Das, Cengage Learning Publishers, 8th Edition, (2014).
2. Geotechnical Engineering Principles and Practices by Cuduto, PHI International
3. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt. Ltd.

REFERENCES:

1. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata McGraw Hill Publishers New Delhi.
2. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
3. Geotechnical Engineering by C. Venkataramiah, New age International Pvt. Ltd, (2002).

AIR POLLUTION AND CONTROL (Professional Elective - I)

B.Tech. III Year II Sem.
Course Code: CE611PE

L T/P/D C
3 0/0/0 3

Pre Requisites: Environmental Engineering

Course Objectives: The subject provides the knowledge of various effects of Air pollution on human beings and Vegetation and Materials. The topics of control methods, details of control equipment, and the methods of controlling gaseous are also included. The objective of the course is to study the moment, occurrence of ground water and its development and management.

Course Outcomes: At the end of the course, the student will be able to:

- Identify sampling and analysis techniques for air quality assessment
- Describe the plume behavior for atmospheric stability conditions
- Able to control air pollution by properties various techniques to control

UNIT – I

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary, point and Non-Point, Line and Areal Sources of air pollution- stationary and mobile sources.

UNIT – II

Effects of Air pollutants on man, material and vegetation; Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT - III

Thermodynamics and Kinetics of Air-pollution – Applications in the removal of gases like SO_x , NO_x , CO , HC etc., air-fuel ratio. Computation and Control of products of combustion. Meteorology and plume Dispersion; properties of atmosphere; Heat, Pressure, Wind forces, Moisture and relative Humidity; Influence of Meteorological phenomena on Air Quality- wind rose diagrams.

UNIT - IV

Lapse Rates, Pressure Systems, Winds and moisture plume behavior and plume Rise Models; Gaussian Model for Plume Dispersion.
Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.
Equipment's – Settling Chambers, Centrifugal separators, filters Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – V

General Methods of Control of NO_x and SO_x emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.
Air Quality Management – Monitoring of SPM, SO_x , NO_x and CO Emission Standards.

TEXT BOOKS:

1. Air pollution By M. N. Rao and H. V. N. Rao – Tata McGraw Hill Company.
2. Air pollution by Wark and Warner. - Harper & Row, New York.

REFERENCE:

1. Air pollution and control By K.V.S.G. Murali Krishna, Kaushal Publishers. Kakinada.

ADVANCED STRUCTURAL ANALYSIS (Professional Elective-I)

B.Tech. III Year II Sem.
Course Code: CE612PE

L	T/P/D	C
3	0/0/0	3

Course Objectives:

- To understand the influence line concepts for indeterminate structures
- To understand the methods of analysis of intermediate trusses for external loads, lack of fit and thermal effect
- To study behavior of arches and their methods of analysis
- To know the concept and analysis of cable stayed bridge
- To study the multi storey frames subjected to gravity loads and lateral loads

Course Outcomes: At the end of the course, the student will be able to:

- Demonstrate the concepts of qualitative influence line diagram for continuous beams and frames.
- Apply the methods of indeterminate truss analysis
- Demonstrate the behavior of arches and their methods of analysis analyze cable suspension bridges
- Analyze multistory frames subjected to gravity loads and lateral loads

UNIT – I

Analysis of Frames: Castigliano's second theorem

Indeterminate Trusses: Determination of static and kinematic indeterminacies – Analysis of trusses having single and two degrees of internal and external indeterminacies.

Two Hinged Arches: Introduction – Classification of Two hinged Arches – Analysis of two hinged parabolic arches – Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT - II

Slope Deflection Method: Analysis of Single Bay – single storey Portal Frames by Slope Deflection Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve, Analysis of inclined frames

Moment Distribution Method - Analysis of Single Bay Single Storey Portal Frames including side Sway. Analysis of inclined frames.

UNIT – III

Kani's Method: Analysis of continuous beams including settlement of supports. Analysis of single bay single storey and single bay two Storey Frames by Kani's Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

UNIT – IV

Matrix Methods of Analysis: Introduction – Static and Kinematic Indeterminacy - Analysis of continuous beams including settlement of supports, using stiffness method. Analysis of pin-jointed plane frames using stiffness method- Analysis of single bay single storey frames including side sway, using stiffness method. Analysis of continuous beams upto three degree of indeterminacy using flexibility method. Shear force and bending moment diagrams.

UNIT – V

Approximate Methods of Analysis: Introduction – Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever method and Factor method. Analysis of multi-storey frames for gravity (vertical) loads. Substitute Frame method.

Influence Lines for Indeterminate Beams: Introduction – ILD for two span continuous beams with constant and variable moments of inertia. ILD for propped cantilever beams. Muller Breslau's principle.

TEXT BOOKS:

1. Structural Analysis Vol – I & II by Vazarani and Ratwani, Khanna Publishers.
2. Structural Analysis Vol I & II by Pundit and Gupta. Tata McGraw Hill Publishers.
3. Structural Analysis SI edition by Aslam Kassimali, Cengage Learning

REFERENCES:

1. Matrix Analysis of Structures by Singh, Cengage Learning Pvt. Ltd.
2. Structural Analysis by R. C. Hibbeler Pearson Education.
3. Basic Structural Analysis by C. S. Reddy., Tata McGraw Hill Publishers.
4. Matrix Analysis of Structures by Pundit and Gupta. Tata McGraw Hill Publishers.
5. Advanced Structural Analysis by A. K. Jain, Nem Chand Bros

GROUND WATER DEVELOPMENT AND MANAGEMENT (Professional Elective - I)

B.Tech. III Year II Sem.
Course Code: CE613PE

L T/P/D C
3 0/0/0 3

Pre Requisites: Water Resources Engineering

Course Objectives: The objective of the course is to study the moment, occurrence of ground water and its development and management

Course Outcomes: At the end of the course, the student will be able to Understand Ground Water occurrence, Ground Water Movement Well constructional etc..

UNIT – I

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

UNIT – II

Ground Water Movement: Permeability, Darcy's law, storage coefficient. Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system. Ground water flow contours their applications.

UNIT – III

Steady groundwater flow towards a well in confined and unconfined aquifers – Dupuit's and Theim's equations, Assumptions, Formation constants, yield of an open well Well interface and well tests – Recuperation Test.

Unsteady flow towards a well – Non equilibrium equations – Theis' solution – Jacob and Chow's simplifications, Leaky aquifers – Well Interference.

UNIT – IV

Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic refraction methods. Subsurface methods – Geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – V

Well Construction – Drilling Equipment used for Well Construction – Bore log – Interpretation of Log Data.

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg relation, Shape of interface, control of seawater intrusion. Groundwater Basin Management: Concepts of conjunction use, Case studies.

TEXT BOOKS:

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
2. Groundwater by H. M. Raghunath, Wiley Eastern Ltd.
3. Ground Water Hydrology by D.K. Todd and L.R Mays John Willey.

REFERENCES:

1. Groundwater Hydrology by Bower, John Wiley & sons.
2. Groundwater System Planning & Management – R. Willes & W. W. G. Yeh, Prentice Hall.
3. Applied Hydrogeology by C. W. Fetta, CBS Publishers & Distributers.

EARTH AND ROCKFILL DAMS AND SLOPE STABILITY (Professional Elective-I)

B.Tech. III Year II Sem.

Course Code: CE614PE

L T/P/D C

3 0/0/0 3

Course Objectives:

- Have an understanding of seismic design concepts and current practices for earth dams and other similar structures to enable them to plan and direct the construction activity appropriately.
- Understand the soil dynamic testing procedure and methodology of seismic design to be able to execute a proper design.
- Have a clear understanding of design methodology and the interpretation in the seismic codes.

Course Outcomes: At the end of the course, the student will be able to:

- Describe the behaviour of natural and engineered soil / rock slopes under various weather and engineering conditions.
- Explain the factors that may affect the stability of slopes.
- Select an appropriate slope stability analysis method subject to geometry of slope, material properties, and uncertainty of observations.
- Assess the potential landslide risk of slopes.

UNIT - I

Earth and Rockfill Dams: General features, Selection of site; Merits and demerits of the earth and rock fill dams, Classification of earth dams, Causes of failure, Safe design criteria. Instrumentation in earth dams: Pore pressure measurements, Settlement gauges, Inclinerometers, Stress measurements, Seismic measurements.

UNIT - II

Failures, Damages and Protection of Earth Dams: Nature and importance of failure, Piping through embankment and foundations, Methods of seepage control through embankments and foundations, Design Criteria for filters, Treatment of upstream and downstream of slopes, Drainage control, Filter design.

UNIT - III

Slope Stability Analysis: Types of Failure: Failure surfaces - Planar surfaces, Circular surfaces, Non-circular surfaces, Limit equilibrium methods, Total stress analysis versus effective Stress analysis, Use of Bishop's pore pressure parameters, Short term and Long term stability in slopes. Taylor Charts.

UNIT - IV

Methods of Slope Stability: Method of Slices, Effect of Tension Cracks, Vertical Cuts. Bishop's Analysis, Bishop and Morgenstern Analysis, Non-circular Failure Surfaces: Janbu Analysis, Sliding Block Analysis, Seismic stability, Stabilization of slopes: Soil reinforcement (geosynthetics/soil nailing/micro piles etc), soil treatment (cement/lime treatment), surface protection (vegetation/erosion control mats/shotcrete).

UNIT - V

Rockfill Dams: Requirements of compacted rockfill, Shear strength of rockfill, Rockfill mixtures, Rockfill embankments, Earth-core Rockfill dams, Stability, Upstream & Downstream slopes.

TEXT BOOK:

1. Sherard, Woodward, Gizienski and Clevenger. Earth and Earth-Rock Dams. John Wiley & Sons. 1963

REFERENCES:

1. Bharat Singh and Sharma, H. D. – Earth and Rockfill Dams, 1999
2. Sowers, G. F. and Salley, H. I. – Earth and Rockfill Dams, Willams, R.C., and Wallace, T.S. 1965.
3. Abramson, L. W., Lee, T. S. and Sharma, S. - Slope Stability and Stabilization methods – John Wiley & sons. (2002)
4. Bromhead, E. N. (1992). The Stability of Slopes, Blackie academic and professional, London.
5. Christian, Earth & Rockfill Dams – Principles of Design and Construction, Kutzner Published Oxford and IBH.
6. Ortiago, J. A. R. and Sayao, A. S. F. J. - Handbook of Slope Stabilization, 2004.

SOIL MECHANICS LAB

B.Tech. III Year II Sem.
Course Code: CE604PC

L T/P/D C
0 0/3/0 2

Pre-Requisites: Soil Mechanics (Co-requisite)

Course Objectives: To obtain index and engineering properties of locally available soils, and to understand the behavior of these soil under various loads.

Course Outcomes: At the end of the course, the student will be able to Classify and evaluate the behavior of the soils subjected to various loads.

LIST OF EXPERIMENTS

1. Atterberg Limits (Liquid Limit, Plastic Limit, and shrinkage limit)
2. a) Field density by core cutter method and
b) Field density by sand replacement method
3. Determination of Specific gravity of soil Grain size distribution by sieve analysis
4. Permeability of soil by constant and variable head test methods
5. Standard Proctor's Compaction Test
6. Determination of Coefficient of consolidation (square root time fitting method)
7. Unconfined compression test
8. Direct shear test
9. Vane shear test
10. Differential free swell index (DFSI) test

REFERENCE:

1. Measurement of Engineering Properties of Soils by. E. Saibaba Reddy & K. Rama Sastri, New Age International

COMPUTER AIDED DRAFTING – II LAB

B.Tech. III Year II Sem.
Course Code: CE605PC

L	T/P/D	C
0	0/3/0	2

Pre-Requisites: CAD Lab – I & Excel, C - Programming

Course Objectives: To make students understand detailing of all kinds of structures such as reinforced concrete, plain concrete, steel structures.

Course Outcomes: At the end of the course, the student will be able to Student can draft various structures

1. Detailing of reinforcement in Cantilever, Simply supported and Continuous Beams (Both Singly & Doubly Reinforced Beams)
2. Detailing of reinforcement in canopy & columns (both uniaxial & biaxial)
3. Detailing of reinforcement in RC isolated footings square, rectangular, circular and combined footings.
4. Detailing of reinforcement in RC one-way, two-way slabs and dog-legged staircases.
5. Drawing of Steel bolted and welded connections.
6. Drawing of steel compression and tension members.
7. Drafting of steel beams-built-up sections.
8. Drafting of steel plate girder
9. Drafting of steel roof truss.

Note: Drafting of all the exercises is to be carried out using commercially available drafting softwares.

ADVANCED ENGLISH COMMUNICATION SKILLS (AECS) LAB

B.Tech. III Year II Sem.
Course Code: EN606HS

L T/P/D C
0 0/3/0 2

Introduction

A course on *Advanced English Communication Skills (AECS) Lab* is considered essential at the third year level of B.Tech and B.Pharmacy courses. At this stage, the students need to prepare themselves for their career which requires them to listen to, read, speak and write in English both for their professional and interpersonal communication. The main purpose of this course is to prepare the students of Engineering for their placements.

Course Objectives: This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve students' fluency in spoken English
- To enable them to listen to English spoken at normal conversational speed
- To help students develop their vocabulary
- To read and comprehend texts in different contexts
- To communicate their ideas relevantly and coherently in writing
- To make students industry-ready
- To help students acquire behavioral skills for their personal and professional life
- To respond appropriately in different socio-cultural and professional contexts

Course Outcomes: Students will be able to:

- Acquire vocabulary and use it contextually
- Listen and speak effectively
- Develop proficiency in academic reading and writing
- Increase possibilities of job prospects
- Communicate confidently in formal and informal contexts

Syllabus

The following course activities will be conducted as part of the Advanced English Communication Skills (AECS) Lab:

1. **Inter-personal Communication and Building Vocabulary** - Starting a Conversation – Responding Appropriately and Relevantly – Using Appropriate Body Language – Role Play in Different Situations - Synonyms and Antonyms, One-word Substitutes, Prefixes and Suffixes, Idioms and Phrases and Collocations.
2. **Reading Comprehension** –General Vs Local Comprehension, Reading for Facts, Guessing Meanings from Context, , Skimming, Scanning, Inferring Meaning.
3. **Writing Skills** – Structure and Presentation of Different Types of Writing – Letter Writing/Resume Writing/ e-correspondence/ Technical Report Writing.

4. **Presentation Skills** – Oral Presentations (individual or group) through JAM Sessions/Seminars/PPTs and Written Presentations through Posters/Projects/Reports/e-mails/Assignments... etc.,
5. **Group Discussion and Interview Skills** – Dynamics of Group Discussion, Intervention, Summarizing, Modulation of Voice, Body Language, Relevance, Fluency and Organization of Ideas and Rubrics of Evaluation- Concept and Process, Pre-interview Planning, Opening Strategies, Answering Strategies, Interview through Tele-conference & Video-conference and Mock Interviews.

Minimum Hardware Requirement

Advanced English Communication Skills (AECS) Laboratory shall have the following infrastructural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics**
- **Eight round tables with five movable chairs for each table.**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **Computer with suitable configuration**

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass, 8th Edition**
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**

REFERENCES:

1. Kumar, Sanjay and Pushp Lata. *English for Effective Communication*, Oxford University Press, 2015.
2. Konar, Nira. *English Language Laboratories – A Comprehensive Manual*, PHI Learning Pvt. Ltd., 2011.

IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A70140	Remote Sensing & GIS	4	-	4
A70143	Transportation Engineering -II	4	-	4
A70138	Estimating & Costing	4	-	4
A70133	Water Resources Engineering-II	4	-	4
	Elective-II	4	-	4
A70330	Finite Element Methods			
A70134	Advanced Foundation Engineering			
A70145	Watershed Management			
A70136	Air Pollution and Control			
	Elective-III	4	-	4
A70135	Advanced Structural Design			
A70137	Earth and Rock fill Dams and Slope Stability			
A70144	Water Resources Systems Analysis			
A70139	Industrial Waste Water Treatment			
A70195	Concrete & Highway Materials Lab	1	3	2
A70192	Environmental Engineering Lab	1	3	2
	Total	24	6	28

IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	Elective-IV	4	-	4
A80151	Rehabilitation and Retrofitting of Structures			
A80148	Geo-Environmental Engineering			
A80147	Design and Drawing of Irrigation Structures			
A80141	Solid Waste Management			
A80150	Prestressed Concrete Structures	4	-	4
A80146	Construction Management	4	-	4
A80087	Industry Oriented Mini project	1	1	2
A80089	Seminar	1	6	2
A80088	Project Work	1	15	10
A80090	Comprehensive viva	1	1	2
	Total	12	21	28

Note: All End Examinations (Theory and Practical) are of three hours duration.

T-Tutorial L – Theory P – Practical D-Drawing C – Credits

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70140) REMOTE SENSING & GIS****UNIT – I**

Introduction to Photogrammetry: Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducial line.

UNIT – II

Remote Sensing –: Basic concept of Remote sensing, Data and Information, Remote sensing data Collection, Remote sensing advantages & Limitations, Remote Sensing process.

Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, vegetation), Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite, introduction to digital data, elements of visual interpretation techniques.

UNIT – III

Geographic Information Systems: Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data-Attribute data – Joining Spatial and Attribute data; GIS Operations: Spatial Data Input- Attribute data Management –Data display- Data Exploration- Data Analysis. COORDINATE SYSTEMS: Geographic Coordinate System: Approximation of the Earth, Datum; Map Projections: Types of Map Projections-Map projection parameters-Commonly used Map Projections - Projected coordinate Systems

UNIT –IV

Vector Data Model: Representation of simple features- Topology and its importance; coverage and its data structure, Shape file; Data models for composite features Object Based Vector Data Model; Classes and their Relationship; The geobase data model; Geometric representation of Spatial Feature and data structure, Topology rules

UNIT –V

Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data Conversion, Integration of Raster and Vector data.

Data Input: Metadata, Conversion of Existing data, Creating new data; Remote Sensing data, Field data, Text data, Digitizing, Scanning, on screen digitizing, importance of source map, Data Editing

TEXT BOOKS:

- 1 Remote sensing of the environment – An earth resource perspective – 2nd edition – by John R. Jensen, Pearson Education.
- 2 Introduction to Geographic Information System – Kang-Tsung Chang, Tata McGraw-Hill Education Private Limited.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70143) TRANSPORTATION ENGINEERING - II****UNIT – I**

Introduction to Railway : Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast, Gauge –Creep of Rails- Theories related to Creep – Sleeper density.

UNIT – II

Geometric Design of Railway Track: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve, Points and Crossing, Rail Joints & Welding of Joints, Railway station& Yards, Signalizing & interlocking.

UNIT – III

Airport Engineering: Airport Site selection – Runway Orientation – Basic Runway Length – Corrections for Elevation, Temperature – Airport Classification - Runway Geometric design – Factors Controlling Taxiway Layout - Terminal Area – Apron – Hangar – Blast Considerations, Typical Airport Layouts – Wind rose diagram - Runway Lightening system & Marking.

UNIT – IV

Port and Harbour Engineering: Requirements of Port and Harbour, Classification of Port & Harbour, Features of a Harbour, Planning of Harbour, Breakwaters, Dry docks, Jetties, Aprons, Transit shed and Warehouses, Navigational aids, Maintenance of Port and Harbours, Inland Water Transport

UNIT –V

Intelligent Transport Systems: ITS Definition, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications; Advanced Traffic Management systems (ATMS), Advanced Public Transportation systems (APTS), ITS architecture components and standards, Overview of ITS implementations in developed countries.

TEXT BOOKS:

1. Satish Chandra and Agarwal, M.M. (2007) "Railway Engineering" Oxford Higher Education, University Press New Delhi.
2. Airport Planning and Design- S.K. Khanna and M.G Arora, Nemchand Bros.
3. A Text book of Transportation Engineering – S.P.Chandola – S.Chand & Co. Ltd. – (2001).

4. Transportation Engineering and Planning – C.S. Papacostas, P.D.Prevedouros.

REFERENCES:

1. A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi.
2. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian.
3. Harbour, Dock and Tunnel Engineering – R. Srinivasan.
4. Dock and Harbour Engineering – Hasmukh P Oza, Gutam H Oza.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70138) ESTIMATING AND COSTING****UNIT – I**

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. Detailed Estimates of Buildings.

UNIT – II

Earthwork for roads and canals.

UNIT - III

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT -IV

Reinforcement bar bending and bar requirement schedules. Contracts – Types of contracts – Contract Documents – Conditions of contract.

UNIT – V

Valuation of buildings. Standard specifications for different items of building construction.

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie.

REFERENCES :

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.).
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
4. National Building Code.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem**

L	T/P/D	C
4	-/-	4

(A70133) WATER RESOURCES ENGINEERING-II**UNIT-I**

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation – Life of Reservoir.. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT-II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT-III

Earth dams: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT-IV

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations,-Silt Ejectors and Silt Excluders

Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT-V

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall.

Canal regulation works, design principles of distributory and head regulators, Cross Regulators -canal outlets, types of canal modules,

Cross Drainage works: types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers.
2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta.
3. Irrigation engineering by K.R.Arora.
4. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers.
5. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.
6. Engineering Hydrology by CS Pojha, R. Berndtsson and P. Bhunya, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70330) FINITE ELEMENT METHODS****(Elective-II)****UNIT – I**

Introduction to Finite Element Method – Basic Equations in Elasticity – stress strain equations – concept of plane stress – plane strain— advantages and disadvantages of FEM.

Element shapes – nodes – nodal degree of freedom – strain displacement relations.

UNIT – II

Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix

FEA Beam elements – stress strain relation- shape functions -stiffness matrix– continuous beams.

UNIT – III

FEA Two dimensional problem – CST – LST element – shape function – stress – strain.

Lagrangian – Serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element –shape functions.

UNIT – IV

Isoparametric formulation – Concepts of isoparametric elements for 2D analysis -formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements.

UNIT-V

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS:

1. Introduction to Finite elements in engineering by Chandrupatla, Belegundu, Prentice Hall.
2. Finite element method by Daryl L. Logan, CENGAGE Learning.

REFERENCES:

1. Finite element analysis by S.S. Bhavikatti-New age International publishers.
2. Finite element analysis by P. Seshu, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70134) ADVANCED FOUNDATION ENGINEERING****(Elective-II)****UNIT – I**

Introduction-Bearing capacity of Footings subjected to Eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soils - Elastic settlement of Footings embedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertamaunn's method, Janbu method.

UNIT – II

Pile Foundations – pile groups- settlement of pile groups resting in sands and clays - negative skin friction-under reamed piles-laterally loaded piles – ultimate lateral capacity - Broms Method - Reese and Matlock Approach.

UNIT – III

Lateral earth pressures theories – Rankine's and Coulomb's theories – Graphical Methods, Culmann's, Trial Wedge methods - Stability checks of cantilever and gravity retaining walls.

UNIT - IV

Cantilever and anchored sheet piles - earth pressure diagram - determination of depth of embedment in sands and clays – braced cuts - earth pressure diagrams – forces in struts.

UNIT – V

Foundations in Expansive Soils – problems in expansive soils – mechanism of swelling – swell pressure and swelling potential – heave – foundation practices – sand cushion – CNS technique – under-reamed pile foundations – granular pile anchor technique, stabilization of expansive soils.

TEXT BOOKS:

- 1) Das, B.M., - (1999) Principles of Foundation Engineering –4th edition PWS Publishing, Singapore.
- 2) Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill International.
- 3) Soil Mechanics and Foundation Engineering by V N S Murthy, CBS Publishers and Distributors.

REFERENCE BOOKS:

- 1) Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
- 2). Geotechnical Engineering by C. Venkataramah, NewAge International Pvt.Ltd, Publishers (2002).
- 3) Analysis and Design of Substructures – Swami Saran, Oxford & IBH Publishing Company Pvt.Ltd (1998).
- 4) Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.Ltd, Publishers (2002).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70145) WATERSHED MANAGEMENT****(Elective-II)****UNIT-I**

Introduction: Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management.

Characteristics of Watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-II

Watershed delineation – Runoff Computations from a watershed – Flood Frequency Analysis – Gumbell, Log Pearson and Weibull Methods of Analysis.

Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements

UNIT-III

Principles of Erosion: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.

Measures to Control Erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT-IV

Water Harvesting: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.

UNIT-V

Forest and Grass Land Management: Interpretation of Satellite Imageries- Land use and Land Cover. Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

Ecosystem Management: Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture, horticulture, social forestry and afforestation.

TEXT BOOKS:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awurbs and WP James, - Prentice Hall Publishers.

REFERENCE:

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70136) AIR POLLUTION AND CONTROL****(Elective -II)****UNIT – I**

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary air pollutants, Point, Line and Areal Sources of air pollution- Stationary and mobile sources. Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT – II

Meteorology and Plume Dispersion; Properties of atmosphere; Heat, Pressure, Wind forces, Moisture and Relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams. Lapse Rates, Pressure Systems, Winds and moisture, plume behavior and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-III

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.

Equipment's – Settling Chambers, Cyclone separators, filters, Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – IV

Control of gaseous emissions - General Methods of Control of NO_x and SO_x emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling – Adsorption – Absorption – Combustion.

UNIT – V

Air Quality Management – Monitoring of SPM, SO_x; NO_x and CO Emission Standards– Air sampling – Sampling Techniques – High volume air sampler – Stack sampling - Analysis of Air pollutants – Air quality standards – Air pollution control act.

TEXT BOOKS:

1. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
2. Air pollution by Wark and Warner.- Harper & Row, New York.

REFERENCE:

1. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70135) ADVANCED STRUCTURAL DESIGN****(Elective-III)****UNIT-I**

Design and Detailing of cantilever type of Retaining walls – Stability Check.
Principles of Counterfort Retaining walls and shelf type retaining walls.

UNIT-II

Design of Circular and Rectangular Water tanks at Ground level and elevated with staging.

UNIT-III

Design of Flat slabs- Design of Raft and pile foundations .

UNIT-IV

Design of Concrete Bridges – IRC loading Design of Stab bridge, T-beam girder bridge.

Introduction to Steel bridges.

UNIT-V

Design of RCC Chimneys Bunkers & Silos.

TEXT BOOKS:

1. Advanced Reinforced Concrete Structures by Varghese, Pranties Hall of India Pvt. Ltd.
2. Bridge Engineering by S Ponnuswamy Mc Graw Hill Co.
3. Reinforced Concrete Design by S.A. Pillai and D. Menon, Tata Mc. Grawhill Publishing Company.
4. Advanced Reinforced Concrete Structures by Krishna Raju.

REFERENCES :

1. Reinforced Concrete Structures Vol. 2 by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, Publications Pvt. Ltd., New Delhi.
2. Essentials of Bridge Engineering by D. John Son Victor, Oxford and IBM Publication Co., Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70137) EARTH AND ROCKFILL DAMS AND SLOPE STABILITY****(Elective-III)****UNIT-I**

Earth and Rockfill Dams: General features, Selection of site; Merits and demerits of the earth and rock fill dams, Classification of earth dams, Causes of failure, Safe design criteria. Instrumentation in earth dams: Pore pressure measurements, Settlement gauges, Inclinoimeters, Stress measurements, Seismic measurements.

UNIT-II

Failures, Damages and Protection of Earth Dams: Nature and importance of failure, Piping through embankment and foundations, Methods of seepage control through embankments and foundations, Design Criteria for filters, Treatment of upstream and down stream of slopes, Drainage control, Filter design.

UNIT-III

Slope Stability Analysis: Types of Failure: Failure surfaces - Planar surfaces, Circular surfaces, Non-circular surfaces, Limit equilibrium methods, Total stress analysis versus effective Stress analysis, Use of Bishop's pore pressure parameters, Short term and Long term stability in slopes. Taylor Charts.

UNIT-IV

Methods of Slope Stability: Method of Slices, Effect of Tension Cracks, Vertical Cuts. Bishop's Analysis, Bishop and Morgenstern Analysis, Non-circular Failure Surfaces: Janbu Analysis, Sliding Block Analysis, Seismic stability, Stabilization of slopes: Soil reinforcement (geosynthetics/soil nailing/micro piles etc), soil treatment (cement/lime treatment), surface protection (vegetation/erosion control mats/shotcrete).

UNIT-V

Rockfill Dams: Requirements of compacted rockfill, Shear strength of rockfill, Rockfill mixtures, Rockfill embankments, Earth-core Rockfill dams, Stability, Upstream & Downstream slopes.

Text Books:

1. Sherard, Woodward, Gizienski and Clevenger. Earth and Earth-Rock Dams. John Wiley & Sons. 1963.

References:

1. Bharat Singh and Sharma, H. D. – Earth and Rockfill Dams, 1999
2. Sowers, G. F. and Salley, H. I. – Earth and Rockfill Dams, Willams, R.C., and Wallace, T.S. 1965.
3. Abramson, L. W., Lee, T. S. and Sharma, S. - Slope Stability and Stabilisation methods – John Wiley & sons. (2002)
4. Bromhead, E. N. (1992). The Stability of Slopes, Blackie academic and professional, London.
5. Christian, Earth & Rockfill Dams – Principles of Design and Construction, Kutzner Published Oxford and IBH.
6. Ortiago, J. A. R. and Sayao, A. S. F. J. - Handbook of Slope Stabilisation, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70144) WATER RESOURCES SYSTEMS ANALYSIS****(Elective-III)****UNIT - I**

Introduction: Definition of system, Types of systems, System approach, System analysis and types of systems, Techniques of water resources system analysis.

Systems Techniques in Water Resources: Objective function and constraints, optimization using calculus, Optimization of a function of single variable, Optimization of a function of multiple variables, Constrained optimization, Kuhn – Tucker conditions.

UNIT - II

Linear programming –I: Formulation of linear programming models, graphical method, simplex method, application of Linear programming in water resources.

UNIT - III

Linear programming –II:

Revised simplex method, duality in linear programming, sensitivity and post optimality analysis.

UNIT - IV

Dynamics programming: Belman's principles of optimality forward and backward recursive dynamic programming, curse of dimensionality, application of dynamic programming for resource allocation.

UNIT - V

Water Resources Economics: Basics of Engineering economics, Discount factors, Uniform annual series, Amortization, Comparison of alternate plans. Principles of Economics analysis, Conditions of project optimality, benefit cost analysis socio economic intuitional and pricing of water resources.

TEXT BOOKS:

- 1 Water Resources System Analysis – Vedula & Mujumdar – Tata Mc. Graw Hill Company Ltd.
- 2 Water Resources Economics - James & Lee. Oxford Publishers 2005.

REFERENCES:

- 1 Operational Research by Taha, Printice Hall of India publishers.
- 2 Water Resources project Economic by Kuiper.E.
- 3 Engineering optimization: Theory and Practice, Rao, Singiresu S. New Age International.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70139) INDUSTRIAL WASTE WATER TREATMENT****(Elective-III)****UNIT – I**

Sources of Pollution – Physical, Chemical, Organic and Biological properties of Industrial Wastes – Differences between industrial and municipal waste waters – Effects of industrial effluents on sewers and Natural Water Bodies.

UNIT – II

Pre and Primary Treatment – Equalization, Proportioning, Neutralization, Oil Separation by Floatation – Waste Reduction - Volume Reduction – Strength Reduction.

UNIT – III

Waste Treatment Methods – Nitrification and De-nitrification – Phosphorous removal – Heavy metal removal – Membrane Separation Process – Air Stripping and Absorption Processes – Special Treatment Methods – Disposal of Treated Waste Water.

UNIT – IV

Characteristics and Composition of waste water and Manufacturing Processes of Industries like Sugar, Characteristics and Composition of Industries like Food Processing Industries, Steel, Petroleum Refineries,

UNIT – V

Characteristics and Composition of Industries like Textiles, Tanneries, Atomic Energy Plants and other Mineral Processing Industries - Joint Treatment of Raw Industrial waste water and Domestic Sewage – Common Effluent Treatment Plants (CETP) – Location, Design, Operation and Maintenance Problems – Economical aspects.

TEXT BOOKS

1. Industrial Waste Water Pollution Control by W. Wesley Eckenfelder – McGraw-Hill.
2. Industrial Waste Treatment by Rao & Datta.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A70195) CONCRETE AND HIGHWAY MATERIALS LAB**I. ROAD AGGREGATES:**

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. CEMENT AND CONCRETES :**TESTS ON CEMENTS :**

1. Normal Consistency of fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A70192) ENVIRONMENTAL ENGINEERING LAB**LIST OF EXPERIMENTS**

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination of iron.
6. Determination of Dissolved Oxygen.
7. Determination of Nitrates.
8. Determination of Optimum dose of coagulant
9. Determination of Chlorine demand
10. Determination of total Phosphorous.
11. Determination of B.O.D
12. Determination of C.O.D
13. Determination of Optimum coagulant dose.
14. Determination of Chlorine demand.
15. Presumptive coliform test.

NOTE : At least 8 of the above experiments are to be conducted.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80151) REHABILITATION AND RETROFITTING OF STRUCTURES****(Elective -IV)****UNIT – I**

Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention. Mechanism of Damage – Types of Damage

UNIT – II

Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – III

Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT – IV

Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning. Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – V

Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

TEXT BOOKS:

1. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.
2. Concrete Technology by A.R. Santakumar, Oxford University press.

REFERENCES

1. Defects and Deterioration in Buildings, EF & N Spon, London.
2. Non-Destructive Evaluation of Concrete Structures by Bungey – Surrey University Press.
3. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W.H. Ranso, (1981).
4. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B.A. Richardson, (1991).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80148) GEOENVIRONMENTAL ENGINEERING****(Elective-IV)****UNIT-I**

Sources and Site Characterization: Scope of Geo-environmental Engineering, Various Sources of Contaminations, Need for contaminated site characterization; and Characterization methods.

UNIT-II

Solid and Hazardous Waste Management: Classification of waste, Characterization solid wastes, Environmental Concerns with waste, waste management strategies.

UNIT-III

Contaminant Transport: Transport process, Mass-transfer process, Modeling, NAPL

UNIT-IV

Remediation Techniques: Objectives of site remediation, various active and passive methods, Bioremediation, Phytoremediation, Remediation of NAPL sites.

UNIT-V

Landfills: Types of landfills, Site Selection, Waste Containment Liners, Leachate collection system, Cover system, Gas collection system.

TEXT BOOKS:

1. Phillip B. Bedient, Refai, H. S. & Newell C. J. - Ground Water Contamination - Prentice Hall Publications, 4th Edition, 2008.
2. Sharma, H. D. and Reddy, K. R. - Geoenvironmental Engineering, John Wiley & Sons (2004).

REFERENCES:

1. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Handbook, Kluwer Academic, 2001.
2. Reddi, L. N. and Inyang, H. I. - Geoenvironmental Engineering Principles and Applications, Marcel. Dekker, Inc., New York (2000).
3. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. - Hazardous Waste Management, New York: McGraw-Hill, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem**

L	T/P/D	C
4	-/-/-	4

(A80147) DESIGN AND DRAWING OF IRRIGATION STRUCTURES**(Elective-IV)****Design and drawing of the following hydraulic structures.**

Group A

1. Surplus weir.
2. Syphon Well Drop
3. Trapezoidal notch fall.
4. Tank sluice with tower head

Group B

1. Sloping glacis weir.
2. Canal regulator
3. Under Tunnel.
4. Type III Syphon aqueduct

Final Examination pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks.

The duration of examination will be FOUR hours.

However, the students are supposed to practise the drawings for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Water Resources Engineering – Principles and Practice by Challa Satyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80141) SOLID WASTE MANAGEMENT****(Elective-IV)****UNIT I:**

Solid Waste and their Handling: Definition of solid wastes – types of solid wastes – Sources - Industrial, mining, agricultural and domestic – Characteristics. Solid waste Problems - impact on environmental health

UNIT II:

Collection, Segregation and Transport AND Management of Municipal Solid Wastes: Handling and segregation, Collection and storage of municipal solid wastes; analysis of Collection systems. Transfer stations – labeling and handling of hazardous wastes. Solid waste processing technologies. Mechanical and thermal volume reduction. Biological and chemical techniques for energy and other resource recovery: composting - types, vermicomposting, termigradation, fermentation. Incineration of solid wastes. Disposal in landfills: site selection, design, and operation of sanitary landfills; Leachate and landfill gas management; landfill closure and post-closure environmental monitoring; landfill remediation. Regulatory aspects of municipal solid waste management.

UNIT III:

Hazardous Waste and Management: Hazardous waste definition. Physical and biological routes of transport of hazardous substances – sources and characterization. Sampling and analysis of hazardous wastes –proximate analysis – survey analysis – directed analysis handling, collection, storage and transport. Hazardous waste treatment technologies TSDF concept - Physical, chemical and thermal treatment of hazardous waste: solidification, chemical fixation, encapsulation, pyrolysis and incineration. Hazardous waste land fills - Site selections, design and operation. HW reduction, recycling and reuse, Regulatory aspects of HWM/HWM rules.

UNIT IV:

Biomedical Waste Management: Classification, collection, segregation Treatment and disposal. Radioactive waste: Definition, Low level and high level radioactive wastes and their management, Radiation standards.

UNIT V:

E-Waste Management: Waste characteristics, generation, collection, transport and disposal, regulatory aspects of e waste, global strategy, recycling.

TEXT BOOKS:

1. Hazardous waste management Charles A. Wentz. Second edition 1995. McGraw Hill International.
2. Integrated solid waste management George Tchobanoglous, Hilary Theisen & Samuel A. Vigil.

REFERENCES:

1. Hazardous waste management by Prof. Anjaneyulu.
2. Criteria for hazardous waste landfills – CPCB guidelines 2000.
3. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
4. Management of Solid waste in developing countries by Frank Flintoff, WHO regional publications 1976.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80150) PRESTRESSED CONCRETE STRUCTURES****UNIT I:**

Introduction: Historic development- General principles of prestressing pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics.

Methods and Systems of prestressing: Pretensioning and Posttensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford- Udall System- Lee McCall system.

UNIT II:

Losses of Prestress: Loss of prestress in pretensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

UNIT III:

Flexure: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC beams of rectangular and I sections- Kern line – Cable profile and cable layout.

Shear: General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- Bureau of Indian Standards (BIS) Code provisions.

UNIT IV:

Transfer of Prestress in Pretensioned Members : Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zielinski and Rowe's methods – Anchorage zone reinforcement- BIS Provisions

UNIT V

Composite Beams: Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

Deflections: Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long

time deflections- BIS code requirements.

TEXT BOOK:

- 1) Prestressed concrete by N.Krishna Raju, 5th Edition, Tata McGraw Hill Book Education Pvt. Ltd.

REFERENCES :

- 1) Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York.
- 2) Prestressed concrete by S. Ramamrutham, Dhanpat Rai & Sons, Delhi.
- 3) Prestressed Concrete by N. Rajagopalan, Narosa Publishing House.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80146) CONSTRUCTION MANAGEMENT****UNIT-I**

Management process- Roles . management theories . Social responsibilities. planning and strategic management . strategy implementation . Decision making: tools and techniques – Organizational structure . Human resource management- motivation performance- leadership.

UNIT-II

Classification of Construction projects, Construction stages, Resources- Functions of Construction Management and its Applications .Preliminary Planning- Collection of Data-Contract Planning – Scientific Methods of Management: Network Techniques in construction management - Bar chart, Gant chart, CPM, PERT- Cost & Time optimization.

UNIT-III

Resource planning - planning for manpower, materials, costs, equipment. Labour, -Scheduling .Forms of scheduling - Resource allocation . budget and budgetary control methods

UNIT-IV

Contract - types of contract, contract document, specification, important conditions of contract – tender and tender document - Deposits by the contractor - Arbitration . negotiation - M.Book - Muster roll -stores.

UNIT-V

Management Information System - Labour Regulations: Social Security - welfare Legislation - Laws relating to Wages, Bonus and Industrial disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act -other labour Laws - Safety in construction : legal and financial aspects of accidents in construction . occupational and safety hazard assessment. Human factors in safety . legal and financial aspects of accidents in construction . occupational and safety hazard assessment

TEXT BOOKS

1. Ghalot, P.S., Dhir,D.M., Construction Planning and Management, Wiley Eastern Limited,1992.
2. Chitkara,K.K., Construction Project Management, Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
3. Punmia,B,C., Project Planning and Control with PERT and CPM, Laxmi Publications, new delhi,1987.

REFERENCE:

1. Construction Management And Planning by: sengupta, b. /guha, h. tata mcgraw-hill publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/-/-	2

(A80087) INDUSTRY ORIENTED MINI PROJECT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/6/-	2

(A80089) SEMINAR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/15/-	10

(A80088) PROJECT WORK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/-/-	2

(A80090) COMPREHENSIVE VIVA

BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

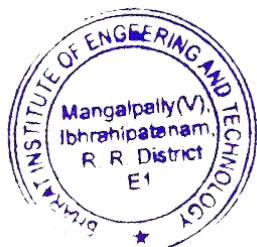
Mangalpally (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Telangana-501510

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

B.Tech-Civil ENGINEERING

2017-18

S. No.	Regulations	No. of Course	Year of Study
1.	R16	15	I & II year I & II semester
2.	R15	5	III Year I & II Semesters
3.	R13	3	IV year I & II Semesters



Vettikanti Subu
PRINCIPAL
Principal
Bharat Institute of Engg. and Tech
Mangalpally(V), Ibrahimpatnam(M)
Ranga Reddy (Dist)-Telangana-501510

With effect from 02/08/2016

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. COURSE STRUCTURE (2016-17)

(Common for Civil, ME, AE, ME (M), MME, AU, Mining, Petroleum, CEE, ME (Nanotech))

I YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	MA102BS	Mathematics-II	4	1	0	4
3	PH103BS	Engineering Physics	3	0	0	3
4	CS104ES	Computer Programming in C	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	ME106ES	Engineering Graphics	2	0	4	4
7	PH107BS	Engineering Physics Lab	0	0	3	2
8	CS108ES	Computer Programming in C Lab	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		Total Credits	18	2	10	24

I YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	AP201BS	Applied Physics	3	0	0	3
2	CH202BS	Engineering Chemistry	4	0	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	EN204HS	Professional Communication in English	3	0	0	3
5	EE205ES	Basic Electrical & Electronics Engineering	4	0	0	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	EN207HS	English Language Communication Skills Lab	0	0	3	2
8	ME208ES	Engineering Workshop	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		Total Credits	18	1	9	24

*Mandatory Course

MATHEMATICS- I
(Linear Algebra and Differential Equations)

B.Tech. I Year I Sem.
Course Code: **MA101BS**

L T/P/D C
3 1/0/0 3

Prerequisites: Foundation course (No prerequisites).

Course Objectives:

To learn

- types of matrices and their properties
- the concept of rank of a matrix and applying the same to understand the consistency
- solving the linear systems
- the concepts of eigen values and eigen vectors and reducing the quadratic forms into their canonical forms
- partial differentiation, concept of total derivative
- finding maxima and minima of functions of two variables
- methods of solving the linear differential equations of first and higher order
- the applications of the differential equations
- formation of the partial differential equations and solving the first order equations.

Course Outcomes:

After learning the contents of this paper the student must be able to

- write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
- find the Eigen values and Eigen vectors which come across under linear transformations
- find the extreme values of functions of two variables with/ without constraints.
- identify whether the given first order DE is exact or not
- solve higher order DE's and apply them for solving some real world problems

UNIT-I

Initial Value Problems and Applications

Exact differential equations - Reducible to exact.

Linear differential equations of higher order with constant coefficients: Non homogeneous terms with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$, $xV(x)$ - Operator form of the differential equation, finding particular integral using inverse operator, Wronskian of functions, method of variation of parameters.

Applications: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories, Electrical circuits.

UNIT-II

Linear Systems of Equations

Types of real matrices and complex matrices, rank, echelon form, normal form, consistency and solution of linear systems (homogeneous and Non-homogeneous) - Gauss elimination, Gauss Jordan and LU decomposition methods- Applications: Finding current in the electrical circuits.

UNIT–III

Eigen values, Eigen Vectors and Quadratic Forms

Eigen values, Eigen vectors and their properties, Cayley - Hamilton theorem (without proof), Inverse and powers of a matrix using Cayley - Hamilton theorem, Diagonalization, Quadratic forms, Reduction of Quadratic forms into their canonical form, rank and nature of the Quadratic forms – Index and signature.

UNIT–IV

Partial Differentiation

Introduction of partial differentiation, homogeneous function, Euler's theorem, total derivative, Chain rule, Taylor's and Mclaurin's series expansion of functions of two variables, functional dependence, Jacobian.

Applications: maxima and minima of functions of two variables without constraints and Lagrange's method (with constraints)

UNIT-V

First Order Partial Differential Equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Lagranges method to solve the first order linear equations and the standard type methods to solve the non linear equations.

Text Books:

1. A first course in differential equations with modeling applications by Dennis G. Zill, Cengage Learning publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.

References:

1. Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons Publisher.
2. Engineering Mathematics by N. P. Bali, Lakshmi Publications.

MATHEMATICS- II (Advanced Calculus)

B.Tech. I Year I Sem.

Course Code: MA102BS/MA202BS

L	T/P/D	C
4	1/0/0	4

Prerequisites: Foundation course (No prerequisites).

Course Objectives:

To learn

- concepts & properties of Laplace Transforms
- solving differential equations using Laplace transform techniques
- evaluation of integrals using Beta and Gamma Functions
- evaluation of multiple integrals and applying them to compute the volume and areas of regions
- the physical quantities involved in engineering field related to the vector valued functions.
- the basic properties of vector valued functions and their applications to line, surface and volume integrals.

Course Outcomes:

After learning the contents of this course the student must be able to

- use Laplace transform techniques for solving DE's
- evaluate integrals using Beta and Gamma functions
- evaluate the multiple integrals and can apply these concepts to find areas, volumes, moment of inertia etc of regions on a plane or in space
- evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I

Laplace Transforms: Laplace transforms of standard functions, Shifting theorems, derivatives and integrals, properties- Unit step function, Dirac's delta function, Periodic function, Inverse Laplace transforms, Convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT-II

Beta and Gamma Functions: Beta and Gamma functions, properties, relation between Beta and Gamma functions, evaluation of integrals using Beta and Gamma functions.

Applications: Evaluation of integrals.

UNIT-III

Multiple Integrals: Double and triple integrals, Change of variables, Change of order of integration.

Applications: Finding areas, volumes & Center of gravity (evaluation using Beta and Gamma functions).

UNIT–IV

Vector Differentiation: Scalar and vector point functions, Gradient, Divergence, Curl and their physical and geometrical interpretation, Laplacian operator, Vector identities.

UNIT–V

Vector Integration: Line Integral, Work done, Potential function, area, surface and volume integrals, Vector integral theorems: Greens, Stokes and Gauss divergence theorems (without proof) and related problems.

Text Books:

1. Advanced Engineering Mathematics by R K Jain & S R K Iyengar, Narosa Publishers
2. Engineering Mathematics by Srimanthapal and Subodh C. Bhunia, Oxford Publishers

References:

1. Advanced Engineering Mathematics by Peter V. O. Neil, Cengage Learning Publishers.
2. Advanced Engineering Mathematics by Lawrence Turyn, CRC Press

ENGINEERING PHYSICS/ENGINEERING PHYSICS - I

B.Tech. I Year I Sem.
Course Code: **PH103BS**

L T/P/D C
3 0/0/0 3

Course Objectives:

- To understand interaction of light with matter through interference, diffraction and polarization.
- To able to distinguish ordinary light with a laser light and to realize propagation of light through optical fibers.
- To understand various crystal systems and there structures elaborately.
- To study various crystal imperfections and probing methods like X-RD.

Course outcomes: after completion of this course the student is able to

- Realize the importance of light phenomena in thin films and resolution.
- Learn principle, working of various laser systems and light propagation through optical fibers.
- Distinguish various crystal systems and understand atomic packing factor.
- Know the various defects in crystals.

UNIT-I

Interference: Coherence, division of amplitude and division of wave front, interference in thin films (transmitted and reflected light), Newton's rings experiment.

Diffraction: Distinction between Fresnel and Fraunhofer diffraction, diffraction due to single slit, N-slits, Diffraction grating experiment.

UNIT-II

Polarization: Introduction, Malus's law, double refraction, Nicol prism, Quarter wave and half wave plates.

Lasers: Characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein coefficients, population inversion, ruby laser, helium – neon laser, semi conductor laser, applications of lasers

UNIT-III

Fiber Optics: Principle of optical fiber, construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: step index and graded index fibers, attenuation in optical fibers, applications of optical fibers in medicine and sensors.

UNIT-IV

Crystallography: Space lattice, unit cell and lattice parameters, crystal systems, Bravais lattices, atomic radius, co-ordination number and packing factor of SC, BCC, FCC, HCP and diamond, Miller indices, crystal planes and directions, inter planar spacing of orthogonal crystal systems.

UNIT-V

X-ray Diffraction and Defects in Crystals: Bragg's law, X-ray diffraction methods: Laue method, powder method; point defects: vacancies, substitutional, interstitial, Frenkel and

Schottky defects, line defects (qualitative) and Burger's vector, surface defects: stacking faults, twin, tilt and grain boundaries.

Text Books:

1. Physics Vol. 2, Halliday, Resnick and Kramer John Wiley and Sons, Edition 4.
2. Modern Engineering Physics, K. Vijaya Kumar and S. Chandra Lingam, S. Chand and Co. Pvt. Ltd.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Student edition.

Reference Books:

1. X-Ray Crystallography, Phillips, John Wiley publishers.
2. Waves, Frank S Crawford Jr, Berkeley Physics course, Volume 3.
3. Solid State Physics, AJ Dekker, MacMilan Publishers.
4. Introduction to Crystallography, Phillips, John Wiley publishers.

COMPUTER PROGRAMMING IN C

B.Tech. I Year I Sem.

Course Code: CS104ES/CS204ES

L T/P/D C

3 0/0/0 3

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in Program development.
- To learn the syntax and semantics of C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs using structured programming approach in C to solve problems.

Course Outcomes:

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to write algorithms for solving problems.
- Ability to draw flowcharts for solving problems.
- Ability to code a given logic in C programming language.
- Gain knowledge in using C language for solving problems.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development, algorithms and flowcharts , Number systems-Binary, Decimal, Hexadecimal and Conversions, storing integers and real numbers.

Introduction to C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - II

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs.

Arrays – Concepts, using arrays in C, inter function communication, array applications- linear search, binary search and bubble sort, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

UNIT - IV

Enumerated, Structure ,and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command–line arguments, Preprocessor commands.

UNIT – V

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions (fseek ,rewind and ftell), C program examples.

Text books:

- 1) Computer Science: A Structured Programming Approach Using C, B.A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
- 2) Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press.

Reference books:

- 1) The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
- 2) Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) Pvt Ltd.
- 3) C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
- 4) Basic computation and Programming with C, Subrata Saha and S. Mukherjee, Cambridge University Press.

ENGINEERING MECHANICS

B.Tech. I Year I Sem.
Course Code: ME105ES

L T/P/D C
3 0/0/0 3

Pre Requisites: None

Course Objectives:

- To understand the resolving forces and moments for a given force system
- To analyze the types of friction for moving bodies and problems related to friction.
- To determine the centroid and second moment of area

UNIT-I

Introduction to Mechanics: Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

UNIT-II

Friction: Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions -Motion of Bodies –Wedge Screw, Screw-jack and differential screw –jack.

UNIT-III

Centroid and Center of Gravity: Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity of Bodies – Centroids of Volumes – Center of gravity of composite bodies.

Area moments of Inertia: Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration. Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.

UNIT-IV

Mass Moment of Inertia: Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies.

Virtual Work: Theory of virtual work-Application.

UNIT-V

Kinetics: Kinetics of a particle-D'Alemberts principle-Motion in a curved path – work, energy and power. Principle of conservation of energy- Kinetics of rigid body in translation, rotation-work done-Principle of work-energy-Impulse-momentum.

Mechanical Vibrations: Definitions, Concepts-Simple Harmonic motion- free vibrations-Simple and compound pendulums

Text Books:

1. Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy, J. Suresh Kumar/ BSP
2. Engineering Mechanics/ Irving Shames, G. Krishna Mohan Rao / Prentice Hall

3. Foundations and applications of Engineering Mechanics by HD Ram and AK Chouhan, Cambridge publications.

References:

1. A Text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain / Academic Publishing Company
2. Engineering Mechanics / Bhattacharyya/ Oxford.

ENGINEERING GRAPHICS

B.Tech. I Year I Sem.

Course Code: ME106ES/ME205ES

L T/P/D C

2 0/0/4 4

Pre-requisites: None

Course objectives:

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

Course Outcomes:

- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid Involute. Scales – Plain, Diagonal and Vernier Scales.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines Projections of Plane regular geometric figures.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views.

UNIT – IV

Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere. Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions Auto CAD: Basic principles only.

Text books:

- Engineering Drawing / Basant Agrawal and Mc Agrawal/ Mc Graw Hill
- Engineering Drawing/ M.B. Shah, B.C. Rane / Pearson.

Reference books:

- Engineering Drawing / N.S. Parthasarathy and Vela Murali/ Oxford
- Engineering Drawing N.D. Bhatt / Charotar

ENGINEERING PHYSICS LAB

B.Tech. I Year I Sem.

Course Code: **PH107BS/PH207BS**

L	T/P/D	C
0	0/3/0	2

(Any TEN experiments compulsory)

- 1) Dispersive power of the material of a prism – Spectrometer.
- 2) Determination of wavelengths of white source – Diffraction grating.
- 3) Newton's Rings – Radius of curvature of Plano convex lens.
- 4) Melde's experiment – Transverse and longitudinal modes.
- 5) Charging, discharging and time constant of an R-C circuit.
- 6) L-C-R circuit – Resonance & Q-factor.
- 7) Magnetic field along the axis of current carrying coil – Stewart and Gees method and to verify Biot – Savart's law.
- 8) Study the characteristics of LED and LASER diode.
- 9) Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
- 10) Energy gap of a material of p-n junction.
- 11) Torsional pendulum – Rigidity modulus.
- 12) Wavelength of light, resolving power and dispersive power of a diffraction grating using laser.
- 13) V-I characteristics of a solar cell.

COMPUTER PROGRAMMING IN C LAB

B.Tech. I Year I Sem.
Course Code: CS108ES/CS208ES

L T/P/D C
0 0/3/0 2

Course Objective:

- To write programs in C using structured programming approach to solve the problems.

Course Outcomes

- 1. Ability to design and test programs to solve mathematical and scientific problems.
- 2. Ability to write structured programs using control structures and functions.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- GNU C Compiler

- Write a C program to find the factorial of a positive integer.
 - Write a C program to find the roots of a quadratic equation.
- Write a C program to determine if the given number is a prime number or not.
 - A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- Write a C program to construct a pyramid of numbers.
 - Write a C program to calculate the following Sum:
$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- The least common multiple (lcm) of two positive integers a and b is the smallest integer that is evenly divisible by both a and b. Write a C program that reads two integers and calls lcm (a, b) function that takes two integer arguments and returns their lcm. The lcm (a, b) function should calculate the least common multiple by calling the gcd (a, b) function and using the following relation:
$$\text{LCM}(a,b) = ab / \text{gcd}(a,b)$$
 - Write a C program that reads two integers n and r to compute the ncr value using the following relation:
$$\text{ncr}(n,r) = n! / r! (n-r)! .$$
 Use a function for computing the factorial value of an integer.
- Write C program that reads two integers x and n and calls a recursive function to compute x^n
 - Write a C program that uses a recursive function to solve the Towers of Hanoi problem.
 - Write a C program that reads two integers and calls a recursive function to compute ncr value.
- Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user using Sieve of Eratosthenes algorithm.
 - Write a C program that uses non recursive function to search for a Key value in a given list of integers. Use linear search method.
- Write a menu-driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
 - Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers. Use binary search method.

8. a) Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
 b) Write a C program that reads two matrices and uses functions to perform the following:
 - i) Addition of two matrices
 - ii) Multiplication of two matrices
9. a) Write a C program that uses functions to perform the following operations:
 - i) to insert a sub-string into a given main string from a given position.
 - ii) to delete n characters from a given position in a given string.
 b) Write a C program that uses a non recursive function to determine if the given string is a palindrome or not.
10. a) Write a C program to replace a substring with another in a given line of text.
 b) Write a C program that reads 15 names each of up to 30 characters, stores them in an array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.
11. a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
 b) Write a C program to convert a positive integer to a roman numeral. Ex. 11 is converted to XI.
12. a) Write a C program to display the contents of a file to standard output device.
 b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
13. a) Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command-line arguments.
 b) Write a C program to compare two files, printing the first line where they differ.
14. a) Write a C program to change the nth character (byte) in a text file. Use fseek function.
 b) Write a C program to reverse the first n characters in a file. The file name and n are specified on the command line. Use fseek function.
15. a) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).
 b) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

Reference Books:

1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
2. Computer Programming in C, V. Rajaraman, PHI.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. C++: The complete reference, H. Schildt, TMH Publishers.

w. e. f. AY 2016-17

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. COURSE STRUCTURE (2016-17)

(Common for Civil, ME, AE, ME (M), MME, AU, Mining, Petroleum, CEE, ME (Nanotech))

I YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	AP201BS	Applied Physics	3	0	0	3
2	CH202BS	Engineering Chemistry	4	0	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	EN204HS	Professional Communication in English	3	0	0	3
5	EE205ES	Basic Electrical & Electronics Engineering	4	0	0	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	EN207HS	English Language Communication Skills Lab	0	0	3	2
8	ME208ES	Engineering Workshop	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		Total Credits	18	1	9	24

*Mandatory Course

AP201BS: APPLIED PHYSICS

B.Tech. I Year II Sem.

L	T/P/D	C
3	0/0/0	3

Course Objectives:

- To understand the elastic behavior of materials.
- To understand basic principles of acoustics and architecture of buildings.
- To study production and applications of ultrasonics.
- To understand magnetic, dielectric and superconducting properties.

Course Outcomes: after completion of this course the student is able to

- Realize the importance of elastic behavior of materials.
- Learn Sabine's formula for reverberation time and apply in architecture of buildings.
- Learn various methods of producing ultrasonics and their uses.
- Learn magnetic, dielectric and superconducting properties of materials and their applications.

UNIT - I

Elastic properties: stress and strain, Hooke's law, elastic behavior of a material, factors affecting elasticity, three moduli of elasticity, work done for unit volume in deforming a body, relation between three moduli of elasticity, determination of rigidity modulus – torsional pendulum.

UNIT - II

Acoustics of buildings and acoustic quieting: Introduction, basic requirement for the acoustically good halls, reverberation and time of reverberation, transmission of sound and transmission loss, factors affecting the architectural acoustics and their remedy, sound absorbing materials, sabine formulae, absorption coefficients, stadium seating, movie theater, acoustic quieting,

UNIT - III

Ultrasonics: Introduction, production of ultrasonic waves, magnetostriction method, piezo electric method, detection of ultrasonic waves, properties of ultrasonic waves, use of ultrasonics for nondestructive testing, applications of ultrasonics.

UNIT - IV

Dielectric Properties: Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, electronic, ionic and orientation polarizations and calculation of their polarizabilities, internal field, Clausius-Mossotti relation, Piezoelectricity, pyroelectricity and ferroelectricity-BaTiO₃ structure.

UNIT - V

Magnetic Properties: Permeability, field intensity, magnetic field induction, magnetization, magnetic susceptibility, origin of magnetic moment, Bohr magneton, classification of dia, para

and ferro magnetic materials on the basis of magnetic moment, hysteresis curve based on domain theory, soft and hard magnetic materials, properties of anti-ferro and ferri magnetic materials.

Superconductivity: Superconductivity phenomenon, Meissner effect, applications of superconductivity.

Text books:

1. Solid State Physics, A. J. Dekkar, MacMillan publishers
2. Fundamentals of Physics, Alan Giambattisa, BM Richardson and Robert C Richardson, Tata McGraw hill Publishers
3. Fundamentals of Acoustics, Kinster and Frey, John Wiley and Sons.

Reference Books:

1. Solid state physics, Charles Kittel, Wiley student edition
2. University Physics, Francis W. Sears, Hugh D. Young, Marle Zeemansky and Roger A Freedman, Pearson Education.
3. Introduction to Magnetic Materials, B.D. Cullity, C.D.Graham, A John Wiley & Sons, Inc., Publication.
4. Elastic and Inelastic Stress Analysis, Irving H. Shames, Francis A. Cozzarelli, Taylor, & Francis Group.

CH102BS/CH202BS: ENGINEERING CHEMISTRY

B.Tech. I Year II Sem.

L T/P/D C
4 0/0/0 4

Course Objectives:

- To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
- To include the importance of water in industrial usage, significance of corrosion control to protect the structures, polymers and their controlled usage.
- To acquire knowledge of engineering materials and about fuels and batteries.
- To acquire required knowledge about engineering materials like cement, refractories and composites..

Course Outcomes:

- Students will gain the basic knowledge of electrochemical procedures related to corrosion and its control.
- They can understand the basic properties of water and its usage in domestic and industrial purposes.
- They learn the use of fundamental principles to make predictions about the general properties of materials.
- They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs

UNIT - I

Water and its treatment: Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Numerical problems. Potable water and its specifications- Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and Ozonization. Defluoridation – Nalgonda technique - Determination of F^- ion by ion- selective electrode method.

Boiler troubles: sludges, scales, and Caustic embrittlement. Internal treatment of Boiler feed water – Calgon conditioning – Phosphate conditioning - Colloidal conditioning – Softening of water by ion-exchange processes. Desalination of water – Reverse osmosis. Numerical problems – Sewage water - Steps involved in treatment of sewage.

UNIT - II

Electrochemistry: Electrode- electrode potential, standard electrode potential, types of electrodes – Construction and functioning of Standard hydrogen electrode, calomel and glass electrode. Nernst equation - electrochemical series and its applications. Electrochemical cells: Daniel cell – cell notation, cell reaction, and cell emf — Concept of concentration cells – Electrolyte concentration cell – Numerical problems.

Batteries: Cell and battery - Primary battery (dry cell, alkaline cell and Lithium cell) and Secondary battery (lead acid, Ni-Cd and lithium ion cell), **Fuel cells:** Hydrogen –oxygen and methanol-oxygen fuel cells – Applications.

UNIT – III

Polymers: Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples.

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, compounding, and fabrication of plastics (compression and injection moulding). Preparation, Properties, and engineering applications of PVC and Bakelite.

Fibers: Characteristics of fibers – preparation, properties and applications of Nylon-6,6 and Dacron. Fiber reinforced plastics (FRP) – Applications.

Rubbers: Natural rubber and its vulcanization - compounding of rubber.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT - IV

Fuels & Combustion: Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG. **Combustion:** Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel.

UNIT - V

Cement: Portland cement, its composition, setting and hardening of Portland cement.

Special cements: White cement, water proof cement, High alumina cement, and Acid resistant cement.

Refractories: Classification, characteristics of good refractories, Refractoriness, refractoriness under load, porosity, and chemical inertness – applications of refractories.

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

Composites: Introduction- Constituents of composites – advantages, classification and constituents of composites. Applications of composites.

Text books:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpatrai Publishing Company, New Delhi (2010)

2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, New Delhi. (2016)

Reference Books:

1. Engineering Chemistry by Shashi Chawla, Dhanpatrai & Company (P) Ltd. Delhi (2011)
2. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
3. Engineering Chemistry by Thirumala Chary and Laxminarayana, Scitech Publishers, Chennai (2016).

MA203BS: Mathematics - III
(Statistical and Numerical Methods)

B.Tech. I Year II Sem.

L T/P/D C
4 1/0/0 4

Prerequisites: Foundation course (No prerequisites).

Course Objectives: To learn

- random variables that describe randomness or an uncertainty in certain realistic situation
- binomial geometric and normal distributions
- sampling distribution of mean, variance, point estimation and interval estimation
- the testing of hypothesis and ANOVA
- the topics those deals with methods to find roots of an equation
- to fit a desired curve by the method of least squares for the given data
- solving ordinary differential equations using numerical techniques

Course Outcomes: After learning the contents of this course the student must be able to

- differentiate among random variables involved in the probability models which are useful for all branches of engineering
- calculate mean, proportions and variances of sampling distributions and to make important decisions s for few samples which are taken from a large data
- solve the tests of ANOVA for classified data
- find the root of a given equation and solution of a system of equations
- fit a curve for a given data
- find the numerical solutions for a given first order initial value problem

UNIT – I

Random variables and Distributions:

Introduction, Random variables, Discrete random variable, Continuous random variable, Probability distribution function, Probability density function, Expectation, Moment generating function, Moments, and properties.

Discrete distributions: Binomial and geometric distributions. Continuous distribution: Normal distributions.

UNIT – II

Sampling Theory: Introduction, Population and samples, Sampling distribution of means (σ Known)-Central limit theorem, t-distribution, Sampling distribution of means (σ unknown)-Sampling distribution of variances – χ^2 and F- distributions, Point estimation, Maximum error of estimate, Interval estimation.

UNIT – III

Tests of Hypothesis: Introduction, Hypothesis, Null and Alternative Hypothesis, Type I and Type II errors, Level of significance, One tail and two-tail tests, Tests concerning one mean

and proportion, two means-proportions and their differences-ANOVA for one-way classified data.

UNIT – IV

Algebraic and Transcendental Equations & Curve Fitting: Introduction, Bisection Method, Method of False position, Iteration methods: fixed point iteration and Newton Raphson methods. Solving linear system of equations by Gauss-Jacobi and Gauss-Seidal Methods.

Curve Fitting: Fitting a linear, second degree, exponential, power curve by method of least squares.

UNIT – V

Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule- Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule- Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Runge-Kutta method (second and fourth order)

Text Books:

1. Probability and Statistics for Engineers by Richard Arnold Johnson, Irwin Miller and John E. Freund, New Delhi, Prentice Hall.
2. Probability and Statistics for Engineers and Sciences by Jay L. Devore, Cengage Learning.
3. Numerical Methods for Scientific and Engineering Computation by M. K. Jain, S. R. K. Iyengar and R. K. Jain, New Age International Publishers

References:

1. Fundamentals of Mathematical Statistics by S. C. Gupta & V. K. Kapoor, S. Chand.
2. Introductory Methods of Numerical Analysis by S. S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematics for engineers and scientists by Alan Jeffrey, 6th edition, CRC press.

INTRODUCTION:

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic and communicative competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts/poems silently leading to reading comprehension. Reading comprehension passages are given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind. For example, from newspaper articles, advertisements, promotional material, etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills.*

Course Objectives: The course will help students to:

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively using the theoretical and Practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students will be able to:

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in formal and informal contexts.

SYLLABUS**Reading Skills****Objectives**

1. To develop an awareness in students about the significance of silent reading and comprehension.
2. To develop students' ability to guess meanings of words from the context and grasp the overall message of the text, draw inferences, etc., by way of:
 - Skimming and Scanning the text
 - Intensive and Extensive Reading
 - Reading for Pleasure
 - Identifying the topic sentence
 - Inferring lexical and contextual meaning

- Recognizing Coherence/Sequencing of Sentences

NOTE: The students will be trained in reading skills using the prescribed texts for detailed study. They will be tested in reading comprehension of different ‘unseen’ passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To create an awareness in students about the components of different forms of writing, beginning with the lower order ones through;
 - Writing of sentences
 - Use of appropriate vocabulary
 - Paragraph writing
 - Coherence and cohesiveness
 - Narration / description
 - Note Making
 - Formal and informal letter writing
 - Describing graphs using expressions of comparison

In order to improve the proficiency of the students in the acquisition of language skills mentioned above, the following text and course contents, divided into Five Units, are prescribed:

The course content / study material is divided into **Five Units**.

Note: *Listening and speaking skills are covered in the syllabus of ELCS Lab.*

UNIT – I

Chapter entitled ‘*Presidential Address*’ by *Dr. A.P.J. Kalam* from “*Fluency in English– A Course book for Engineering Students*” published by Orient BlackSwan, Hyderabad.

Vocabulary: Word Formation -- Root Words --The Use of Prefixes and Suffixes-- Collocations-- Exercises for Practice.

Grammar: Punctuation – Parts of Speech- Articles -Exercises for Practice.

Reading: *Double Angels* by David Scott-Reading and Its Importance- Techniques for Effective Reading- Signal Words- Exercises for Practice

Writing: Writing Sentences- Techniques for Effective Writing-- Paragraph Writing- Types, Structure and Features of a Paragraph-Coherence and Cohesiveness: Logical, Lexical and Grammatical Devices - Exercises for Practice

UNIT – II

Chapter entitled *Satya Nadella: Email to Employees on his First Day as CEO* from “*Fluency in English– A Course book for Engineering Students*” Published by Orient BlackSwan, Hyderabad.

Vocabulary: Synonyms and Antonyms – Homonyms, Homophones, Homographs- Exercises for Practice (Chapter 17 '*Technical Communication- Principles and Practice*'. *Third Edition* published by Oxford University Press may also be followed.)

Grammar: Verbs-Transitive, Intransitive and Non-finite Verbs – Mood and Tense—Gerund – Words with Appropriate Prepositions – Phrasal Verbs - Exercises for Practice

Reading: Sub-skills of Reading- Skimming, Scanning, Extensive Reading and Intensive Reading - *The Road Not Taken* by **Robert Frost** -- Exercises for Practice

Writing: Letter Writing –Format, Styles, Parts, Language to be used in Formal Letters- Letter of Apology – Letter of Complaint-Letter of Inquiry with Reply – Letter of Requisition -- Exercises for Practice

UNIT – III

From the book entitled '*Technical Communication- Principles and Practice*'. *Third Edition* published by Oxford University Press.

Vocabulary: Introduction- A Brief History of Words – Using the Dictionary and Thesaurus– Changing Words from One Form to Another – Confusables (From Chapter 17 entitled '*Grammar and Vocabulary Development*')

Grammar: Tenses: Present Tense- Past Tense- Future Tense- Active Voice – Passive Voice- Conditional Sentences – Adjective and Degrees of Comparison. (From Chapter 17 entitled '*Grammar and Vocabulary Development*')

Reading: Improving Comprehension Skills – Techniques for Good Comprehension- Skimming and Scanning- Non-verbal Signals – Structure of the Text – Structure of Paragraphs – Punctuation – Author's viewpoint (Inference) – Reader Anticipation: Determining the Meaning of Words – Summarizing- Typical Reading Comprehension Questions. (From Chapter 10 entitled '*Reading Comprehension*')

Writing: Introduction- Letter Writing-Writing the Cover Letter- Cover Letters Accompanying Resumes- Emails. (From Chapter 15 entitled '*Formal Letters, Memos, and Email*')

UNIT – IV

Chapter entitled '*Good Manners*' by **J.C. Hill** from *Fluency in English – A Course book for Engineering Students*" published by Orient Blackswan, Hyderabad.

Vocabulary: Idiomatic Expressions –One- word Substitutes --- Exercises for Practice (Chapter 17 '*Technical Communication- Principles and Practice*'. *Third Edition* published by Oxford University Press may also be followed.)

Grammar: Sequence of Tenses- Concord (Subject in Agreement with the Verb) – Exercises for Practice

Reading: '*If*' poem by **Rudyard Kipling**--Tips for Writing a Review --- Author's Viewpoint – Reader's Anticipation-- Herein the Students will be required to Read and Submit a Review of a Book (Literary or Non-literary) of their choice – Exercises for Practice.

Writing: Information Transfer-Bar Charts-Flow Charts-Tree Diagrams etc., -- Exercises for Practice.

Introduction - Steps to Effective Precis Writing – Guidelines- Samples (Chapter 12 entitled ‘*The Art of Condensation*’ from ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press)

UNIT – V

Chapter entitled ‘*Father Dear Father*’ by Raj Kinger from ***Fluency in English – A Course book for Engineering Students***” Published by Orient BlackSwan, Hyderabad

Vocabulary: Foreign Words—Words borrowed from other Languages- Exercises for Practice

Grammar: Direct and Indirect Speech- Question Tags- Exercises for Practice

Reading: Predicting the Content- Understanding the Gist – SQ3R Reading Technique- Study Skills – Note Making - Understanding Discourse Coherence – Sequencing Sentences. (From Chapter 10 entitled ‘**Reading Comprehension**’ - ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press.)

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports –Formats- Prewriting – Structure of Reports (Manuscript Format) - Types of Reports - Writing the Report. (From Chapter 13 entitled ‘**Technical Reports**’ - ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press.)

 Exercises from both the texts not prescribed shall be used for classroom tasks.

Text Books:

1. “*Fluency in English – A Course book for Engineering Students*” by Board of Editors: **Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.**
2. Raman, Meenakshi & Sharma, Sangeeta. “***Technical Communication- Principles and Practice***”. **Third Edition. New Delhi: Oxford University Press. 2015. Print.**

References:

1. Green, David. *Contemporary English Grammar –Structures and Composition*. MacMillan India. 2014 (Print)
2. Rizvi, M. Ashraf. *Effective Technical Communication*. Tata Mc Graw –Hill. 2015 (Print).

EE106ES/EE205ES: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech. I Year II Sem.

L T/P/D C
4 0/0/0 4

Pre-requisite: None

Course Objectives:

- To introduce the concept of electrical circuits and its components
- To introduce the concepts of diodes & transistors, and
- To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes: After this course, the student will be able

- To analyze and solve electrical circuits using network laws and theorems.
- To identify and characterize diodes and various types of transistors.

UNIT - I

Basic Concepts of Electrical Circuits and Single Phase AC Circuits

Electrical Circuits: R-L-C Parameters, Voltage and Current, Independent and Dependent Sources, Source Transformation – V-I relationship for passive elements, Kirchoff's Laws, Network reduction techniques – series, parallel, series-parallel, star-to-delta, delta-to-star transformation, Nodal Analysis,

Single Phase AC Circuits: R.M.S. and Average values, Form Factor, steady state analysis of series, parallel and series-parallel combinations of R, L and C with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance – phase and phase difference, Concept of power factor, j-notation, complex and polar forms of representation.

UNIT - II

Resonance: Series resonance and Parallel resonance circuits, concept of bandwidth and Q factor, Locus Diagrams for RL, RC and RLC Combinations for Various Parameters.

Network Theorems: Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Tellegen's, Millman's and Compensation theorems for DC and AC excitations.

UNIT - III

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

Rectifiers and Filters: P-N junction diode as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π - section Filters.

UNIT - IV

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

Transistor Biasing And Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in V_{BE} and β , Bias Compensation using Diodes and Transistors.

Transistor Configurations: BJT modeling, Hybrid model, Determination of h-parameters from transistor characteristics, Analysis of CE, CB and CC configurations using h-parameters, Comparison of CE, CB and CC configurations.

UNIT- V

Junction Field Effect Transistor: Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, Small Signal Model, Biasing FET.

Special Purpose Devices: Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

Text Books:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath Mc Graw Hill Education

References:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabratajit, TMH, 2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2nd edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press-2004.
5. Network Theory by N. C. Jagan & C. Lakshminarayana, B.S. Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

LIST OF EXPERIMENTS

Volumetric Analysis:

1. Estimation of Ferrous ion by Dichrometry.
2. Estimation of hardness of water by Complexometric method using EDTA.
3. Estimation of Ferrous and Ferric ions in a given mixture by Dichrometry.
4. Estimation Ferrous ion by Permanganometry.
5. Estimation of copper by Iodomery.
6. Estimation of percentage of purity of MnO_2 in pyrolusite
7. Determination of percentage of available chlorine in bleaching powder.
8. Determination of salt concentration by ion- exchange resin.

Instrumental methods of Analysis:

1. Estimation of HCl by Conductometry.
2. Estimation of Ferrous ion by Potentiometry.
3. Determination of Ferrous iron in cement by Colorimetric method.
4. Determination of viscosity of an oil by Redwood / Oswald's Viscometer.
5. Estimation of manganese in KMnO_4 by Colorimetric method.
6. Estimation of HCl and Acetic acid in a given mixture by Conductometry.
7. Estimation of HCl by Potentiometry.

Preparation of Polymers:

1. Preparation of Bakelite and urea formaldehyde resin.

Note: All the above experiments must be performed.

Text Books:

1. Vogel's Text Book of Quantitative Chemical Analysis, 5th Edition (2015) G. H. Jeffery, J. Bassett, J. Mendham and R. C. Denney.
2. A Text Book on experiments and calculations in Engineering Chemistry by S.S. Dara S. Chand & Company Ltd., Delhi (2003).

EN107HS/EN207HS: ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

B.Tech. I Year II Sem.

L T/P/D C
0 0/3/0 2

The **English Language Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking, group discussions and interviews

Course Outcomes: Students will be able to attain:

- Better understanding of nuances of English language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills.

Syllabus: English Language Communication Skills Lab (ELCS) shall have two parts:

- Computer Assisted Language Learning (CALL) Lab
- Interactive Communication Skills (ICS) Lab

Listening Skills: Objectives:

- To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills: Objectives

- To involve students in speaking activities in various contexts
- To enable students express themselves fluently and appropriately in social and professional contexts :
 - Oral practice
 - Describing objects/situations/people
 - Role play – Individual/Group activities
 - Just A Minute (JAM) Sessions.

The following course content is prescribed for the **English Language Communication Skills Lab**.

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker.

Testing Exercises

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Sentence Stress – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Sentence Stress – Intonation.

Testing Exercises

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.

Testing Exercises

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines.

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

Testing Exercises

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication-Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

Testing Exercises

ICS Lab:

Understand: Group Discussion- Interview Skills.

Practice: Group Discussion- Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

Computers with Suitable Configuration

High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Prescribed Lab Manuals:

1. A book entitled “*ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities*” by Board of Editors: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.

2. Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. ***“EMBARC- English for undergraduates”*** Delhi: Cambridge University Press. 2016. Print.

Suggested Software:

1. Cambridge Advanced Learners' English Dictionary with CD.
2. Grammar Made Easy by Darling Kindersley.
3. Punctuation Made Easy by Darling Kindersley.
4. Oxford Advanced Learner's Compass, 8th Edition.
5. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
7. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).

References:

1. Jayashree Mohanraj. *Let Us Hear Them Speak*. New Delhi: Sage Texts. 2015. Print.
2. Hancock, M. *English Pronunciation in Use. Intermediate Cambridge*: Cambridge University Press. 2009. Print.

ME108ES/ME208ES: ENGINEERING WORKSHOP

B.Tech. I Year II Sem.

L T/P/D C
0 0/3/0 2

Pre-requisites: Practical skill

Course Objectives:

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes: At the end of the course, the student will be able to:

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

- Carpentry
- Fitting
- Tin-Smithy and Development of jobs carried out and soldering.
- Black Smithy
- House-wiring
- Foundry
- Welding
- Power tools in construction, wood working, electrical engineering and mechanical
- Engineering.

2. TRADES FOR DEMONSTRATION & EXPOSURE:

- Plumbing, Machine Shop, Metal Cutting (Water Plasma)

Text Books:

1. Workshop Practice /B. L. Juneja / Cengage

2. Workshop Manual / K. Venugopal / Anuradha.

Reference Books:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**B.TECH. CIVIL ENGINEERING****COURSE STRUCTURE & SYLLABUS (2016-17)****II YEAR I SEMESTER**

S. No	Course Code	Course Title	L	T	P	Credits
1	MA301BS	Mathematics - IV	4	1	0	4
2	CE302ES	Strength of Materials - I	4	1	0	4
3	CE303ES	Fluid Mechanics - I	4	1	0	4
4	CE304ES	Building Material, Construction and Planning	3	0	0	3
5	CE305ES	Surveying	3	0	0	3
6	CE306ES	Strength of Material Lab	0	0	3	2
7	CE307ES	Computer Aided Design – I Lab	0	0	3	2
8	CE308ES	Surveying lab - I	0	0	3	2
9	*MC300HS	Gender Sensitization Lab	0	0	3	0
		Total Credits	18	3	12	24

II YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	CE401ES	Strength of Material - II	4	1	0	4
2	CE402ES	Fluid Mechanics - II	4	1	0	4
3	CE403ES	Structural Analysis	4	1	0	4
4	CV404ES	Engineering Geology	3	0	0	3
5	SM405MS	Business Economic and Financial Analysis	3	0	0	3
6	CE406ES	Fluid Mechanics Lab	0	0	3	2
7	CE408ES	Surveying - II Lab	0	0	3	2
8	CV407ES	Engineering Geology Lab	0	0	3	2
9	*MC400ES	Environmental Science and Technology	3	0	0	0
		Total Credits	21	3	9	24

***Satisfactory/ Unsatisfactory**

MA301BS: MATHEMATICS - IV
(Complex Variables and Fourier Analysis)

B.Tech. II Year I Sem.

L	T/P/D	C
4	1/0/0	4

Prerequisites: Foundation course (No Prerequisites).

Course Objectives: To learn

- differentiation and integration of complex valued functions
- evaluation of integrals using Cauchy's integral formula
- Laurent's series expansion of complex functions
- evaluation of integrals using Residue theorem
- express a periodic function by Fourier series and a non-periodic function by Fourier transform
- to analyze the displacements of one dimensional wave and distribution of one dimensional heat equation

Course Outcomes: After learning the contents of this paper the student must be able to

- analyze the complex functions with reference to their analyticity, integration using Cauchy's integral theorem
- find the Taylor's and Laurent's series expansion of complex functions
- the bilinear transformation
- express any periodic function in term of sines and cosines
- express a non-periodic function as integral representation
- analyze one dimensional wave and heat equation

UNIT-I

Functions of a complex variable: Introduction, Continuity, Differentiability, Analyticity, properties, Cauchy, Riemann equations in Cartesian and polar coordinates. Harmonic and conjugate harmonic functions-Milne-Thompson method

UNIT-II

Complex integration: Line integral, Cauchy's integral theorem, Cauchy's integral formula, and Generalized Cauchy's integral formula, Power series: Taylor's series- Laurent series, Singular points, isolated singular points, pole of order m – essential singularity, Residue, Cauchy Residue theorem (Without proof).

UNIT-III

Evaluation of Integrals: Types of real integrals:

(a) Improper real integrals $\int_{-\infty}^{\infty} f(x)dx$ (b) $\int_c^{c+2\pi} f(\cos \theta, \sin \theta)d\theta$

Bilinear transformation- fixed point- cross ratio- properties- invariance of circles.

UNIT–IV

Fourier series and Transforms: Introduction, Periodic functions, Fourier series of periodic function, Dirichlet's conditions, Even and odd functions, Change of interval, Half range sine and cosine series.

Fourier integral theorem (without proof), Fourier sine and cosine integrals, sine and cosine, transforms, properties, inverse transforms, Finite Fourier transforms.

UNIT–V

Applications of PDE: Classification of second order partial differential equations, method of separation of variables, Solution of one dimensional wave and heat equations.

TEXT BOOKS:

1. A first course in complex analysis with applications by Dennis G. Zill and Patrick Shanahan, Johns and Bartlett Publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.
3. Advanced engineering Mathematics with MATLAB by Dean G. Duffy

REFERENCES:

1. Fundamentals of Complex Analysis by Saff, E. B. and A. D. Snider, Pearson.
2. Advanced Engineering Mathematics by Louis C. Barrett, McGraw Hill.

CE302ES: STRENGTH OF MATERIALS - I

B.Tech. II Year I Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Engineering Mechanics

Course Objectives: The subject provide the knowledge of simple stress strains flexural stresses in members, shear stresses and deflection in beams so that the concepts can be applied to the Engineering problems.

Course Outcomes: At the end of the course, the student will be able to:

- Analyze the statically determinate and indeterminate problems.
- Determine the stresses and strains in the members subjected to axial, bending.
- Evaluate the slope and deflection of beams subjected to loads.
- Determine the principal stresses and strains in structural members.

UNIT – I

Simple Stresses and Strains: Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Elastic constants.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

Shear Force and Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contra flexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT – IV

Deflection of Beams:

Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam – Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load-Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

Conjugate Beam Method: Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

UNIT – V

Principal Stresses and Strains : Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Maximum shear stress theory- Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

TEXT BOOKS:

1. Strength of Materials by R. K. Bansal, Lakshmi Publications House Pvt. Ltd.
2. Strength of Materials by R. Subramanian, Oxford University Press.
3. Strength of Materials by W.A Nash, MC Graw Hills 2014 6th edition.
4. Mechanics of Materials by James M Gere and Barry J Goodno Cengage Learning India Pvt. Ltd Eight edition.

REFERENCES:

1. Strength of Materials by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd.
2. Mechanics of Structures Vol –I by H. J. Shah and S. B. Junnarkar, Charotar Publishing House Pvt. Ltd.
3. Strength of Materials by S. S. Rattan, McGraw Hill Education Pvt. Ltd.
4. Fundamentals of Solid Mechanics by M. L. Gambhir, PHI Learning Pvt. Ltd.
5. Strength of Materials and Structures by John Case *et al.*, Butterworth-Heinemann.
6. Strength of Materials by Dr.Sadhu Singh Khanna Publishers 11th edition 2015.

CE303ES: FLUID MECHANICS - I

B.Tech. II Year I Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Engineering Mechanics

Course Objectives: Students who take this class can expect to

- Develop an appreciation for the properties of Newtonian fluids.
- Study analytical solutions to variety of simplified problems.
- Understand the dynamics of fluid flows and the governing non-dimensional parameters.
- Apply concepts of mass, momentum and energy conservation to flows.
- Grasp the basic ideas of turbulence.

Course Outcomes: At the end of the course, the student will be able to:

- Apply conservation laws to derive governing equations of fluid flows.
- Compute hydrostatic and hydrodynamic forces.
- Analyze and design simple pipe systems.
- Apply principles of dimensional analysis to design experiments.
- Compute drag and lift coefficients.

UNIT - I

Introduction: Dimensions and units – Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers. Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT – II

Buoyancy and floatation: stability of bodies, meta centre, liquids in relative equilibrium.

Fluid Kinematics: Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, circulation and vorticity, flownet analysis.

UNIT – III

Fluid Dynamics and Measurement of Flow: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier – stokes equations (Explanatory) Momentum equation and its application – forces on pipe bend. Pitot tube,

Venturi meter, and orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches - –Broad crested weirs.

UNIT - IV

Closed Conduit Flow: Reynold's experiment – Characteristics of Laminar & Turbulent flows. Laws of Fluid friction – Darcy's equation, variation of friction factor with Reynold's number – Moody's Chart, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line. Pipe network problems Flow between parallel plates, Flow through long tubes, flow through inclined tubes, water hammer.

UNIT – V

Boundary Layer Theory: Approximate Solutions of Navier Stokes Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers (no derivations) BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

TEXT BOOKS:

1. Fluid Mechanics by F.M. White McGraw Hill Education (India) Pvt. Ltd, New Delhi, 2011
2. Fluid Mechanics by V.L. Streeter., E.B.Wylie and K.W. Bedford, McGraw Hill Education (India) Pvt. Ltd, New Delhi 2016.
3. Fluid Mechanics by P.N. Modi and S.M.Seth, Standard Book House, Delhi, 2011.

REFERENCES:

1. Mechanics of Fluids by Potter, M.C D.C Wiggers, B.H Ramdan Cengage, 2012.
2. Fluid Mechanics by J F Douglas, J M Gasiorek, J A Swaffield and L B Jack, Pearson 2015.
3. Fluid Mechanics and Fluid Machines by S. K. Som, Gautam Biswas and S. Chakraborty, McGraw Hill Education (India) Pvt. Ltd, New Delhi 2015.
4. Engineering Fluid Mechanics by K L Kumar, S Chand, Eurasia Publishing House, New Delhi, 2014.
5. Fluid Mechanics by Dr. A. K. Jain Khanna Publishers, twelfth edition 2014.

CE304ES: BUILDING MATERIALS, CONSTRUCTION AND PLANNING

B.Tech. II Year I Sem.

L	T/P/D	C
3	0/0/0	3

Course Objectives: To give the students a basic idea about the construction materials, building components and to introduce various.

Course Outcomes: At the end of the course, the student will be able to identify various building materials required for construction & planning.

UNIT - I

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing.

Bricks – Composition of Brick earth – manufacture and structural requirements, Fly ash, Ceramics.

Timber, Aluminum, Glass, Paints and Plastics: Wood - structure – types and properties – seasoning – defects; alternate materials for Timber – GI / fibre – reinforced glass bricks, steel & aluminum, Plastics.

UNIT - II

Cement & Admixtures: Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests.

Admixtures – mineral & chemical admixtures – uses.

UNIT - III

Building Components : Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ; foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

Building Services: Plumbing Services: Water Distribution, Sanitary – Lines & Fittings; Ventilations: Functional requirements systems of ventilations. Air-conditioning - Essentials and Types; Acoustics – characteristic – absorption – Acoustic design; Fire protection – Fire Hazards – Classification of fire resistant materials and constructions

UNIT - IV

Mortars, Masonry and Finishing's

Mortars: Lime and Cement Mortars

Brick masonry – types – bonds; Stone masonry – types; Composite masonry – Brick-stone composite; Concrete, Reinforced brick.

Finishers: Plastering, Pointing, Painting, Claddings – Types – Tiles – ACP.

Form work: Types: Requirements – Standards – Scaffolding – Design; Shoring, Underpinning.

UNIT – V

Building Planning: Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.
2. Building Construction by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.

REFERENCES:

1. Building Materials and Construction by G C Sahu, Joygopal Jena McGraw hill Pvt Ltd 2015.
2. Building Materials by Duggal, New Age International.
3. Building Materials by P. C. Varghese, PHI.
4. Building Construction by PC Varghese PHI.
5. Construction Technology – Vol – I & II by R. Chubby, Longman UK.
6. Alternate Building Materials and Technology, Jagadish, Venkatarama Reddy and others; New Age Publications.

CE305ES: SURVEYING

B.Tech. II Year I Sem.

L	T/P/D	C
3	0/0/0	3

Course Objectives: The first step in engineering practice is surveying and the soundness of any civil engineering work is dependent on the reliability and accuracy of surveying. Therefore, it is imperative that a student of engineering should have good knowledge of surveying. To impart the knowledge of surveying and latest technologies in surveying it is necessary to introduce this subject in the curriculum.

Course Outcomes: At the end of the course, the student will be able to:

- Calculate angles, distances and levels
- Identify data collection methods and prepare field notes
- Understand the working principles of survey instruments
- Estimate measurement errors and apply corrections
- Interpret survey data and compute areas and volumes

UNIT - I

Introduction and Basic Concepts: Introduction, Objectives, classification and principles of surveying, Scales, Shrinkage of Map, Conventional symbols and Code of Signals, Surveying accessories, phases of surveying.

Measurement of Distances and Directions

Linear distances- Approximate methods, Direct Methods- Chains- Tapes, ranging, Tape corrections, indirect methods- optical methods- E.D.M. method.

Prismatic Compass- Bearings, included angles, Local Attraction, Magnetic Declination, and dip.

UNIT - II

Levelling and Contouring

Leveling- Basics definitions, types of levels and levelling staves, temporary adjustments, methods of levelling, booking and Determination of levels- HI Method-Rise and Fall method, Effect of Curvature of Earth and Refraction.

Contouring- Characteristics and uses of Contours, Direct & Indirect methods of contour surveying, interpolation and sketching of Contours.

Computation of Areas and Volumes

Areas - Determination of areas consisting of irregular boundary and regular boundary (coordinates, MDM, DMD methods), Planimeter.

Volumes - Computation of areas for level section and two level sections with and without transverse slopes, determination of volume of earth work in cutting and embankments, volume of borrow pits, capacity of reservoirs.

UNIT - III

Theodolite Surveying: Types of Theodolites, Fundamental Lines, temporary adjustments, measurement of horizontal angle by repetition method and reiteration method, measurement of vertical Angle, Trigonometrical levelling when base is accessible and inaccessible.

Traversing: Methods of traversing, traverse computations and adjustments, Gale's traverse table, Omitted measurements.

UNIT - IV

Tacheometric Surveying: Principles of Tacheometry, stadia and tangential methods of Tacheometry.

Curves: Types of curves and their necessity, elements of simple curve, setting out of simple Curves, Introduction to compound curves.

UNIT - V

Modern Surveying Methods: Total Station and Global Positioning System. : Basic principles, classifications, applications, comparison with conventional surveying. Electromagnetic wave theory - electromagnetic distance measuring system - principle of working and EDM instruments, Components of GPS – space segment, control segment and user segment, reference systems, satellite orbits, GPS observations. Applications of GPS.

TEXT BOOKS:

1. Surveying and levelling by R. Subramanian, Oxford university press, New Delhi.
2. Chandra A M, "Higher Surveying", New age International Pvt. Ltd., Publishers, New Delhi, 2002.
3. Hoffman. B, H. Lichtenegga and J. Collins, Global Positioning System - Theory and Practice, Springer -Verlag Publishers, 2001.

REFERENCES:

1. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill – 2000.
2. Arora K R "Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004.
3. Surveying (Vol – 1, 2 & 3), by B. C. Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) ltd., New Delhi.
4. Chandra A M, "Plane Surveying", New Age International Pvt. Ltd., New Delhi, 2002.
5. Surveying by Bhavikatti; Vikas publishing house ltd.
6. Duggal S K, "Surveying (Vol – 1 & 2), Tata McGraw Hill Publishing Co. Ltd. New Delhi, 2004.
7. Surveying and leveling by R. Agor Khanna Publishers 2015.

CE306ES: STRENGTH OF MATERIALS LAB

B.Tech. II Year I Sem.

L	T/P/D	C
0	0/3/0	2

Course Objectives: The objective of the course is to make the student understand the behavior of materials under different types of loading for different types structures

Course Outcomes: At the end of the course, the student will be able to:

- Conduct tension test on Materials like steel etc.
- Conduct compression tests on spring, wood and concrete
- Conduct flexural and torsion test to determine elastic constants
- Determine hardness of metals

List of Experiments:

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

List of Major Equipment:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauges.

CE307ES: COMPUTER AIDED DRAFTING LAB

B.Tech. II Year I Sem.

L	T/P/D	C
0	0/3/0	2

Course Objectives: The objective of this lab is to teach the student basic drawing fundamentals in various civil engineering applications, specially in building drawing.

Course Outcomes: At the end of the course, the student will be able to:

Master the usage of Autocad commands for drawing 2D & 3D building drawings required for different civil engg applications.

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different softwares
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
 - a) Single storied buildings
 - b) multi storied buildings
5. Developing sections and elevations for
 - a) Single storied buildings
 - b) multi storied buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD softwares
7. Exercises on development of working drawings of buildings

TEXT BOOKS:

1. Computer Aided Design Laboratory by M. N. Sessa Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

CE308ES: SURVEYING LAB – I

B.Tech. II Year I Sem.

L	T/P/D	C
0	0/3/0	2

Pre Requisites: Surveying Theory

Course Objectives: To impart the practical knowledge in the field, it is essential to introduce in curriculum. Drawing of Plans and Maps and determining the area are pre requisites before taking up any Civil Engineering works.

Course Outcomes: At the end of the course, the student will be able to:
Practically able to draw plans & maps to determine the areas before taking up any civil engineering works.

1. Surveying of an area by chain survey (closed traverse) & plotting.
2. Chaining across obstacles
3. Determine of distance between two inaccessible points with compass
4. Survey of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane table survey.
6. Two point and three point problems in plane table survey.
7. Levelling – Longitudinal and cross-section and plotting
8. Trigonometric leveling using theodolite
9. Height and distances using principles of tacheometric surveying
10. a) Measurement of Horizontal angle & vertical angle.
b) Distance between inaccessible point by theodolite

MC300HS: GENDER SENSITIZATION LAB

B.Tech. II Year I Sem.

L T/P/D C
0 0/3/0 2

Course Objectives:

- To develop students' sensibility with regard to issues of gender in contemporary India.
- To provide a critical perspective on the socialization of men and women.
- To introduce students to information about some key biological aspects of genders.
- To expose the students to debates on the politics and economics of work.
- To help students reflect critically on gender violence.
- To expose students to more egalitarian interactions between men and women.

Course Outcomes:

- Students will have developed a better understanding of important issues related to gender in contemporary India.
- Students will be sensitized to basic dimensions of the biological, sociological, psychological and legal aspects of gender. This will be achieved through discussion of materials derived from research, facts, everyday life, literature and film.
- Students will attain a finer grasp of how gender discrimination works in our society and how to counter it.
- Students will acquire insight into the gendered division of labour and its relation to politics and economics.
- Men and women students and professionals will be better equipped to work and live together as equals.
- Students will develop a sense of appreciation of women in all walks of life.
- Through providing accounts of studies and movements as well as the new laws that provide protection and relief to women, the textbook will empower students to understand and respond to gender violence.

UNIT-I

UNDERSTANDING GENDER

Gender: Why Should We Study It? (*Towards a World of Equals*: Unit -1)

Socialization: Making Women, Making Men (*Towards a World of Equals*: Unit -2)

Introduction. Preparing for Womanhood. Growing up Male. First lessons in Caste. Different Masculinities.

UNIT-II

GENDER AND BIOLOGY

Missing Women: Sex Selection and Its Consequences (*Towards a World of Equals*: Unit -4)
Declining Sex Ratio. Demographic Consequences.

Gender Spectrum: Beyond the Binary (*Towards a World of Equals*: Unit -10)

Two or Many? Struggles with Discrimination.

UNIT-III

GENDER AND LABOUR

Housework: the Invisible Labour (*Towards a World of Equals*: Unit -3)

“My Mother doesn’t Work.” “Share the Load.”

Women’s Work: Its Politics and Economics (*Towards a World of Equals*: Unit -7)

Fact and Fiction. Unrecognized and Unaccounted work. Additional Reading: Wages and Conditions of Work.

UNIT-IV

ISSUES OF VIOLENCE

Sexual Harassment: Say No! (*Towards a World of Equals*: Unit -6)

Sexual Harassment, not Eve-teasing- Coping with Everyday Harassment- Further Reading: “Chupulu”.

Domestic Violence: Speaking Out (*Towards a World of Equals*: Unit -8)

Is Home a Safe Place? -When Women Unite [Film]. Rebuilding Lives. Additional Reading: New Forums for Justice.

Thinking about Sexual Violence (*Towards a World of Equals*: Unit -11)

Blaming the Victim-“I Fought for my Life....” - Additional Reading: The Caste Face of Violence.

UNIT-V

GENDER: CO - EXISTENCE

Just Relationships: Being Together as Equals (*Towards a World of Equals*: Unit -12)

Mary Kom and Onler. Love and Acid just do not Mix. Love Letters. Mothers and Fathers. Additional Reading: Rosa Parks-The Brave Heart.

TEXTBOOK

All the five Units in the Textbook, “*Towards a World of Equals: A Bilingual Textbook on Gender*” written by A. Suneetha, Uma Bhrugubanda, Duggirala Vasanta, Rama Melkote, Vasudha Nagaraj, Asma Rasheed, Gogu Shyamala, Deepa Sreenivas and Susie Tharu and published by **Telugu Akademi, Hyderabad**, Telangana State in the year **2015**.

Note: Since it is an Interdisciplinary Course, Resource Persons can be drawn from the fields of English Literature or Sociology or Political Science or any other qualified faculty who has expertise in this field from engineering departments.

REFERENCE BOOKS:

1. Menon, Nivedita. Seeing like a Feminist. New Delhi: Zubaan-Penguin Books, 2012
2. Abdulali Sohaila. “*I Fought For My Life...and Won.*” Available online at:
<http://www.thealternative.in/lifestyle/i-fought-for-my-lifeand-won-sohaila-abdulal/>

CE401ES: STRENGTH OF MATERIALS – II

B.Tech. II Year II Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Strength of Materials - I

Course Objectives: Study of the subject provides the understanding of principal stress, strains, springs, columns, and structures.

Course Outcomes: At the end of the course, the student will be able to

- Determine stresses in the member subjected to Torsion
- Analyze columns and struts
- Understand the concept of direct and bending stresses
- Analyze and design springs, thin and thick cylinders
- Understand the concept of unsymmetrical bending.

UNIT – I

Torsion of Circular Shafts: Theory of pure torsion – Derivation of Torsion equations : $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – II

Columns and Struts: Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

Beam Columns: Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT - III

Direct and Bending Stresses: Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis.

Beams Curved In Plan: Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semi-circular beam simply-supported on three equally spaced supports.

UNIT – IV

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells.

Thick Cylinders: Introduction - Lamé's theory for thick cylinders – Derivation of Lamé's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

UNIT – V

Unsymmetrical Bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis - Deflection of beams under unsymmetrical bending.

Shear Centre: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

TEXT BOOKS:

1. Mechanics of Materials Ferdinand P. Beer et al., Tata McGraw Hill Education Pvt. Ltd 5th edition 2009.
2. Strength of Materials R. Subramanian, Oxford University Press 2010
3. Strength of Materials by B.S. Basavarajaiah, B.S. Mahadevappa, Universities Press 3rd Edition 2015.

REFERENCES:

1. Fundamentals of Solid Mechanics by M. L. Gambhir, PHI Learning Pvt. Ltd
2. Introduction to Strength of Materials by U. C. Jindal, Galgotia Publications Pvt. Ltd.
3. Mechanics of Materials by R. C. Hibbeler, Pearson Education
4. Strength of Materials by S. S. Rattan, Tata McGraw Hill Education Pvt. Ltd.
5. Strength of Materials by R.K Rajput, S. Chand & Company Ltd.
6. Strength of Materials by S.S Bhavikatti, Vikas Publishing House Pvt. Ltd.

CE402ES: FLUID MECHANICS - II

B.Tech. II Year II Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Fluid Mechanics

Course Objectives: To understand basic concept of fluid flow and its application to chemical process industries including pipe flow, fluid machinery and agitation & mixing.

Course Outcomes: At the end of the course, the student will be able to:

- Understand the concepts of channel flows.
- Compute flow profiles in channel transitions and analyze hydraulic transients
- Design the working proportions of hydraulic machines

UNIT – I

Open Channel Flow: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow Stickler's formula for Mannings 'n' – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows. Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- for surface profiles -Rapidly varied flow, hydraulic jump, energy dissipation. Surges – Types

UNIT - II

Hydraulic Similitude: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations. Distorted and non-distorted models. Scale Effect.

UNIT – III

Basics of Turbo Machinery: Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines.

UNIT - IV

Hydraulic Turbines: Layout of a typical Hydropower installation – Heads and efficiencies-classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation and preventive measures

UNIT – V

Centrifugal Pump: installation details-classification-types work done- Manometric head-minimum starting speed-losses and efficiencies-specific speed multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitation.

Reciprocating pumps: Basics, types, air vessels, slip

Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS:

1. Open Channel flow by K. Subramanya, Tata McGraw Hill Education (India) Pvt Ltd.
2. Fluid Mechanics & Machinery by CSP Ojha, P.N. Chandramouli and R. Berndtsson Oxford University Press.
3. Hydraulic Machines by K. Subramanya McGraw Hill Education(India) Pvt Ltd, 2013

REFERENCES:

1. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard Book House, New Delhi.
2. Elements of Open channel flow by Ranga Raju, McGraw Hill Education(India) Pvt Ltd, 2013
3. Flow Through Open Channels by Rajesh Srivastava, Oxford University Press, 2011
4. Open Channel flow Hydraulics by R.H. French, McGraw Book Company, New York, 1986.
5. Fluid Mechanics by Dr. A. K. Jain Khanna Publishers 2016

CE403ES: STRUCTURAL ANALYSIS

B.Tech. II Year II Sem.

L	T/P/D	C
4	1/0/0	4

Pre Requisites: Strength of Materials –I

Course Objectives: To make the students to understand the principles of analysis of structures subjected to static and moving loads by various methods.

Course Outcomes: At the end of the course, the student will be able to:

- Analyze Perfect , Imperfect And Redundant Frames
- Formulate Equilibrium and compatibility equations for structural members
- Analyze one dimensional and two dimensional problems using classical methods
- Analyze indeterminate structures
- Analyze structures for gravity loads, moving loads and lateral loads

UNIT - I

Introduction to Structures and Indeterminacy: Equilibrium and compatibility equations - types of supports and reactions, types of joints and equilibrium equations, Static and kinematic indeterminacies of beams and frames. Effect of force releases like moment hinge, shear releases, link on static indeterminacy, Relative Merits of indeterminate structures over determinate structures.

Propped Cantilever and Fixed Beams: Types of props : Elastic and Rigid props, Determination of - Analysis of Propped cantilever and fixed beams, including the beams with different moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams-Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – II

Frames: Classification- plane and space frames, pin jointed and rigid jointed frames.

Analysis of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed frames, assumptions, transfer of load to joints from wind and other forces - Analysis of determinate pin jointed frames using method of joints and method of sections for vertical loads, horizontal loads and inclined loads.

UNIT – III

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem-Unit Load Method. Deflections of simple beams and pin- jointed plane trusses.

Three Hinged Arches – Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Three hinged arches. Normal Thrust and radial shear in an arch. Geometrical properties of parabolic and circular arch. Three hinged circular arch at different levels. Absolute maximum bending moment diagram for a three hinged arch.

UNIT – IV

Slope Deflection Method: Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve.

Moment Distribution Method: application to continuous beams with and without settlement of supports. Shear force and bending moment diagrams and Elastic curve.

UNIT – V

Moving Loads and Influence Lines: Introduction-applications to bridges (only description), Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section - Point loads, UDL longer than the span, UDL shorter than the span- maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load UDL longer than the span, UDL shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length. Influence lines for forces in members of deck and through type trusses like Pratt and Warren trusses. Equivalent uniformly distributed load. Focal length. Muller Breslau's principle for determinate and indeterminate beams (qualitative)

TEXT BOOKS:

1. Structural Analysis Vol –I & II by V. N. Vazirani and M. M. Ratwani, Khanna Publishers.
2. Structural Analysis Vol I & II by G. S. Pandit and S. P. Gupta, Tata McGraw Hill Education Pvt. Ltd.
3. Mechanics of Structures Vol – I and II by H. J. Shah and S. B. Junnarkar, Charotar Publishing House Pvt. Ltd.

REFERENCES:

1. Structural Analysis by R. C. Hibbeler, Pearson Education
2. Structural Analysis by Devdas Menon, Narosa Publishing House.
3. Basic Structural Analysis by C. S. Reddy., Tata McGraw Hill Education Pvt. Ltd.
4. Fundamentals of Structural Analysis by M. L. Gamhir, PHI Learning Pvt. Ltd
5. Structural Analysis -I by S. S. Bhavikatti, Vikas Publishing House Pvt. Ltd.

CV404ES: ENGINEERING GEOLOGY

B.Tech. II Year II Sem.

L	T/P/D	C
3	0/0/0	3

Course Objectives: The objectives of the course is to give the basic knowledge of Geology that is required for constructing various Civil Engineering Structures, basic Geology, Geological Hazardous and Environmental Geology which gives a complete picture on the Geological aspects that are to be considered for the planning and construction of major Civil Engineering projects

Course Outcomes: At the end of the course, the student will be able to:

- Understand weathering process and mass movement
- Distinguish geological formations
- Identify geological structures and processes for rock mass quality
- Identify subsurface information and groundwater potential sites through geophysical investigations
- Apply geological principles for mitigation of natural hazards and select sites for dams and tunnels

UNIT - I

Introduction: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology, Petrology and Structural geology.

Weathering of Rocks : Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnels weathering of common rock like “Granite”

UNIT - II

Mineralogy: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Chalcite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

Petrology: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Macroscopic and microscopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Lignite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate.

UNIT - III

Structural Geology: Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types and case studies. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils. Ground water, Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration.

UNIT - IV

Earth Quakes: Causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Landslides, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and landslides.

Importance of Geophysical Studies: Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT - V

Geology of Dams, Reservoirs, and Tunnels: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors contributing to the success of a reservoir. Geological factors influencing water Lightness and life of reservoirs - Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (i.e. Tithological, structural and ground water) in tunneling over break and lining in tunnels.

TEXT BOOKS:

1. Engineering Geology by N. Chennakesavulu, McMillan, India Ltd. 2005
2. Engineering Methods by D. Venkat Reddy; Vikas Publishers 2015.
3. Engineering Geology by S K Duggal, H K Pandey Mc Graw Hill Education Pvt Ltd 2014
4. Principles of Engineering Geology by K.V.G.K. Gokhale – B.S publications

REFERENCES:

1. F.G. Bell, Fundamental of Engineering B.S. Publications, 2005.
2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution
3. Engineering Geology by Subinoy Gangopadhyay, Oxford university press.
4. Engineering Geology for Civil Engineers – P.C. Varghese PHI

SM405MS: BUSINESS ECONOMICS AND FINANCIAL ANALYSIS

B.Tech. II Year II Sem.

L	T/P/D	C
3	0/0/0	3

Course Objective: To learn the basic Business types, impact of the Economy on Business and Firms specifically. To analyze the Business from the Financial Perspective.

Course Outcome: The students will understand the various Forms of Business and the impact of economic variables on the Business. The Demand, Supply, Production, Cost, Market Structure, Pricing aspects are learnt. The Students can study the firm's financial position by analysing the Financial Statements of a Company.

UNIT – I

Introduction to Business and Economics:

Business: Structure of Business Firm, Theory of Firm, Types of Business Entities, Limited Liability Companies, Sources of Capital for a Company, Non-Conventional Sources of Finance.

Economics: Significance of Economics, Micro and Macro Economic Concepts, Concepts and Importance of National Income, Inflation, Money Supply in Inflation, Business Cycle, Features and Phases of Business Cycle. Nature and Scope of Business Economics, Role of Business Economist, Multidisciplinary nature of Business Economics.

UNIT – II

Demand and Supply Analysis:

Elasticity of Demand: Elasticity, Types of Elasticity, Law of Demand, Measurement and Significance of Elasticity of Demand, Factors affecting Elasticity of Demand, Elasticity of Demand in decision making, Demand Forecasting: Characteristics of Good Demand Forecasting, Steps in Demand Forecasting, Methods of Demand Forecasting.

Supply Analysis: Determinants of Supply, Supply Function & Law of Supply.

UNIT- III

Production, Cost, Market Structures & Pricing:

Production Analysis: Factors of Production, Production Function, Production Function with one variable input, two variable inputs, Returns to Scale, Different Types of Production Functions.

Cost analysis: Types of Costs, Short run and Long run Cost Functions.

Market Structures: Nature of Competition, Features of Perfect competition, Monopoly, Oligopoly, and Monopolistic Competition.

Pricing: Types of Pricing, Product Life Cycle based Pricing, Break Even Analysis, and Cost Volume Profit Analysis.

UNIT-IV

Financial Accounting: Accounting concepts and Conventions, Accounting Equation, Double-Entry system of Accounting, Rules for maintaining Books of Accounts, Journal, Posting to Ledger, Preparation of Trial Balance, Elements of Financial Statements, Preparation of Final Accounts.

UNIT -V

Financial Analysis through Ratios:

Concept of Ratio Analysis, Liquidity Ratios, Turnover Ratios, Profitability Ratios, Proprietary Ratios, Solvency, Leverage Ratios (simple problems).

Introduction to Fund Flow and Cash Flow Analysis (simple problems).

TEXT BOOKS:

1. D. D. Chaturvedi, S. L. Gupta, Business Economics - Theory and Applications, International Book House Pvt. Ltd. 2013.
2. Dhanesh K Khatri, Financial Accounting, Tata Mc –Graw Hill, 2011.
3. Geethika Ghosh, Piyali Gosh, Purba Roy Choudhury, Managerial Economics, 2e, Tata Mc Graw Hill Education Pvt. Ltd. 2012.

REFERENCES:

1. Paresh Shah, Financial Accounting for Management 2e, Oxford Press, 2015.
2. S. N. Maheshwari, Sunil K Maheshwari, Sharad K Maheshwari, Financial Accounting, 5e, Vikas Publications, 2013

CE406ES: FLUID MECHANICS LAB

B.Tech. II Year II Sem.

L	T/P/D	C
0	0/3/0	2

Pre Requisites: FM Theory

Course Objectives: To give the student an exposure to various hydraulic devices and Pipe Flow.

Course Outcomes: At the end of the course, the student will be able to:

- Determine coefficient of discharge for orifice and mouthpiece.
- Calibrate notches venturimeter orifice meters
- Determine minor losses in pipes

List of Experiments:

1. Determination of Coefficient of discharge for a small orifice.
2. Determination of Coefficient of discharge for a mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch / Triangular Notch/Trapezoidal Notch.
4. Determination of friction factor of a pipe
5. Calibration of Venturimeter
6. Calibration of Orifice meter
7. Determination of Coefficient for minor losses - Sudden Expansion
8. Determination of Coefficient for minor losses- Sudden Contraction
9. Verification of Bernoulli's equation.
10. Study of Water Hammer due to sudden Closure of valve.

CE408ES: SURVEYING - II LAB

B.Tech. II Year II Sem.

L	T/P/D	C
0	0/3/0	2

Course Objective: To impart the practical knowledge in the field to set out any Civil Engineering work

Course Outcome: Perform surveying on any civil engineering work

1. Determine of area using total station
2. Traversing using total station
3. Contouring using total station
4. Determination of remote height using total station
5. Stake out using total station
6. Distance, gradient, differential height between two inaccessible points using total station.
7. Curve settling using total station
8. Resection using total station
9. Setting out works for buildings and pipe lines
10. Finding position of stations using G.P.S

CV407ES: ENGINEERING GEOLOGY LAB

B.Tech. II Year II Sem.

L	T/P/D	C
0	0/3/0	2

Pre Requisites: Engineering Geology Theory

Course Objectives: The object of this lab is that to provide practical knowledge about physical properties of minerals, rocks, drawing of geological maps, showing faults, uniformities etc.

Course Outcomes: At the end of the course, the student will be able to:
Identify the various rocks, minerals depending on geological classifications

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic description and identification of rocks referred under theory.
3. Microscopic study of rocks.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.
6. Electrical resistivity meter.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.
5. Microscopic identification of rocks.

MC400ES: ENVIRONMENTAL SCIENCE AND TECHNOLOGY

B.Tech. II Year II Sem.

L	T/P/D	C
3	0/0/0	0

Course Objectives:

- Understanding the importance of ecological balance for sustainable development.
- Understanding the impacts of developmental activities and mitigation measures
- Understanding the environmental policies and regulations

Course Outcomes: Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development

UNIT-I

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III

Biodiversity And Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-V

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. EIA: EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

TEXT BOOKS:

1. Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
2. Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T. Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M. Masters and Wendell P. Ela . 2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B. Botkin & Edward A. Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications

II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A40008	Probability & Statistics	4	-	4
A40114	Strength of Materials - II	4	-	4
A40111	Hydraulics & Hydraulic Machinery	4	-	4
A40009	Environmental Studies	4	-	4
A40115	Structural Analysis -I	4	-	4
A40109	Building Materials, Construction & Planning	4	-	4
A40186	Computer Aided Drafting of Buildings	-	3	2
A40190	Surveying Lab- II	-	3	2
	Total	24	6	28

III YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A50116	Concrete Technology	4	-	4
A50121	Reinforced Concrete Structures Design and Drawing	4	-	4
A50118	Engineering Geology	4	-	4
A50120	Geotechnical Engineering	4	-	4
A50122	Water Resources Engineering-I	4	-	4
	Open Elective	4	-	4
A50117	Disaster Management			
A50017	Intellectual Property Rights			
A50018	Human Values and Professional Ethics			
A50181	Fluid Mechanics & Hydraulic Machinery Lab	-	3	2
A50191	Engineering Geology Lab	-	3	2
	Total	24	6	28

III YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A60130	Steel Structures Design and Drawing	3	2	4
A60119	Environmental Engineering	4		4
A60132	Transportation Engineering -I	4		4
A60126	Foundation Engineering	4		4
A60131	Structural Analysis -II	4		4
	Elective -I	4	-	4
A60123	Elements of Earthquake Engineering			
A60127	Ground Improvement Techniques			
A60128	Ground Water Hydrology			
A60124	Environmental Impact Assessment			
A60129	Principles of Entrepreneurship			
A60194	Geotechnical Engineering Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	Total	23	8	28

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

L	T/P/D	C
4	-/-	4

(A50116) CONCRETE TECHNOLOGY**UNIT I**

Cement : Portland cement – chemical composition – Hydration of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

Admixtures : Types of admixtures – mineral and chemical admixtures – properties – dosages – effects - usage.

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – II

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT – III

Hardened Concrete : Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods – codal provisions for NDT.

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – IV

Mix Design : Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical Quality Control – Acceptance criteria – Proportioning of concrete mix by normal and pumpable concretes by –

BIS method of mix design.

UNIT – V

Special Concretes: Light weight concrete – Light weight aggregate concrete – Cellular concrete – No-fines concrete – Fibre reinforced concrete – Polymer concrete – Types of Polymer concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition.
2. Concrete Technology by M.S.Shetty. – S.Chand & Co.

REFERENCES:

1. Concrete Technology by Job Thomas, Cengage Learning.
2. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi.
3. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi.
4. Concrete: Micro structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, Mc-Graw Hill Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50121) REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING****UNIT –I**

Concepts of RC. Design – Limit State method – Material Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS – 456 – 2000 – Working Stress Method.

Beams : Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – II

Shear, Torsion and Bond : Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing Limit state design for serviceability for deflection, cracking and codal provision.

UNIT - III

Design of Two-way slabs, one way slab, continuous slab Using I S Coefficients, Cantilever slab /Canopy slab.

UNIT –IV

Short and Long columns –axial loads, uni axial and biaxial bending I S Code provisions.

UNIT – V

Design of Footings - isolated (square, rectangular) and Combined footings. Design of Stair case.

TEXT BOOKS:

1. Limit state designed of reinforced concrete – P.C.Varghese, Prentice Hall of India, New Delhi.
2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishers, New Delhi
3. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
4. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers

REFERENCES :

1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.

2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
3. Plasticity in Reinforced Concrete by Chen – Cengage Learning Pvt. Ltd.
4. Design of concrete structures – Arthus H.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.
5. Design of Reinforced Concrete Foundations – P.C. Varghese Prentice Hall of India, New Delhi.
6. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
7. Reinforced concrete structures – I.C. Syal & A.K.Goel, S.Chand Publishers.
8. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50118) ENGINEERING GEOLOGY****UNIT – I**

Introduction: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology, Petrology and Structural geology.

Weathering of Rocks: Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnels weathering of common rock like “Granite”

UNIT – II

Mineralogy : Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Chalcite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite. **Petrology :** Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

UNIT – III

Structural Geology : Indian stratigraphy, paleontology and geological time scale, Outcrop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types. Ground water: Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, land slides hazards, water in land slides their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, Earthquake and landslides.

UNIT – IV

Geology of Dams and Reservoirs : Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs, Geo hazards, ground subsidence. Geophysical studies: Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT – V

Tunnels: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels, Tunnels in rock, subsidence over old mines , minining substances

TEXT BOOKS:

- 1) Engineering Geology by N.Chennkesavulu, Mac-Millan, Publishers 2nd Edition India Ltd. 2010.
- 2) Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications
- 3) Engineering Geology by Subinoy Gangopadhyay, Oxford University press.

REFERENCES:

1. Engineering Geology for Civil Engineering, P.C. Varghese, PHI Learning& private Limited.
2. Geology basics of Engineering by Aurele Parriaux, CRC press
3. Krynine & Judd, principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution.
4. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

L	T/P/D	C
4	-/-	4

(A50120) GEOTECHNICAL ENGINEERING**UNIT – I**

Introduction: Soil formation – clay mineralogy and soil structure and clay mineralogy – moisture content – weight- volume relationship – Relative density.

Index Properties of Soils: Grain size analysis – Sieve analysis, principle of Hydrometer method – consistency limits and indices – I.S. Classification of soils.

UNIT –II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting permeability – laboratory determination of coefficient of permeability –Permeability of layered soils – In-situ permeability tests (Pumping in & Pumping out test).

Effective Stress & Seepage Through Soils: Total, neutral and effective stress – principle of effective stress - quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT –III

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

Compaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties – Field compaction Equipment – compaction quality control.

UNIT – IV

Consolidation: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement.

UNIT - V

Shear Strength of Soils: Importance of shear strength – Mohr's– Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelopes – Shear strength of

sands - dilatancy – critical void ratio – Liquefaction- shear strength of clays.

TEXT BOOKS:

1. Principals of Geotechnical Engineering by Braja M.Das, Cengage Learning Publishers.
2. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
3. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi.

REFERENCES:

1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).
2. Geotechnical Engineering Handbook By Das – JRoss Publishing.
3. Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
4. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.
5. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
6. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50122) WATER RESOURCES ENGINEERING-I****UNIT I**

Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data - Adjustment of record -Rainfall Double Mass Curve. Runoff- Factors affecting Runoff – Runoff over a Catchment- Empirical and Rational Formulae.

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT II

Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow- Base Flow Separation - Direct Runoff Hydrograph - Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph, Synthetic Unit Hydrograph.

UNIT-III

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of wells,- Well Construction – Well Development.

UNIT-IV

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility –Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies-Water Logging.

UNIT-V

Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining.

Design Discharge over a catchment, Computation of design discharge-

rational formula, SCS curve number method, flood frequency analysis-Introductory Part only. Stream Gauging – measurement and estimation of stream flow.

TEXT BOOKS:

1. Engineering Hydrology by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Elementary hydrology by V.P.Singh, PHI publications.
2. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
3. Water Resources Engineering – I by Dr. G.Venkata Ramana, Academic Publishing Company.
4. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
5. Irrigation and Hydraulic structures by S.K.Grag.
6. Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata Mc. Graw Hill.
7. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50117) DISASTER MANAGEMENT****(Open Elective)****Unit-I**

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit –II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards –

Unit –III

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

Unit –IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters.

Infrequent events: Cyclones – Lightning – Hailstorms.

Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Planetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters-Soil Erosion.

Soil Erosion:— Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion.

Chemical hazards/ disasters:— Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation Biological hazards/ disasters:- Population Explosion.

Unit –V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

TEXT BOOKS:

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni.
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning.

REFERENCES

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990.
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997.
3. Kates, B.I & White, G.F The Environment as Hazards, oxford, New York, 1978.
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000.
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003.
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994.
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003.
8. A.S. Arya Action Plan For Earthquake, Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994.
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi .
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50017) INTELLECTUAL PROPERTY RIGHTS****(Open Elective)****UNIT – I**

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks : Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets : Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition : Misappropriation right of publicity, False advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah. E. Bouchoux, cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50018) HUMAN VALUES AND PROFESSIONAL ETHICS****(Open Elective)****Objectives :** This introductory course input is intended

- a. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- b. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- c. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

Unit I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration-what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Unit II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

Unit III:

Understanding Harmony in the Family and Society- Harmony in Human -

Human Relationship : Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!

Unit IV:

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence : Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

Unit V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a) Ability to utilize the professional competence for augmenting universal human order,
- b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

- a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- b) At the level of society: as mutually enriching institutions and organizations

TEXT BOOKS:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

2. Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA.
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991.
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A50181) FLUID MECHANICS & HYDRAULIC MACHINERY LAB

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of friction factor of a pipe.
5. Determination of Coefficient for minor losses.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Performance characteristics of a single stage/ multi-stage centrifugal pump.
12. Performance characteristics of a reciprocating pump.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A50191) ENGINEERING GEOLOGY LAB

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic and microscopic description and identification of rocks referred under theory.
3. Megascopic and microscopic identification of rocks & minerals.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****3 -/-2 4****(A60130) STEEL STRUCTURES DESIGN AND DRAWING****UNIT – I**

Materials – Making of iron and steel – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads–and combinations loading wind loads on roof trusses, behavior of steel, local buckling. Concept of limit State Design – Different Limit States as per IS 800 -2007 – Design Strengths- deflection limits – serviceability - Bolted connections – Welded connections – Design Strength – Efficiency of joint – Prying action Types of Welded joints - Design of Tension members – Design Strength of members.

UNIT – II

Design of compression members – Buckling class – slenderness ratio / strength design – laced – battened columns –column splice – column base – slab base.

UNIT – III

Design of Beams – Plastic moment – Bending and shear strength laterally / supported beams design – Built up sections – large plates Web buckling Crippling and Deflection of beams, Design of Purlin.

UNIT – IV

Design of eccentric connections with brackets, Beam end connections – Web angle – Un-stiffened and stiffened seated connections (bolted and Welded types) Design of truss joints

UNIT – V

Design of welded plate girders – optimum depth Design of main section – Design of end bearing stiffness and intermediate stiffness

Connection between web and flange and Design of flange splice and web splices.

TEXT BOOKS :

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010.

REFERENCE BOOKS :

1. Design of Steel structures by K.S. Sai Ram, Person Education.

2. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt. Ltd.
3. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Standard Publications.
4. Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House, New Delhi, 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60119) ENVIRONMENTAL ENGINEERING****UNIT – I**

Introduction: Water supply schemes – Protected water supply – Population forecasts, design period – water demand – Types of demand – factors affecting – fluctuations – fire demand – Sources of Water– intakes – infiltration galleries, confined and unconfined aquifers – water quality parameters and testing – drinking water standards.

UNIT II

Layout and general outline of water treatment units – sedimentation, uniform settling velocity– principles – design factors – surface loading – Jar test – optimum dosage of coagulant - coagulation-flocculation, clarifier design – coagulants – feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – types of disinfection - theory of chlorination - chlorine demand - other disinfection treatment methods. Distribution systems – Types of layouts of Distribution systems – design of distribution systems - Hardy Cross and equivalent pipe methods - service reservoirs – Determination of Storage capacity.

UNIT - III

Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage –examination of sewage – B.O.D. – C.O.D. equations. Design of sewers – shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing.

UNIT – IV

Layout and general out line of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles and design of biological treatment – trickling filters – standard and high rate- Filters – ASP – ASP modification – Aeration.

UNIT - V

Construction and design of oxidation ponds – Oxidation ditches – Sludge Treatment - Sludge digestion tanks –design of Digestion tank –Factors affecting sludge digestion - Sludge disposal by drying – septic tanks - working principles and design – soak pits. Ultimate disposal of waste water – self purification of rivers – Sewage farming..

TEXT BOOKS:

1. Water Supply & Sanitary Engineering by G.S.Bindie.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi.
3. Water Supply Engineering Vol.1 & Waste water Engineering Vol. II, P.N. Modi, Standard Book Publishers, Newdelhi.

REFERENCES :

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
2. Water and Waste Water Technology by Steel.
3. Water and Waste Water Engineering by Fair Geyer and Okun.
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, PHI.
5. Waste water Engineering by Metcalf and Eddy.
6. Theory & Practice of Water & Wastewater Treatment by Ronald L Droste, Wiley India Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60132) TRANSPORTATION ENGINEERING – I****UNIT I**

Highway Development and Planning: Highway Development in India – Necessity for Highway Planning- Different Road Development Plans; Classification of Roads - Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports – Highway Project.

UNIT – II

Highway Geometric Design: Importance of Geometric Design - Design controls and Criteria - Highway Cross Section Elements - Sight Distance Elements- Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance - Design of Horizontal Alignment - Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT – III

Traffic Engineering & Regulations: Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies - Data Collection and Presentation - Speed studies - Data Collection and Presentation - Origin & Destination studies, Parking Studies – Onstreet & Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams - Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings-Types of Road Markings - Design of Traffic Signals – Webster Method.

UNIT – IV

Intersection Design: Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.

Unit - V

Highway Material, Construction and Maintenance: Highway Material Characterization: Subgrade Soil, Stone Aggregates, Bitumen Materials, Construction of Gravel Roads - Construction of Water Bound Macadam Roads - Construction of Bituminous Pavements: Surface Dressing, Bitumen Bound Macadam, Bituminous Concrete - Construction of Cement Concrete Pavements - Construction of Joints in Cement Concrete Pavements - Joint

Filler and Seal - Pavement Failures – Maintenance of Highways – Highway Drainage.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 6th Edition – 1997.

REFERENCES:

1. Principles of Traffic and Highway Engineering – Garber & Hoel, Cengage Learning.
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.
3. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60126) FOUNDATION ENGINEERING****UNIT – I**

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

Slope Stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – III

Earth Pressure Theories: Rankine's theory of earth pressure – earth pressures different soils and layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

RETAINING WALLS: Types of retaining walls – stability of retaining walls against overturning, sliding, bearing capacity and drainage from backfill

UNIT – IV

Shallow Foundations - Strength Criteria - Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

Shallow Foundations - Settlement Criteria - Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity - allowable settlements of structures.

Pile Foundation: Types of piles – Load carrying capacity of piles based on static pile formulae in different soils- Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT - V

Well Foundations: Types – Different shapes of wells – Components of wells – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. Das, B.M., - (2012) Principles of Foundation Engineering –Cengage Learning
2. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).

3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group.

REFERENCES:

1. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd 1998.
2. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
3. Teng,W.C – Foundation Design , Prentice Hall, New Jersey.
4. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60131) STRUCTURAL ANALYSIS - II****UNIT – I**

Moment Distribution Method - Analysis of Single Bay Single Storey Portal Frames including side Sway. Analysis of inclined frames.

Kani's Method: Analysis of continuous beams including settlement of supports. Analysis of single bay single storey and single bay two Storey Frames by Kani's Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

UNIT – II

Slope Deflection Method: Analysis of Single Bay – single storey Portal Frames by Slope Deflection Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

Two Hinged Arches: Introduction – Classification of Two hinged Arches – Analysis of two hinged parabolic arches – Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT – III

Approximate Methods of Analysis: Introduction – Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever method and Factor method. Analysis of multi-storey frames for gravity (vertical) loads. Substitute Frame method. Analysis of Mill bents.

UNIT – IV

Matrix Methods of Analysis: Introduction – Static and Kinematic Indeterminacy - Analysis of continuous beams including settlement of supports, using stiffness method. Analysis of pin-jointed determinate plane frames using stiffness method- Analysis of single bay single storey frames including side sway, using stiffness method. Analysis of continuous beams upto three degree of indeterminacy using flexibility method. Shear force and bending moment diagrams. Elastic curve.

UNIT- V

Influence Lines for Indeterminate Beams: Introduction – ILD for two span continuous beam with constant and variable moments of inertia. ILD for propped cantilever beams.

Indeterminate Trusses: Determination of static and kinematic indeterminacies – Analysis of trusses having single and two degrees of internal and external indeterminacies –Castigliano's second theorem.

TEXT BOOKS:

- 1) Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.
- 2) Structural Analysis Vol I & II by Pundit and Gupta., Tata McGraw Hill Publishers.
- 3) Structural Analysis SI edition by Aslam Kassimali, Cengage Learning.

REFERENCES:

- 1) Matrix Analysis of Structures by Singh, Cengage Learning Pvt. Ltd.
- 2) Structural Analysis by Hibbeler.
- 3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
- 4) Matrix Analysis of Structures by Pundit and Gupta., Tata McGraw Hill Publishers.
- 5) Advanced Structural Analysis by A.K.Jain, Nem Chand Bros.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60123) ELEMENTS OF EARTHQUAKE ENGINEERING****(Elective-I)****UNIT I**

Engineering Seismology: Earthquake phenomenon cause of earthquakes- Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes- Magnitude/Intensity of an earthquake-scales-Energy released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground motions- Seismic zones of India.

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom- Continuous system-Lumped mass idealization-Oscillatory motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system-undamped and damped-critical damping-Logarithmic decrement-Forced vibrations-Harmonic excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

UNIT II

Conceptual design: Introduction-Functional planning-Continuous load path- Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members-Twisting of buildings-Ductility-definition-ductility relationships-flexible buildings-framing systems-choice of construction materials-unconfined concrete-confined concrete-masonry-reinforcing steel.

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT III

Reinforced Concrete Buildings: Principles of earthquake resistant design of RC members- Structural models for frame buildings- Seismic methods of analysis- Seismic design methods- IS code based methods for seismic design- Seismic evaluation and retrofitting- Vertical irregularities- Plan configuration problems- Lateral load resisting systems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral distribution of base shear.

UNIT IV

Masonry Buildings: Introduction- Elastic properties of masonry assemblage- Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of infill

walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT V

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls- sectional shapes- variations in elevation- cantilever walls without openings – Failure mechanism of non-structures- Effects of non-structural elements on structural system- Analysis of non-structural elements- Prevention of non-structural damage- Isolation of non-structures. Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction- Impact of Ductility- Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behaviour of beams, columns and joints in RC buildings during earthquakes- Vulnerability of open ground storey and short columns during earthquakes

TEXT BOOKS:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press.
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCES:

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons.
2. Earthquake Resistant Design of Building structures by Vinod Hosur, Wiley India Pvt. Ltd.
3. Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd.
4. Masonry and Timber structures including earthquake Resistant Design –Anand S.Arya, Nem chand & Bros.
5. Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murthy.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60127) GROUND IMPROVEMENT TECHNIQUES****(Elective-I)****UNIT – I**

Introduction to Ground Modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterise problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

UNIT – II

Mechanical Modification – Deep Compaction Techniques- Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

UNIT – III

Hydraulic Modification – Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering. Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains,

UNIT – IV

Physical and Chemical Modification – Modification by admixtures, Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing.

UNIT – V

Modification by Inclusions and Confinement - Soil reinforcement, reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

TEXT BOOKS

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications.

REFERENCES:

1. Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey.
2. Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.
3. Xianthakos, Abreimson and Bruce - Ground Control and Improvement
4. Mosley – Ground Improvement.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60128) GROUND WATER HYDROLOGY****(Elective-I)****UNIT – I**

Ground Water Occurrence and Movement: Ground water hydrologic cycle, origin of ground Water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention. Permeability, Darcy's law, storage coefficient, Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinates system, ground water flow contours their applications.

UNIT – II

Analysis of Pumping Test data-I: Steady flow ground water flow towards a well in confined and unconfined aquifers-Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests. Unsteady flow towards a well – Non equilibrium equations-Theism solution-Jacob and Chow's simplifications, Leak aquifers.

UNIT – III

Surface and Subsurface Investigation: Surface methods of exploration-Electrical resistivity and Seismic refraction methods. Subsurface methods-geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT – IV

Artificial Recharge of Ground Water: Concept of artificial recharge-recharge methods, relative merits. Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – V

Saline Water Intrusion In aquifers: Occurrence of saline water intrusions, Ghyben-Herzberg relation, Shape of interface, control of seawater intrusion.

TEXT BOOKS:

1. Ground Water Hydrology by H. M. Raghunath, Wiley Eastern Ltd.
2. Introduction to Hydraulics & Hydrology: With Applications for Stormwater Management, 4th Edition, Cengage Learning.

REFERENCES:

1. Ground water Hydrology by David Keith Todd, John Wiley & sons. New York.
2. Ground water by Bawver, John Wiley & sons.
3. Hydrology by Subramanya K.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60124) ENVIRONMENTAL IMPACT ASSESSMENT****(Elective-I)****UNIT I**

Definition of EIA, Types of EIA, Various types of Environmental Impacts: Direct Impacts, Indirect Impacts, Cumulative Impacts, Induced Impacts, EIA Principles, Process, Benefits and Flaws, Environmental Impact Statement, Objectives of EIA, Environmental Sustainability, Identification of Potential Impacts, Affected Environment, Impact prediction, Impact Assessment, Impact Mitigation, Selecting the Proposed Action, Environmental Monitoring, Public consultation.

UNIT II

Creation of EIA Data Base, Compilation, Environmental Inventory: Baseline Data Generation, Environmental Monitoring Networking Design (EMND), Monitoring Stations, Data Products and Sources, Impact Identification (II) Methodologies, Interaction-Matrix Methods, Use of the Leopold Matrix, Checklist Methodologies: Simple Checklists, Descriptive Checklists, Uses of Checklists, Network Methodologies.

UNIT III

Meteorological Data, Ambient Air Quality Monitoring, Air Quality Standards and Regulations, Impact Prediction, Impact Prediction Approach, Utilization of Dispersion Models, Impact Prediction Tools, Impact Assessment (IA): Significance and Assessment of the Impacts, Impact Mitigation Measures, **Impacts on Water Environment** - Sources of Pollution, Major Pollutants- Water Quality parameters, Surface Water Contaminants and their Impacts, Existing Groundwater Quality Environment – Standards – Prediction and Assessment of Impacts – Mitigation measures.

UNIT IV

Soil Pollution, Causes, Soil erosion, Desertification, Salinisation, Acidification, Land Filling of Waste, Impacts on Soils, Conceptual Approach: Identification, prediction and assessment of Soil Quantity-Quality Impacts, Description of Existing Resources, Identification and Incorporation of Mitigation Measures, Impacts on Noise Environment: Basics of Noise Pollution, Noise Exposure Forecast (NEF), Standards and Guidelines, Impact Prediction, Assessment of Impact Significance, Identification and Incorporation of Mitigation Measures.

UNIT V

Status of Wetlands, Threats to Wetlands, Ecology Impact Assessment System: **Importance of Biological Impact Assessment**, Identification, Prediction and Assessment and Significance of Biological Impacts, Mitigation Measures, Conservation of Flora & Fauna, **Impacts on Socio Economic and Other Environment**: Components, Considerations, Human Environment: Socio Economic Factors - Advantages of Impact Assessment – Assessment of Impact on Historical Structures – Mitigation Measures.

TEXT BOOKS:

1. Environmental Impact Assessment, Canter, L.W., 1977, McGraw Hills, New York.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers.

REFERENCES:

1. Technological guidance manuals of EIA. MoEF, Gol.
2. Environmental Impact Assessment, 2003, Y. Anjaneyulu, B.S Publications.
3. Environmental Impact Assessment Principles and applications, Erickson, P.A.
4. Environmental Impact Assessment: Theory and Practice, Dr.M.Anji Reddy, BS Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60129) PRINCIPLES OF ENTREPRENEURSHIP****(Elective -I)****Unit I:**

Introduction to Entrepreneurship: Definition of Entrepreneur Entrepreneurial Traits. Entrepreneur vs. Manager, Creating and Starting the venture: Sources of new ideas, methods of generating ideas, creative problem solving - Writing Business Plan, Evaluating Business Plans. Launching formalities.

Unit II:

Financing and Managing the new venture: Sources of capital, Record keeping, recruitment, motivating and leading teams, financial controls. Marketing and sales controls. E-commerce and entrepreneurship, Internet advertising- New venture Expansion Strategies and Issues.

Unit III:

Institutional/financial support: Schemes and functions of Directorate of Industries, District Industries Centres (DICs), Industrial Development Corporation (IDC), State Financial Corporation (SFCs), Small Scale Industries Development Corporations (SSIDCs), Khadi and Village Industries Commission (KVIC), Technical Consultancy Organisation (TCO), Small Industries Service Institute (SISI), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI).

Unit IV:

Production and Marketing Management: Thrust areas of production management, Selection of production Techniques, Plant utilization and maintenance, Designing the work place, Inventory control , material handling and quality control. Marketing functions, market segmentation, market research and channels of distribution, Sales promotion and product pricing.

Unit V :

Labour legislation, Salient Provisions of Health, Safety, and Welfare under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and Payment of Bonus Act.

TEXT BOOKS:

1. Robert Hisrich, & Michael Peters: Entrepreneurship, TMH,2009.
2. Dollinger: Entrepreneurship, Pearson,2009.

REFERENCE BOOKS:

1. Vasant Desai, Dynamics of Entrepreneurial Development and

- Management, Himalaya Publishing House, 2009.
2. Harvard Business Review on Entrepreneurship, HBR Paper Back.
 3. Robert J. Calvin: Entrepreneurial Management, TMH, 2009.
 4. Gurmeet Naroola: The entrepreneurial Connection, TMH, 2009.
 5. Bolton & Thompson: Entrepreneurs—Talent, Temperament and Techniques, Butterworth Heinemann, 2009.
 6. Agarwal: Indian Economy, Wishwa Prakashan 2009.
 7. Dutt & Sundaram: Indian Economy, S. Chand, 2009
 8. B D Singh, :Industrial Relations & Labour Laws, Excel, 2009.
 9. Aruna Kaulgud: Entrepreneurship Management by, Vikas publishing house, 2009.
 10. Essential of entrepreneurship and small business management by Thomas W. Zimmerer & Norman M. Searborough, PHI-2009.
 11. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem**

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(A60194) GEOTECHNICAL ENGINEERING LAB**LIST OF EXPERIMENTS**

1. Atterberg's Limits (LL & PL)
2. Field density-core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant and variable head test
5. Compaction test
6. CBR Test
7. Consolidation test
8. Unconfined compression test
9. Tri-axial Compression test
10. Direct shear test.
11. Vane shear test

Note: Any eight experiments may be completed.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****- -/3/- 2****(A60086) ADVANCED COMMUNICATION SKILLS (ACS) LAB****Introduction**

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

Gathering ideas and information to organise ideas relevantly and coherently.

Engaging in debates.

Participating in group discussions.

- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding

appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

Prescribed Lab Manual: A book titled **A Course Book of Advanced Communication Skills (ACS) Lab** published by Universities Press, Hyderabad.

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
 - **Preparing for being Interviewed**
 - **Positive Thinking**
 - **Interviewing Skills**
 - **Telephone Skills**
 - **Time Management**

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
3. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
6. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
7. English Vocabulary in Use series, Cambridge University Press 2008.
8. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
9. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
10. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New

Delhi, 2009.

11. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
12. Job Hunting by Colm Downes, Cambridge University Press 2008.
13. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
14. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
15. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
16. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

1. **Seminar/ Professional Presentation**
 2. **A Report on the same has to be prepared and presented.**
- * ***Teachers may use their discretion to choose topics relevant and suitable to the needs of students.***
 - * ***Not more than two students to work on each mini project.***
 - * ***Students may be assessed by their performance both in oral presentation and written report.***

Outcomes

- ☞ Accomplishment of sound vocabulary and its proper use contextually.
- ☞ Flair in Writing and felicity in written expression.
- ☞ Enhanced job prospects.
- ☞ Effective Speaking Abilities

IV YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A70140	Remote Sensing & GIS	4	-	4
A70143	Transportation Engineering -II	4	-	4
A70138	Estimating & Costing	4	-	4
A70133	Water Resources Engineering-II	4	-	4
	Elective-II	4	-	4
A70330	Finite Element Methods			
A70134	Advanced Foundation Engineering			
A70145	Watershed Management			
A70136	Air Pollution and Control			
	Elective-III	4	-	4
A70135	Advanced Structural Design			
A70137	Earth and Rock fill Dams and Slope Stability			
A70144	Water Resources Systems Analysis			
A70139	Industrial Waste Water Treatment			
A70195	Concrete & Highway Materials Lab	-	3	2
A70192	Environmental Engineering Lab	-	3	2
	Total	24	6	28

IV YEAR II SEMESTER

Code	Subject	L	T/P/D	C
	Elective-IV	4	-	4
A80151	Rehabilitation and Retrofitting of Structures			
A80148	Geo-Environmental Engineering			
A80147	Design and Drawing of Irrigation Structures			
A80141	Solid Waste Management			
A80150	Prestressed Concrete Structures	4	-	4
A80146	Construction Management	4	-	4
A80087	Industry Oriented Mini project	-	-	2
A80089	Seminar	-	6	2
A80088	Project Work	-	15	10
A80090	Comprehensive viva	-	-	2
	Total	12	21	28

Note: All End Examinations (Theory and Practical) are of three hours duration.

T-Tutorial L – Theory P – Practical D-Drawing C – Credits

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70140) REMOTE SENSING & GIS****UNIT – I**

Introduction to Photogrammetry: Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducial line.

UNIT – II

Remote Sensing –: Basic concept of Remote sensing, Data and Information, Remote sensing data Collection, Remote sensing advantages & Limitations, Remote Sensing process.

Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, vegetation), Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite, introduction to digital data, elements of visual interpretation techniques.

UNIT – III

Geographic Information Systems: Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data-Attribute data – Joining Spatial and Attribute data; GIS Operations: Spatial Data Input-Attribute data Management –Data display- Data Exploration- Data Analysis. COORDINATE SYSTEMS: Geographic Coordinate System: Approximation of the Earth, Datum; Map Projections: Types of Map Projections-Map projection parameters-Commonly used Map Projections - Projected coordinate Systems

UNIT –IV

Vector Data Model: Representation of simple features- Topology and its importance; coverage and its data structure, Shape file; Data models for composite features Object Based Vector Data Model; Classes and their Relationship; The geobase data model; Geometric representation of Spatial Feature and data structure, Topology rules

UNIT –V

Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data Conversion, Integration of Raster and Vector data.

Data Input: Metadata, Conversion of Existing data, Creating new data; Remote Sensing data, Field data, Text data, Digitizing, Scanning, on screen digitizing, importance of source map, Data Editing

TEXT BOOKS:

- 1 Remote sensing of the environment – An earth resource perspective – 2nd edition – by John R. Jensen, Pearson Education.
- 2 Introduction to Geographic Information System – Kang-Tsung Chang, Tata McGraw-Hill Education Private Limited.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70143) TRANSPORTATION ENGINEERING - II****UNIT – I**

Introduction to Railway : Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast, Gauge –Creep of Rails- Theories related to Creep – Sleeper density.

UNIT – II

Geometric Design of Railway Track: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve, Points and Crossing, Rail Joints & Welding of Joints, Railway station& Yards, Signalizing & interlocking.

UNIT – III

Airport Engineering: Airport Site selection – Runway Orientation – Basic Runway Length – Corrections for Elevation, Temperature – Airport Classification - Runway Geometric design – Factors Controlling Taxiway Layout - Terminal Area – Apron – Hangar – Blast Considerations, Typical Airport Layouts – Wind rose diagram - Runway Lightening system & Marking.

UNIT – IV

Port and Harbour Engineering: Requirements of Port and Harbour, Classification of Port & Harbour, Features of a Harbour, Planning of Harbour, Breakwaters, Dry docks, Jetties, Aprons, Transit shed and Warehouses, Navigational aids, Maintenance of Port and Harbours, Inland Water Transport

UNIT –V

Intelligent Transport Systems: ITS Definition, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications; Advanced Traffic Management systems (ATMS), Advanced Public Transportation systems (APTS), ITS architecture components and standards, Overview of ITS implementations in developed countries.

TEXT BOOKS:

1. Satish Chandra and Agarwal, M.M. (2007) "Railway Engineering" Oxford Higher Education, University Press New Delhi.
2. Airport Planning and Design- S.K. Khanna and M.G Arora, Nemchand Bros.
3. A Text book of Transportation Engineering – S.P.Chandola – S.Chand & Co. Ltd. – (2001).

4. Transportation Engineering and Planning – C.S. Papacostas, P.D.Prevedouros.

REFERENCES:

1. A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi.
2. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian.
3. Harbour, Dock and Tunnel Engineering – R. Srinivasan.
4. Dock and Harbour Engineering – Hasmukh P Oza, Gutam H Oza.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70138) ESTIMATING AND COSTING****UNIT – I**

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. Detailed Estimates of Buildings.

UNIT – II

Earthwork for roads and canals.

UNIT - III

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT -IV

Reinforcement bar bending and bar requirement schedules. Contracts – Types of contracts – Contract Documents – Conditions of contract.

UNIT – V

Valuation of buildings. Standard specifications for different items of building construction.

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie.

REFERENCES :

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.).
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
4. National Building Code.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70133) WATER RESOURCES ENGINEERING-II****UNIT-I**

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation – Life of Reservoir.. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT-II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT-III

Earth dams: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT-IV

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations,-Silt Ejectors and Silt Excluders

Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT-V

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall.

Canal regulation works, design principles of distributory and head regulators, Cross Regulators -canal outlets, types of canal modules,

Cross Drainage works: types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers.
2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta.
3. Irrigation engineering by K.R.Arora.
4. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers.
5. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.
6. Engineering Hydrology by CS Pojha, R. Berndtsson and P. Bhunya, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70330) FINITE ELEMENT METHODS****(Elective-II)****UNIT – I**

Introduction to Finite Element Method – Basic Equations in Elasticity – stress strain equations – concept of plane stress – plane strain— advantages and disadvantages of FEM.

Element shapes – nodes – nodal degree of freedom – strain displacement relations.

UNIT – II

Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix

FEA Beam elements – stress strain relation- shape functions -stiffness matrix– continuous beams.

UNIT – III

FEA Two dimensional problem – CST – LST element – shape function – stress – strain.

Lagrangian – Serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element –shape functions.

UNIT – IV

Isoparametric formulation – Concepts of isoparametric elements for 2D analysis -formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements.

UNIT-V

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS:

1. Introduction to Finite elements in engineering by Chandrupatla, Belegundu, Prentice Hall.
2. Finite element method by Daryl L. Logan, CENGAGE Learning.

REFERENCES:

1. Finite element analysis by S.S. Bhavikatti-New age International publishers.
2. Finite element analysis by P. Seshu, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70134) ADVANCED FOUNDATION ENGINEERING****(Elective-II)****UNIT – I**

Introduction-Bearing capacity of Footings subjected to Eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soils - Elastic settlement of Footings embedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertmann's method, Janbu method.

UNIT – II

Pile Foundations – pile groups- settlement of pile groups resting in sands and clays - negative skin friction-under reamed piles-laterally loaded piles – ultimate lateral capacity - Broms Method - Reese and Matlock Approach.

UNIT – III

Lateral earth pressures theories – Rankine's and Coulomb's theories – Graphical Methods, Culmann's, Trial Wedge methods - Stability checks of cantilever and gravity retaining walls.

UNIT - IV

Cantilever and anchored sheet piles - earth pressure diagram - determination of depth of embedment in sands and clays – braced cuts - earth pressure diagrams – forces in struts.

UNIT – V

Foundations in Expansive Soils – problems in expansive soils – mechanism of swelling – swell pressure and swelling potential – heave – foundation practices – sand cushion – CNS technique – under-reamed pile foundations – granular pile anchor technique, stabilization of expansive soils.

TEXT BOOKS:

- 1) Das, B.M., - (1999) Principles of Foundation Engineering –4th edition PWS Publishing, Singapore.
- 2) Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill International.
- 3) Soil Mechanics and Foundation Engineering by V N S Murthy, CBS Publishers and Distributors.

REFERENCE BOOKS:

- 1) Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
- 2). Geotechnical Engineering by C. Venkataramah, NewAge International Pvt.Ltd, Publishers (2002).
- 3) Analysis and Design of Substructures – Swami Saran, Oxford & IBH Publishing Company Pvt.Ltd (1998).
- 4) Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.Ltd, Publishers (2002).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70145) WATERSHED MANAGEMENT****(Elective-II)****UNIT-I**

Introduction: Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management.

Characteristics of Watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-II

Watershed delineation – Runoff Computations from a watershed – Flood Frequency Analysis – Gumbell, Log Pearson and Weibull Methods of Analysis.

Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements

UNIT-III

Principles of Erosion: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.

Measures to Control Erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT-IV

Water Harvesting: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.

UNIT-V

Forest and Grass Land Management: Interpretation of Satellite Imageries- Land use and Land Cover. Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

Ecosystem Management: Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silviculture, horticulture, social forestry and afforestation.

TEXT BOOKS:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awurbs and WP James, - Prentice Hall Publishers.

REFERENCE:

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70136) AIR POLLUTION AND CONTROL****(Elective -II)****UNIT – I**

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary air pollutants, Point, Line and Areal Sources of air pollution- Stationary and mobile sources. Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT – II

Meteorology and Plume Dispersion; Properties of atmosphere; Heat, Pressure, Wind forces, Moisture and Relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams. Lapse Rates, Pressure Systems, Winds and moisture, plume behavior and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-III

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.

Equipment's – Settling Chambers, Cyclone separators, filters, Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – IV

Control of gaseous emissions - General Methods of Control of NO_x and SO_x emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling – Adsorption – Absorption – Combustion.

UNIT – V

Air Quality Management – Monitoring of SPM, SO_x; NO_x and CO Emission Standards– Air sampling – Sampling Techniques – High volume air sampler – Stack sampling - Analysis of Air pollutants – Air quality standards – Air pollution control act.

TEXT BOOKS:

1. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
2. Air pollution by Wark and Warner.- Harper & Row, New York.

REFERENCE:

1. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70135) ADVANCED STRUCTURAL DESIGN****(Elective-III)****UNIT-I**

Design and Detailing of cantilever type of Retaining walls – Stability Check.
Principles of Counterfort Retaining walls and shelf type retaining walls.

UNIT-II

Design of Circular and Rectangular Water tanks at Ground level and elevated with staging.

UNIT-III

Design of Flat slabs- Design of Raft and pile foundations .

UNIT-IV

Design of Concrete Bridges – IRC loading Design of Stab bridge, T-beam girder bridge.

Introduction to Steel bridges.

UNIT-V

Design of RCC Chimneys Bunkers & Silos.

TEXT BOOKS:

1. Advanced Reinforced Concrete Structures by Varghese, Pranties Hall of India Pvt. Ltd.
2. Bridge Engineering by S Ponnuswamy Mc Graw Hill Co.
3. Reinforced Concrete Design by S.A. Pillai and D. Menon, Tata Mc. Grawhill Publishing Company.
4. Advanced Reinforced Concrete Structures by Krishna Raju.

REFERENCES :

1. Reinforced Concrete Structures Vol. 2 by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, Publications Pvt. Ltd., New Delhi.
2. Essentials of Bridge Engineering by D. John Son Victor, Oxford and IBM Publication Co., Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70137) EARTH AND ROCKFILL DAMS AND SLOPE STABILITY****(Elective-III)****UNIT-I**

Earth and Rockfill Dams: General features, Selection of site; Merits and demerits of the earth and rock fill dams, Classification of earth dams, Causes of failure, Safe design criteria. Instrumentation in earth dams: Pore pressure measurements, Settlement gauges, Inclined meters, Stress measurements, Seismic measurements.

UNIT-II

Failures, Damages and Protection of Earth Dams: Nature and importance of failure, Piping through embankment and foundations, Methods of seepage control through embankments and foundations, Design Criteria for filters, Treatment of upstream and down stream of slopes, Drainage control, Filter design.

UNIT-III

Slope Stability Analysis: Types of Failure: Failure surfaces - Planar surfaces, Circular surfaces, Non-circular surfaces, Limit equilibrium methods, Total stress analysis versus effective Stress analysis, Use of Bishop's pore pressure parameters, Short term and Long term stability in slopes. Taylor Charts.

UNIT-IV

Methods of Slope Stability: Method of Slices, Effect of Tension Cracks, Vertical Cuts. Bishop's Analysis, Bishop and Morgenstern Analysis, Non-circular Failure Surfaces: Janbu Analysis, Sliding Block Analysis, Seismic stability, Stabilization of slopes: Soil reinforcement (geosynthetics/soil nailing/micro piles etc), soil treatment (cement/lime treatment), surface protection (vegetation/erosion control mats/shotcrete).

UNIT-V

Rockfill Dams: Requirements of compacted rockfill, Shear strength of rockfill, Rockfill mixtures, Rockfill embankments, Earth-core Rockfill dams, Stability, Upstream & Downstream slopes.

Text Books:

1. Sherard, Woodward, Gizienski and Clevenger. Earth and Earth-Rock Dams. John Wiley & Sons. 1963.

References:

1. Bharat Singh and Sharma, H. D. – Earth and Rockfill Dams, 1999
2. Sowers, G. F. and Salley, H. I. – Earth and Rockfill Dams, Williams, R.C., and Wallace, T.S. 1965.
3. Abramson, L. W., Lee, T. S. and Sharma, S. - Slope Stability and Stabilisation methods – John Wiley & sons. (2002)
4. Bromhead, E. N. (1992). The Stability of Slopes, Blackie academic and professional, London.
5. Christian, Earth & Rockfill Dams – Principles of Design and Construction, Kutzner Published Oxford and IBH.
6. Ortiago, J. A. R. and Sayao, A. S. F. J. - Handbook of Slope Stabilisation, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70144) WATER RESOURCES SYSTEMS ANALYSIS****(Elective-III)****UNIT - I**

Introduction: Definition of system, Types of systems, System approach, System analysis and types of systems, Techniques of water resources system analysis.

Systems Techniques in Water Resources: Objective function and constraints, optimization using calculus, Optimization of a function of single variable, Optimization of a function of multiple variables, Constrained optimization, Kuhn – Tucker conditions.

UNIT - II

Linear programming –I: Formulation of linear programming models, graphical method, simplex method, application of Linear programming in water resources.

UNIT - III

Linear programming –II:

Revised simplex method, duality in linear programming, sensitivity and post optimality analysis.

UNIT - IV

Dynamics programming: Belman's principles of optimality forward and backward recursive dynamic programming, curse of dimensionality, application of dynamic programming for resource allocation.

UNIT - V

Water Resources Economics: Basics of Engineering economics, Discount factors, Uniform annual series, Amortization, Comparison of alternate plans. Principles of Economics analysis, Conditions of project optimality, benefit cost analysis socio economic intuitional and pricing of water resources.

TEXT BOOKS:

- 1 Water Resources System Analysis – Vedula & Mujumdar – Tata Mc. Graw Hill Company Ltd.
- 2 Water Resources Economics - James & Lee. Oxford Publishers 2005.

REFERENCES:

- 1 Operational Research by Taha, Printice Hall of India publishers.
2. Water Resources project Economic by Kuiper.E.
3. Engineering optimization: Theory and Practice, Rao, Singiresu S. New Age International.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70139) INDUSTRIAL WASTE WATER TREATMENT****(Elective-III)****UNIT – I**

Sources of Pollution – Physical, Chemical, Organic and Biological properties of Industrial Wastes – Differences between industrial and municipal waste waters – Effects of industrial effluents on sewers and Natural Water Bodies.

UNIT – II

Pre and Primary Treatment – Equalization, Proportioning, Neutralization, Oil Separation by Floatation – Waste Reduction - Volume Reduction – Strength Reduction.

UNIT – III

Waste Treatment Methods – Nitrification and De-nitrification – Phosphorous removal – Heavy metal removal – Membrane Separation Process – Air Stripping and Absorption Processes – Special Treatment Methods – Disposal of Treated Waste Water.

UNIT – IV

Characteristics and Composition of waste water and Manufacturing Processes of Industries like Sugar, Characteristics and Composition of Industries like Food Processing Industries, Steel, Petroleum Refineries,

UNIT – V

Characteristics and Composition of Industries like Textiles, Tanneries, Atomic Energy Plants and other Mineral Processing Industries - Joint Treatment of Raw Industrial waste water and Domestic Sewage – Common Effluent Treatment Plants (CETP) – Location, Design, Operation and Maintenance Problems – Economical aspects.

TEXT BOOKS

1. Industrial Waste Water Pollution Control by W. Wesley Eckenfelder – McGraw-Hill.
2. Industrial Waste Treatment by Rao & Datta.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A70195) CONCRETE AND HIGHWAY MATERIALS LAB**I. ROAD AGGREGATES:**

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. CEMENT AND CONCRETES :**TESTS ON CEMENTS :**

1. Normal Consistency of fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A70192) ENVIRONMENTAL ENGINEERING LAB**LIST OF EXPERIMENTS**

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination of iron.
6. Determination of Dissolved Oxygen.
7. Determination of Nitrates.
8. Determination of Optimum dose of coagulant
9. Determination of Chlorine demand
10. Determination of total Phosphorous.
11. Determination of B.O.D
12. Determination of C.O.D
13. Determination of Optimum coagulant dose.
14. Determination of Chlorine demand.
15. Presumptive coliform test.

NOTE : At least 8 of the above experiments are to be conducted.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80151) REHABILITATION AND RETROFITTING OF STRUCTURES****(Elective -IV)****UNIT – I**

Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention. Mechanism of Damage – Types of Damage

UNIT – II

Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – III

Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT – IV

Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning. Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – V

Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

TEXT BOOKS:

1. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.
2. Concrete Technology by A.R. Santakumar, Oxford University press.

REFERENCES

1. Defects and Deterioration in Buildings, EF & N Spon, London.
2. Non-Destructive Evaluation of Concrete Structures by Bungey – Surrey University Press.
3. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W.H. Ranso, (1981).
4. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B.A. Richardson, (1991).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80148) GEOENVIRONMENTAL ENGINEERING****(Elective-IV)****UNIT-I**

Sources and Site Characterization: Scope of Geo-environmental Engineering, Various Sources of Contaminations, Need for contaminated site characterization; and Characterization methods.

UNIT-II

Solid and Hazardous Waste Management: Classification of waste, Characterization solid wastes, Environmental Concerns with waste, waste management strategies.

UNIT-III

Contaminant Transport: Transport process, Mass-transfer process, Modeling, NAPL

UNIT-IV

Remediation Techniques: Objectives of site remediation, various active and passive methods, Bioremediation, Phytoremediation, Remediation of NAPL sites.

UNIT-V

Landfills: Types of landfills, Site Selection, Waste Containment Liners, Leachate collection system, Cover system, Gas collection system.

TEXT BOOKS:

1. Phillip B. Bedient, Refai, H. S. & Newell C. J. - Ground Water Contamination - Prentice Hall Publications, 4th Edition, 2008.
2. Sharma, H. D. and Reddy, K. R. - Geoenvironmental Engineering, John Wiley & Sons (2004).

REFERENCES:

1. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Handbook, Kluwer Academic, 2001.
2. Reddi, L. N. and Inyang, H. I. - Geoenvironmental Engineering Principles and Applications, Marcel. Dekker, Inc., New York (2000).
3. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. - Hazardous Waste Management, New York: McGraw-Hill, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80147) DESIGN AND DRAWING OF IRRIGATION STRUCTURES****(Elective-IV)****Design and drawing of the following hydraulic structures.**

Group A

1. Surplus weir.
2. Syphon Well Drop
3. Trapezoidal notch fall.
4. Tank sluice with tower head

Group B

1. Sloping glacis weir.
2. Canal regulator
3. Under Tunnel.
4. Type III Syphon aqueduct

Final Examination pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks.

The duration of examination will be FOUR hours.

However, the students are supposed to practise the drawings for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Water Resources Engineering – Principles and Practice by Challa Satyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80141) SOLID WASTE MANAGEMENT****(Elective-IV)****UNIT I:**

Solid Waste and their Handling: Definition of solid wastes – types of solid wastes – Sources - Industrial, mining, agricultural and domestic – Characteristics. Solid waste Problems - impact on environmental health

UNIT II:

Collection, Segregation and Transport AND Management of Municipal Solid Wastes: Handling and segregation, Collection and storage of municipal solid wastes; analysis of Collection systems. Transfer stations – labeling and handling of hazardous wastes. Solid waste processing technologies. Mechanical and thermal volume reduction. Biological and chemical techniques for energy and other resource recovery: composting - types, vermicomposting, termigradation, fermentation. Incineration of solid wastes. Disposal in landfills: site selection, design, and operation of sanitary landfills; Leachate and landfill gas management; landfill closure and post-closure environmental monitoring; landfill remediation. Regulatory aspects of municipal solid waste management.

UNIT III:

Hazardous Waste and Management: Hazardous waste definition. Physical and biological routes of transport of hazardous substances – sources and characterization. Sampling and analysis of hazardous wastes –proximate analysis – survey analysis – directed analysis handling, collection, storage and transport. Hazardous waste treatment technologies TSDF concept - Physical, chemical and thermal treatment of hazardous waste: solidification, chemical fixation, encapsulation, pyrolysis and incineration. Hazardous waste land fills - Site selections, design and operation. HW reduction, recycling and reuse, Regulatory aspects of HWM/HWM rules.

UNIT IV:

Biomedical Waste Management: Classification, collection, segregation Treatment and disposal. Radioactive waste: Definition, Low level and high level radioactive wastes and their management, Radiation standards.

UNIT V:

E-Waste Management: Waste characteristics, generation, collection, transport and disposal, regulatory aspects of e waste, global strategy, recycling.

TEXT BOOKS:

1. Hazardous waste management Charles A. Wentz. Second edition 1995. McGraw Hill International.
2. Integrated solid waste management George Tchobanoglous, Hilary Theisen & Samuel A. Vigil.

REFERENCES:

1. Hazardous waste management by Prof. Anjaneyulu.
2. Criteria for hazardous waste landfills – CPCB guidelines 2000.
3. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
4. Management of Solid waste in developing countries by Frank Flintoff, WHO regional publications 1976.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80150) PRESTRESSED CONCRETE STRUCTURES****UNIT I:**

Introduction: Historic development- General principles of prestressing pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics.

Methods and Systems of prestressing: Pretensioning and Posttensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford- Udall System- Lee McCall system.

UNIT II:

Losses of Prestress: Loss of prestress in pretensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

UNIT III:

Flexure: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC beams of rectangular and I sections- Kern line – Cable profile and cable layout.

Shear: General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- Bureau of Indian Standards (BIS) Code provisions.

UNIT IV:

Transfer of Prestress in Pretensioned Members : Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zielinski and Rowe's methods – Anchorage zone reinforcement- BIS Provisions

UNIT V

Composite Beams: Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

Deflections: Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long

time deflections- BIS code requirements.

TEXT BOOK:

- 1) Prestressed concrete by N.Krishna Raju, 5th Edition, Tata McGraw Hill Book Education Pvt. Ltd.

REFERENCES :

- 1) Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York.
- 2) Prestressed concrete by S. Ramamrutham, Dhanpat Rai & Sons, Delhi.
- 3) Prestressed Concrete by N. Rajagopalan, Narosa Publishing House.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80146) CONSTRUCTION MANAGEMENT****UNIT-I**

Management process- Roles . management theories . Social responsibilities. planning and strategic management . strategy implementation . Decision making: tools and techniques – Organizational structure . Human resource management- motivation performance- leadership.

UNIT-II

Classification of Construction projects, Construction stages, Resources- Functions of Construction Management and its Applications .Preliminary Planning- Collection of Data-Contract Planning – Scientific Methods of Management: Network Techniques in construction management - Bar chart, Gant chart, CPM, PERT- Cost & Time optimization.

UNIT-III

Resource planning - planning for manpower, materials, costs, equipment. Labour, -Scheduling .Forms of scheduling - Resource allocation . budget and budgetary control methods

UNIT-IV

Contract - types of contract, contract document, specification, important conditions of contract – tender and tender document - Deposits by the contractor - Arbitration . negotiation - M.Book - Muster roll -stores.

UNIT-V

Management Information System - Labour Regulations: Social Security - welfare Legislation - Laws relating to Wages, Bonus and Industrial disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act -other labour Laws - Safety in construction : legal and financial aspects of accidents in construction . occupational and safety hazard assessment. Human factors in safety . legal and financial aspects of accidents in construction . occupational and safety hazard assessment

TEXT BOOKS

1. Ghalot, P.S., Dhir,D.M., Construction Planning and Management, Wiley Eastern Limited,1992.
2. Chitkara,K.K., Construction Project Management, Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
3. Punmia,B,C., Project Planning and Control with PERT and CPM, Laxmi Publications, new delhi,1987.

REFERENCE:

1. Construction Management And Planning by: sengupta, b. /guha, h. tata mcgraw-hill publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/-	2

(A80087) INDUSTRY ORIENTED MINI PROJECT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/6/-	2

(A80089) SEMINAR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/15/-	10

(A80088) PROJECT WORK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/-	2

(A80090) COMPREHENSIVE VIVA

BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

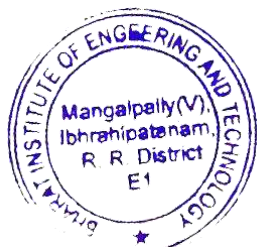
Mangalpally (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Telangana-501510

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

B.Tech-CIVIL ENGINEERING

2016-17

S. No.	Regulations	No. of Course	Year of Study
1.	R16	4	I year I & II semester
2.	R15	5	II Year I & II Semesters
3.	R13	10	III & IV year I & II Semesters



Vettikanti Subu
PRINCIPAL
Principal
Bharat Institute of Engg. and Tech
Mangalpally(V), Ibrahimpatnam(M)
Ranga Reddy (Dist)-Telangana-501510

With effect from 02/08/2016

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. COURSE STRUCTURE (2016-17)

(Common for Civil, ME, AE, ME (M), MME, AU, Mining, Petroleum, CEE, ME (Nanotech))

I YEAR I SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	MA101BS	Mathematics-I	3	1	0	3
2	MA102BS	Mathematics-II	4	1	0	4
3	PH103BS	Engineering Physics	3	0	0	3
4	CS104ES	Computer Programming in C	3	0	0	3
5	ME105ES	Engineering Mechanics	3	0	0	3
6	ME106ES	Engineering Graphics	2	0	4	4
7	PH107BS	Engineering Physics Lab	0	0	3	2
8	CS108ES	Computer Programming in C Lab	0	0	3	2
9	*EA109MC	NSS	0	0	0	0
		Total Credits	18	2	10	24

I YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	AP201BS	Applied Physics	3	0	0	3
2	CH202BS	Engineering Chemistry	4	0	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	EN204HS	Professional Communication in English	3	0	0	3
5	EE205ES	Basic Electrical & Electronics Engineering	4	0	0	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	EN207HS	English Language Communication Skills Lab	0	0	3	2
8	ME208ES	Engineering Workshop	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		Total Credits	18	1	9	24

*Mandatory Course

MATHEMATICS- I
(Linear Algebra and Differential Equations)

B.Tech. I Year I Sem.
Course Code: **MA101BS**

L T/P/D C
3 1/0/0 3

Prerequisites: Foundation course (No prerequisites).

Course Objectives:

To learn

- types of matrices and their properties
- the concept of rank of a matrix and applying the same to understand the consistency
- solving the linear systems
- the concepts of eigen values and eigen vectors and reducing the quadratic forms into their canonical forms
- partial differentiation, concept of total derivative
- finding maxima and minima of functions of two variables
- methods of solving the linear differential equations of first and higher order
- the applications of the differential equations
- formation of the partial differential equations and solving the first order equations.

Course Outcomes:

After learning the contents of this paper the student must be able to

- write the matrix representation of a set of linear equations and to analyze the solution of the system of equations
- find the Eigen values and Eigen vectors which come across under linear transformations
- find the extreme values of functions of two variables with/ without constraints.
- identify whether the given first order DE is exact or not
- solve higher order DE's and apply them for solving some real world problems

UNIT-I

Initial Value Problems and Applications

Exact differential equations - Reducible to exact.

Linear differential equations of higher order with constant coefficients: Non homogeneous terms with RHS term of the type e^{ax} , $\sin ax$, $\cos ax$, polynomials in x , $e^{ax}V(x)$, $xV(x)$ - Operator form of the differential equation, finding particular integral using inverse operator, Wronskian of functions, method of variation of parameters.

Applications: Newton's law of cooling, law of natural growth and decay, orthogonal trajectories, Electrical circuits.

UNIT-II

Linear Systems of Equations

Types of real matrices and complex matrices, rank, echelon form, normal form, consistency and solution of linear systems (homogeneous and Non-homogeneous) - Gauss elimination, Gauss Jordan and LU decomposition methods- Applications: Finding current in the electrical circuits.

UNIT–III

Eigen values, Eigen Vectors and Quadratic Forms

Eigen values, Eigen vectors and their properties, Cayley - Hamilton theorem (without proof), Inverse and powers of a matrix using Cayley - Hamilton theorem, Diagonalization, Quadratic forms, Reduction of Quadratic forms into their canonical form, rank and nature of the Quadratic forms – Index and signature.

UNIT–IV

Partial Differentiation

Introduction of partial differentiation, homogeneous function, Euler's theorem, total derivative, Chain rule, Taylor's and Mclaurin's series expansion of functions of two variables, functional dependence, Jacobian.

Applications: maxima and minima of functions of two variables without constraints and Lagrange's method (with constraints)

UNIT-V

First Order Partial Differential Equations

Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions, Lagranges method to solve the first order linear equations and the standard type methods to solve the non linear equations.

Text Books:

1. A first course in differential equations with modeling applications by Dennis G. Zill, Cengage Learning publishers.
2. Higher Engineering Mathematics by Dr. B. S. Grewal, Khanna Publishers.

References:

1. Advanced Engineering Mathematics by E. Kreyszig, John Wiley and Sons Publisher.
2. Engineering Mathematics by N. P. Bali, Lakshmi Publications.

MATHEMATICS- II (Advanced Calculus)

B.Tech. I Year I Sem.

Course Code: MA102BS/MA202BS

L	T/P/D	C
4	1/0/0	4

Prerequisites: Foundation course (No prerequisites).

Course Objectives:

To learn

- concepts & properties of Laplace Transforms
- solving differential equations using Laplace transform techniques
- evaluation of integrals using Beta and Gamma Functions
- evaluation of multiple integrals and applying them to compute the volume and areas of regions
- the physical quantities involved in engineering field related to the vector valued functions.
- the basic properties of vector valued functions and their applications to line, surface and volume integrals.

Course Outcomes:

After learning the contents of this course the student must be able to

- use Laplace transform techniques for solving DE's
- evaluate integrals using Beta and Gamma functions
- evaluate the multiple integrals and can apply these concepts to find areas, volumes, moment of inertia etc of regions on a plane or in space
- evaluate the line, surface and volume integrals and converting them from one to another

UNIT-I

Laplace Transforms: Laplace transforms of standard functions, Shifting theorems, derivatives and integrals, properties- Unit step function, Dirac's delta function, Periodic function, Inverse Laplace transforms, Convolution theorem (without proof).

Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT-II

Beta and Gamma Functions: Beta and Gamma functions, properties, relation between Beta and Gamma functions, evaluation of integrals using Beta and Gamma functions.

Applications: Evaluation of integrals.

UNIT-III

Multiple Integrals: Double and triple integrals, Change of variables, Change of order of integration.

Applications: Finding areas, volumes & Center of gravity (evaluation using Beta and Gamma functions).

UNIT–IV

Vector Differentiation: Scalar and vector point functions, Gradient, Divergence, Curl and their physical and geometrical interpretation, Laplacian operator, Vector identities.

UNIT–V

Vector Integration: Line Integral, Work done, Potential function, area, surface and volume integrals, Vector integral theorems: Greens, Stokes and Gauss divergence theorems (without proof) and related problems.

Text Books:

1. Advanced Engineering Mathematics by R K Jain & S R K Iyengar, Narosa Publishers
2. Engineering Mathematics by Srimanthapal and Subodh C. Bhunia, Oxford Publishers

References:

1. Advanced Engineering Mathematics by Peter V. O. Neil, Cengage Learning Publishers.
2. Advanced Engineering Mathematics by Lawrence Turyn, CRC Press

ENGINEERING PHYSICS/ENGINEERING PHYSICS - I

B.Tech. I Year I Sem.
Course Code: **PH103BS**

L T/P/D C
3 0/0/0 3

Course Objectives:

- To understand interaction of light with matter through interference, diffraction and polarization.
- To able to distinguish ordinary light with a laser light and to realize propagation of light through optical fibers.
- To understand various crystal systems and there structures elaborately.
- To study various crystal imperfections and probing methods like X-RD.

Course outcomes: after completion of this course the student is able to

- Realize the importance of light phenomena in thin films and resolution.
- Learn principle, working of various laser systems and light propagation through optical fibers.
- Distinguish various crystal systems and understand atomic packing factor.
- Know the various defects in crystals.

UNIT-I

Interference: Coherence, division of amplitude and division of wave front, interference in thin films (transmitted and reflected light), Newton's rings experiment.

Diffraction: Distinction between Fresnel and Fraunhofer diffraction, diffraction due to single slit, N-slits, Diffraction grating experiment.

UNIT-II

Polarization: Introduction, Malus's law, double refraction, Nicol prism, Quarter wave and half wave plates.

Lasers: Characteristics of lasers, spontaneous and stimulated emission of radiation, Einstein coefficients, population inversion, ruby laser, helium – neon laser, semi conductor laser, applications of lasers

UNIT-III

Fiber Optics: Principle of optical fiber, construction of fiber, acceptance angle and acceptance cone, numerical aperture, types of optical fibers: step index and graded index fibers, attenuation in optical fibers, applications of optical fibers in medicine and sensors.

UNIT-IV

Crystallography: Space lattice, unit cell and lattice parameters, crystal systems, Bravais lattices, atomic radius, co-ordination number and packing factor of SC, BCC, FCC, HCP and diamond, Miller indices, crystal planes and directions, inter planar spacing of orthogonal crystal systems.

UNIT-V

X-ray Diffraction and Defects in Crystals: Bragg's law, X-ray diffraction methods: Laue method, powder method; point defects: vacancies, substitutional, interstitial, Frenkel and

Schottky defects, line defects (qualitative) and Burger's vector, surface defects: stacking faults, twin, tilt and grain boundaries.

Text Books:

1. Physics Vol. 2, Halliday, Resnick and Kramer John Wiley and Sons, Edition 4.
2. Modern Engineering Physics, K. Vijaya Kumar and S. Chandra Lingam, S. Chand and Co. Pvt. Ltd.
3. Introduction to Solid State Physics, Charles Kittel, Wiley Student edition.

Reference Books:

1. X-Ray Crystallography, Phillips, John Wiley publishers.
2. Waves, Frank S Crawford Jr, Berkeley Physics course, Volume 3.
3. Solid State Physics, AJ Dekker, MacMilan Publishers.
4. Introduction to Crystallography, Phillips, John Wiley publishers.

COMPUTER PROGRAMMING IN C

B.Tech. I Year I Sem.

Course Code: CS104ES/CS204ES

L T/P/D C

3 0/0/0 3

Course Objectives:

- To learn the fundamentals of computers.
- To understand the various steps in Program development.
- To learn the syntax and semantics of C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs using structured programming approach in C to solve problems.

Course Outcomes:

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to write algorithms for solving problems.
- Ability to draw flowcharts for solving problems.
- Ability to code a given logic in C programming language.
- Gain knowledge in using C language for solving problems.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development, algorithms and flowcharts , Number systems-Binary, Decimal, Hexadecimal and Conversions, storing integers and real numbers.

Introduction to C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators(Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements(making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - II

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs.

Arrays – Concepts, using arrays in C, inter function communication, array applications- linear search, binary search and bubble sort, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function, memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

UNIT - IV

Enumerated, Structure ,and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures-Nested structures, structures containing arrays, structures containing pointers, arrays of structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command–line arguments, Preprocessor commands.

UNIT – V

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions (fseek ,rewind and ftell), C program examples.

Text books:

- 1) Computer Science: A Structured Programming Approach Using C, B.A. Forouzan and R. F. Gilberg, Third Edition, Cengage Learning.
- 2) Programming in C. P. Dey and M Ghosh , Second Edition, Oxford University Press.

Reference books:

- 1) The C Programming Language, B.W. Kernighan and Dennis M. Ritchie, Second Edition, Pearson education.
- 2) Programming with C, B. Gottfried, 3rd edition, Schaum's outlines, McGraw Hill Education (India) Pvt Ltd.
- 3) C From Theory to Practice, G S. Tselikis and N D. Tselikas, CRC Press.
- 4) Basic computation and Programming with C, Subrata Saha and S. Mukherjee, Cambridge University Press.

ENGINEERING MECHANICS

B.Tech. I Year I Sem.
Course Code: ME105ES

L T/P/D C
3 0/0/0 3

Pre Requisites: None

Course Objectives:

- To understand the resolving forces and moments for a given force system
- To analyze the types of friction for moving bodies and problems related to friction.
- To determine the centroid and second moment of area

UNIT-I

Introduction to Mechanics: Basic Concepts, system of Forces Coplanar Concurrent Forces - Components in Space Resultant -Moment of Forces and its Application - Couples and Resultant of Force Systems. Equilibrium of system of Forces: Free body diagrams, Equations of Equilibrium of Coplanar Systems and Spatial Systems.

UNIT-II

Friction: Types of friction -Limiting friction -Laws of Friction -static and Dynamic Frictions -Motion of Bodies –Wedge Screw, Screw-jack and differential screw –jack.

UNIT-III

Centroid and Center of Gravity: Introduction – Centroids of lines – Centroids of area - Centroids of Composite figures - Theorem of Pappus -Centre of Gravity of Bodies – Centroids of Volumes – Center of gravity of composite bodies.

Area moments of Inertia: Introduction – Definition of Moment of Inertia -Polar Moment of Inertia – Radius of gyration. Transfer Theorem for moment of inertia – Moments of inertia by integration - Moments of Inertia of Composite Figures, Product of Inertia, Transfer Formula for Product of Inertia.

UNIT-IV

Mass Moment of Inertia: Introduction - Moment of Inertia of Masses – Radius of gyration - Transfer Formula for Mass Moments of Inertia – Mass moments of inertia by integration - Mass moment of inertia of composite bodies.

Virtual Work: Theory of virtual work-Application.

UNIT-V

Kinetics: Kinetics of a particle-D'Alemberts principle-Motion in a curved path – work, energy and power. Principle of conservation of energy- Kinetics of rigid body in translation, rotation-work done-Principle of work-energy-Impulse-momentum.

Mechanical Vibrations: Definitions, Concepts-Simple Harmonic motion- free vibrations-Simple and compound pendulums

Text Books:

1. Singer's Engineering Mechanics Statics and Dynamics/ K. Vijaya Kumar Reddy, J. Suresh Kumar/ BSP
2. Engineering Mechanics/ Irving Shames, G. Krishna Mohan Rao / Prentice Hall

3. Foundations and applications of Engineering Mechanics by HD Ram and AK Chouhan, Cambridge publications.

References:

1. A Text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain / Academic Publishing Company
2. Engineering Mechanics / Bhattacharyya/ Oxford.

ENGINEERING GRAPHICS

B.Tech. I Year I Sem.
Course Code: ME106ES/ME205ES

L T/P/D C
2 0/0/4 4

Pre-requisites: None

Course objectives:

- To provide basic concepts in engineering drawing.
- To impart knowledge about standard principles of orthographic projection of objects.
- To draw sectional views and pictorial views of solids.

Course Outcomes:

- Preparing working drawings to communicate the ideas and information.
- Read, understand and interpret engineering drawings.

UNIT – I

Introduction to Engineering Drawing: Principles of Engineering Graphics and their Significance, Conic Sections including the Rectangular Hyperbola – General method only. Cycloid, Epicycloid and Hypocycloid Involute. Scales – Plain, Diagonal and Vernier Scales.

UNIT- II

Orthographic Projections: Principles of Orthographic Projections – Conventions – Projections of Points and Lines Projections of Plane regular geometric figures.—Auxiliary Planes.

UNIT – III

Projections of Regular Solids – Auxiliary Views.

UNIT – IV

Sections or Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views – Sections of Sphere. Development of Surfaces of Right Regular Solids – Prism, Cylinder, Pyramid and Cone

UNIT – V

Isometric Projections: Principles of Isometric Projection – Isometric Scale – Isometric Views – Conventions – Isometric Views of Lines, Plane Figures, Simple and Compound Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of Spherical Parts. Conversion of Isometric Views to Orthographic Views and Vice-versa – Conventions Auto CAD: Basic principles only.

Text books:

- Engineering Drawing / Basant Agrawal and Mc Agrawal/ Mc Graw Hill
- Engineering Drawing/ M.B. Shah, B.C. Rane / Pearson.

Reference books:

- Engineering Drawing / N.S. Parthasarathy and Vela Murali/ Oxford
- Engineering Drawing N.D. Bhatt / Charotar

ENGINEERING PHYSICS LAB

B.Tech. I Year I Sem.

Course Code: **PH107BS/PH207BS**

L	T/P/D	C
0	0/3/0	2

(Any TEN experiments compulsory)

- 1) Dispersive power of the material of a prism – Spectrometer.
- 2) Determination of wavelengths of white source – Diffraction grating.
- 3) Newton's Rings – Radius of curvature of Plano convex lens.
- 4) Melde's experiment – Transverse and longitudinal modes.
- 5) Charging, discharging and time constant of an R-C circuit.
- 6) L-C-R circuit – Resonance & Q-factor.
- 7) Magnetic field along the axis of current carrying coil – Stewart and Gees method and to verify Biot – Savart's law.
- 8) Study the characteristics of LED and LASER diode.
- 9) Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
- 10) Energy gap of a material of p-n junction.
- 11) Torsional pendulum – Rigidity modulus.
- 12) Wavelength of light, resolving power and dispersive power of a diffraction grating using laser.
- 13) V-I characteristics of a solar cell.

COMPUTER PROGRAMMING IN C LAB

B.Tech. I Year I Sem.
Course Code: CS108ES/CS208ES

L T/P/D C
0 0/3/0 2

Course Objective:

- To write programs in C using structured programming approach to solve the problems.

Course Outcomes

- 1. Ability to design and test programs to solve mathematical and scientific problems.
- 2. Ability to write structured programs using control structures and functions.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- GNU C Compiler

- a) Write a C program to find the factorial of a positive integer.
 - b) Write a C program to find the roots of a quadratic equation.
- a) Write a C program to determine if the given number is a prime number or not.
 - b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- a) Write a C program to construct a pyramid of numbers.
 - b) Write a C program to calculate the following Sum:
$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- a) The least common multiple (lcm) of two positive integers a and b is the smallest integer that is evenly divisible by both a and b. Write a C program that reads two integers and calls lcm (a, b) function that takes two integer arguments and returns their lcm. The lcm (a, b) function should calculate the least common multiple by calling the gcd (a, b) function and using the following relation:
$$\text{LCM}(a,b) = ab / \text{gcd}(a,b)$$
 - b) Write a C program that reads two integers n and r to compute the ncr value using the following relation:
$$\text{ncr}(n,r) = n! / r! (n-r)! .$$
 Use a function for computing the factorial value of an integer.
- a) Write C program that reads two integers x and n and calls a recursive function to compute x^n
 - b) Write a C program that uses a recursive function to solve the Towers of Hanoi problem.
 - c) Write a C program that reads two integers and calls a recursive function to compute ncr value.
- a) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user using Sieve of Eratosthenes algorithm.
 - b) Write a C program that uses non recursive function to search for a Key value in a given list of integers. Use linear search method.
- a) Write a menu-driven C program that allows a user to enter n numbers and then choose between finding the smallest, largest, sum, or average. The menu and all the choices are to be functions. Use a switch statement to determine what action to take. Display an error message if an invalid choice is entered.
 - b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers. Use binary search method.

8. a) Write a C program that implements the Bubble sort method to sort a given list of integers in ascending order.
b) Write a C program that reads two matrices and uses functions to perform the following:
 - i) Addition of two matrices
 - ii) Multiplication of two matrices
9. a) Write a C program that uses functions to perform the following operations:
 - i) to insert a sub-string into a given main string from a given position.
 - ii) to delete n characters from a given position in a given string.b) Write a C program that uses a non recursive function to determine if the given string is a palindrome or not.
10. a) Write a C program to replace a substring with another in a given line of text.
b) Write a C program that reads 15 names each of up to 30 characters, stores them in an array, and uses an array of pointers to display them in ascending (ie. alphabetical) order.
11. a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
b) Write a C program to convert a positive integer to a roman numeral. Ex. 11 is converted to XI.
12. a) Write a C program to display the contents of a file to standard output device.
b) Write a C program which copies one file to another, replacing all lowercase characters with their uppercase equivalents.
13. a) Write a C program to count the number of times a character occurs in a text file. The file name and the character are supplied as command-line arguments.
b) Write a C program to compare two files, printing the first line where they differ.
14. a) Write a C program to change the nth character (byte) in a text file. Use fseek function.
b) Write a C program to reverse the first n characters in a file. The file name and n are specified on the command line. Use fseek function.
15. a) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file).
b) Define a macro that finds the maximum of two numbers. Write a C program that uses the macro and prints the maximum of two numbers.

Reference Books:

1. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.
2. Computer Programming in C, V. Rajaraman, PHI.
3. Programming in C, Stephen G. Kochan, Fourth Edition, Pearson Education.
4. C++: The complete reference, H. Schildt, TMH Publishers.

w. e. f. AY 2016-17

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

B.TECH. COURSE STRUCTURE (2016-17)

(Common for Civil, ME, AE, ME (M), MME, AU, Mining, Petroleum, CEE, ME (Nanotech))

I YEAR II SEMESTER

S. No	Course Code	Course Title	L	T	P	Credits
1	AP201BS	Applied Physics	3	0	0	3
2	CH202BS	Engineering Chemistry	4	0	0	4
3	MA203BS	Mathematics-III	4	1	0	4
4	EN204HS	Professional Communication in English	3	0	0	3
5	EE205ES	Basic Electrical & Electronics Engineering	4	0	0	4
6	CH206BS	Engineering Chemistry Lab	0	0	3	2
7	EN207HS	English Language Communication Skills Lab	0	0	3	2
8	ME208ES	Engineering Workshop	0	0	3	2
9	*EA209MC	NCC/NSO	0	0	0	0
		Total Credits	18	1	9	24

*Mandatory Course

AP201BS: APPLIED PHYSICS

B.Tech. I Year II Sem.

L	T/P/D	C
3	0/0/0	3

Course Objectives:

- To understand the elastic behavior of materials.
- To understand basic principles of acoustics and architecture of buildings.
- To study production and applications of ultrasonics.
- To understand magnetic, dielectric and superconducting properties.

Course Outcomes: after completion of this course the student is able to

- Realize the importance of elastic behavior of materials.
- Learn Sabine's formula for reverberation time and apply in architecture of buildings.
- Learn various methods of producing ultrasonics and their uses.
- Learn magnetic, dielectric and superconducting properties of materials and their applications.

UNIT - I

Elastic properties: stress and strain, Hooke's law, elastic behavior of a material, factors affecting elasticity, three moduli of elasticity, work done for unit volume in deforming a body, relation between three moduli of elasticity, determination of rigidity modulus – torsional pendulum.

UNIT - II

Acoustics of buildings and acoustic quieting: Introduction, basic requirement for the acoustically good halls, reverberation and time of reverberation, transmission of sound and transmission loss, factors affecting the architectural acoustics and their remedy, sound absorbing materials, sabine formulae, absorption coefficients, stadium seating, movie theater, acoustic quieting,

UNIT - III

Ultrasonics: Introduction, production of ultrasonic waves, magnetostriction method, piezo electric method, detection of ultrasonic waves, properties of ultrasonic waves, use of ultrasonics for nondestructive testing, applications of ultrasonics.

UNIT - IV

Dielectric Properties: Electric dipole, dipole moment, dielectric constant, polarizability, electric susceptibility, displacement vector, electronic, ionic and orientation polarizations and calculation of their polarizabilities, internal field, Clausius-Mossotti relation, Piezoelectricity, pyroelectricity and ferroelectricity-BaTiO₃ structure.

UNIT - V

Magnetic Properties: Permeability, field intensity, magnetic field induction, magnetization, magnetic susceptibility, origin of magnetic moment, Bohr magneton, classification of dia, para

and ferro magnetic materials on the basis of magnetic moment, hysteresis curve based on domain theory, soft and hard magnetic materials, properties of anti-ferro and ferri magnetic materials.

Superconductivity: Superconductivity phenomenon, Meissner effect, applications of superconductivity.

Text books:

1. Solid State Physics, A. J. Dekkar, MacMillan publishers
2. Fundamentals of Physics, Alan Giambattisa, BM Richardson and Robert C Richardson, Tata McGraw hill Publishers
3. Fundamentals of Acoustics, Kinster and Frey, John Wiley and Sons.

Reference Books:

1. Solid state physics, Charles Kittel, Wiley student edition
2. University Physics, Francis W. Sears, Hugh D. Young, Marle Zeemansky and Roger A Freedman, Pearson Education.
3. Introduction to Magnetic Materials, B.D. Cullity, C.D.Graham, A John Wiley & Sons, Inc., Publication.
4. Elastic and Inelastic Stress Analysis, Irving H. Shames, Francis A. Cozzarelli, Taylor, & Francis Group.

CH102BS/CH202BS: ENGINEERING CHEMISTRY

B.Tech. I Year II Sem.

L T/P/D C
4 0/0/0 4

Course Objectives:

- To bring adaptability to new developments in Engineering Chemistry and to acquire the skills required to become a perfect engineer.
- To include the importance of water in industrial usage, significance of corrosion control to protect the structures, polymers and their controlled usage.
- To acquire knowledge of engineering materials and about fuels and batteries.
- To acquire required knowledge about engineering materials like cement, refractories and composites..

Course Outcomes:

- Students will gain the basic knowledge of electrochemical procedures related to corrosion and its control.
- They can understand the basic properties of water and its usage in domestic and industrial purposes.
- They learn the use of fundamental principles to make predictions about the general properties of materials.
- They can predict potential applications of chemistry and practical utility in order to become good engineers and entrepreneurs

UNIT - I

Water and its treatment: Introduction – hardness of water – causes of hardness – types of hardness: temporary and permanent – expression and units of hardness – Estimation of hardness of water by complexometric method. Numerical problems. Potable water and its specifications- Steps involved in the treatment of potable water - Disinfection of potable water by chlorination and Ozonization. Defluoridation – Nalgonda technique - Determination of F^- ion by ion- selective electrode method.

Boiler troubles: sludges, scales, and Caustic embrittlement. Internal treatment of Boiler feed water – Calgon conditioning – Phosphate conditioning - Colloidal conditioning – Softening of water by ion-exchange processes. Desalination of water – Reverse osmosis. Numerical problems – Sewage water - Steps involved in treatment of sewage.

UNIT - II

Electrochemistry: Electrode- electrode potential, standard electrode potential, types of electrodes – Construction and functioning of Standard hydrogen electrode, calomel and glass electrode. Nernst equation - electrochemical series and its applications. Electrochemical cells: Daniel cell – cell notation, cell reaction, and cell emf — Concept of concentration cells – Electrolyte concentration cell – Numerical problems.

Batteries: Cell and battery - Primary battery (dry cell, alkaline cell and Lithium cell) and Secondary battery (lead acid, Ni-Cd and lithium ion cell), **Fuel cells:** Hydrogen –oxygen and methanol-oxygen fuel cells – Applications.

UNIT – III

Polymers: Definition – Classification of polymers with examples – Types of polymerization – addition (free radical addition) and condensation polymerization with examples.

Plastics: Definition and characteristics- thermoplastic and thermosetting plastics, compounding, and fabrication of plastics (compression and injection moulding). Preparation, Properties, and engineering applications of PVC and Bakelite.

Fibers: Characteristics of fibers – preparation, properties and applications of Nylon-6,6 and Dacron. Fiber reinforced plastics (FRP) – Applications.

Rubbers: Natural rubber and its vulcanization - compounding of rubber.

Elastomers: Characteristics –preparation – properties and applications of Buna-S, Butyl and Thiokol rubber.

Conducting polymers: Characteristics and Classification with examples-mechanism of conduction in trans-polyacetylene and applications of conducting polymers.

Biodegradable polymers: Concept and advantages - Polylactic acid and poly vinyl alcohol and their applications.

UNIT - IV

Fuels & Combustion: Classification- solid fuels: coal – analysis of coal – proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining, cracking – types – moving bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol - Fischer-Tropsch's process; Gaseous fuels – composition and uses of natural gas, LPG and CNG. **Combustion:** Definition, Calorific value of fuel – HCV, LCV; Calculation of air quantity required for combustion of a fuel.

UNIT - V

Cement: Portland cement, its composition, setting and hardening of Portland cement.

Special cements: White cement, water proof cement, High alumina cement, and Acid resistant cement.

Refractories: Classification, characteristics of good refractories, Refractoriness, refractoriness under load, porosity, and chemical inertness – applications of refractories.

Lubricants: Classification of lubricants with examples-characteristics of a good lubricants - mechanism of lubrication (thick film, thin film and extreme pressure)- properties of lubricants: viscosity, cloud point, pour point, flash point and fire point.

Composites: Introduction- Constituents of composites – advantages, classification and constituents of composites. Applications of composites.

Text books:

1. Engineering Chemistry by P.C. Jain & M. Jain, Dhanpatrai Publishing Company, New Delhi (2010)

2. Engineering Chemistry by Rama Devi, Venkata Ramana Reddy and Rath, Cengage learning, New Delhi. (2016)

Reference Books:

1. Engineering Chemistry by Shashi Chawla, Dhanpatrai & Company (P) Ltd. Delhi (2011)
2. Engineering Chemistry by Shikha Agarwal, Cambridge University Press, Delhi (2015)
3. Engineering Chemistry by Thirumala Chary and Laxminarayana, Scitech Publishers, Chennai (2016).

MA203BS: Mathematics - III
(Statistical and Numerical Methods)

B.Tech. I Year II Sem.

L T/P/D C
4 1/0/0 4

Prerequisites: Foundation course (No prerequisites).

Course Objectives: To learn

- random variables that describe randomness or an uncertainty in certain realistic situation
- binomial geometric and normal distributions
- sampling distribution of mean, variance, point estimation and interval estimation
- the testing of hypothesis and ANOVA
- the topics those deals with methods to find roots of an equation
- to fit a desired curve by the method of least squares for the given data
- solving ordinary differential equations using numerical techniques

Course Outcomes: After learning the contents of this course the student must be able to

- differentiate among random variables involved in the probability models which are useful for all branches of engineering
- calculate mean, proportions and variances of sampling distributions and to make important decisions s for few samples which are taken from a large data
- solve the tests of ANOVA for classified data
- find the root of a given equation and solution of a system of equations
- fit a curve for a given data
- find the numerical solutions for a given first order initial value problem

UNIT – I

Random variables and Distributions:

Introduction, Random variables, Discrete random variable, Continuous random variable, Probability distribution function, Probability density function, Expectation, Moment generating function, Moments, and properties.

Discrete distributions: Binomial and geometric distributions. Continuous distribution: Normal distributions.

UNIT – II

Sampling Theory: Introduction, Population and samples, Sampling distribution of means (σ Known)-Central limit theorem, t-distribution, Sampling distribution of means (σ unknown)-Sampling distribution of variances – χ^2 and F- distributions, Point estimation, Maximum error of estimate, Interval estimation.

UNIT – III

Tests of Hypothesis: Introduction, Hypothesis, Null and Alternative Hypothesis, Type I and Type II errors, Level of significance, One tail and two-tail tests, Tests concerning one mean

and proportion, two means-proportions and their differences-ANOVA for one-way classified data.

UNIT – IV

Algebraic and Transcendental Equations & Curve Fitting: Introduction, Bisection Method, Method of False position, Iteration methods: fixed point iteration and Newton Raphson methods. Solving linear system of equations by Gauss-Jacobi and Gauss-Seidal Methods.

Curve Fitting: Fitting a linear, second degree, exponential, power curve by method of least squares.

UNIT – V

Numerical Integration and solution of Ordinary Differential equations: Trapezoidal rule- Simpson's $1/3^{\text{rd}}$ and $3/8^{\text{th}}$ rule- Solution of ordinary differential equations by Taylor's series, Picard's method of successive approximations, Euler's method, Runge-Kutta method (second and fourth order)

Text Books:

1. Probability and Statistics for Engineers by Richard Arnold Johnson, Irwin Miller and John E. Freund, New Delhi, Prentice Hall.
2. Probability and Statistics for Engineers and Sciences by Jay L. Devore, Cengage Learning.
3. Numerical Methods for Scientific and Engineering Computation by M. K. Jain, S. R. K. Iyengar and R. K. Jain, New Age International Publishers

References:

1. Fundamentals of Mathematical Statistics by S. C. Gupta & V. K. Kapoor, S. Chand.
2. Introductory Methods of Numerical Analysis by S. S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematics for engineers and scientists by Alan Jeffrey, 6th edition, CRC press.

B.Tech. I Year II Sem.**L T/P/D C****3 0/0/0 3****INTRODUCTION:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire language skills, the syllabus of English has been designed to develop linguistic and communicative competencies of Engineering students.

In English classes, the focus should be on the skills development in the areas of vocabulary, grammar, reading and writing. For this, the teachers should use the prescribed text for detailed study. The students should be encouraged to read the texts/poems silently leading to reading comprehension. Reading comprehension passages are given for practice in the class. The time should be utilized for working out the exercises given after each excerpt, and also for supplementing the exercises with authentic materials of a similar kind. For example, from newspaper articles, advertisements, promotional material, etc. *The focus in this syllabus is on skill development, fostering ideas and practice of language skills.*

Course Objectives: The course will help students to:

- Improve the language proficiency of students in English with an emphasis on Vocabulary, Grammar, Reading and Writing skills.
- Equip students to study academic subjects more effectively using the theoretical and Practical components of English syllabus.
- Develop study skills and communication skills in formal and informal situations.

Course Outcomes: Students will be able to:

- Use English Language effectively in spoken and written forms.
- Comprehend the given texts and respond appropriately.
- Communicate confidently in formal and informal contexts.

SYLLABUS**Reading Skills****Objectives**

1. To develop an awareness in students about the significance of silent reading and comprehension.
2. To develop students' ability to guess meanings of words from the context and grasp the overall message of the text, draw inferences, etc., by way of:
 - Skimming and Scanning the text
 - Intensive and Extensive Reading
 - Reading for Pleasure
 - Identifying the topic sentence
 - Inferring lexical and contextual meaning

- Recognizing Coherence/Sequencing of Sentences

NOTE: The students will be trained in reading skills using the prescribed texts for detailed study. They will be tested in reading comprehension of different ‘unseen’ passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill
2. To create an awareness in students about the components of different forms of writing, beginning with the lower order ones through;
 - Writing of sentences
 - Use of appropriate vocabulary
 - Paragraph writing
 - Coherence and cohesiveness
 - Narration / description
 - Note Making
 - Formal and informal letter writing
 - Describing graphs using expressions of comparison

In order to improve the proficiency of the students in the acquisition of language skills mentioned above, the following text and course contents, divided into Five Units, are prescribed:

The course content / study material is divided into **Five Units**.

Note: *Listening and speaking skills are covered in the syllabus of ELCS Lab.*

UNIT – I

Chapter entitled ‘*Presidential Address*’ by *Dr. A.P.J. Kalam* from “*Fluency in English– A Course book for Engineering Students*” published by Orient BlackSwan, Hyderabad.

Vocabulary: Word Formation -- Root Words --The Use of Prefixes and Suffixes-- Collocations-- Exercises for Practice.

Grammar: Punctuation – Parts of Speech- Articles -Exercises for Practice.

Reading: *Double Angels* by David Scott-Reading and Its Importance- Techniques for Effective Reading- Signal Words- Exercises for Practice

Writing: Writing Sentences- Techniques for Effective Writing-- Paragraph Writing- Types, Structure and Features of a Paragraph-Coherence and Cohesiveness: Logical, Lexical and Grammatical Devices - Exercises for Practice

UNIT – II

Chapter entitled *Satya Nadella: Email to Employees on his First Day as CEO* from “*Fluency in English– A Course book for Engineering Students*” Published by Orient BlackSwan, Hyderabad.

Vocabulary: Synonyms and Antonyms – Homonyms, Homophones, Homographs- Exercises for Practice (Chapter 17 '*Technical Communication- Principles and Practice*'. *Third Edition* published by Oxford University Press may also be followed.)

Grammar: Verbs-Transitive, Intransitive and Non-finite Verbs – Mood and Tense—Gerund – Words with Appropriate Prepositions – Phrasal Verbs - Exercises for Practice

Reading: Sub-skills of Reading- Skimming, Scanning, Extensive Reading and Intensive Reading - *The Road Not Taken* by **Robert Frost** -- Exercises for Practice

Writing: Letter Writing –Format, Styles, Parts, Language to be used in Formal Letters- Letter of Apology – Letter of Complaint-Letter of Inquiry with Reply – Letter of Requisition -- Exercises for Practice

UNIT – III

From the book entitled '*Technical Communication- Principles and Practice*'. *Third Edition* published by Oxford University Press.

Vocabulary: Introduction- A Brief History of Words – Using the Dictionary and Thesaurus– Changing Words from One Form to Another – Confusables (From Chapter 17 entitled '*Grammar and Vocabulary Development*')

Grammar: Tenses: Present Tense- Past Tense- Future Tense- Active Voice – Passive Voice- Conditional Sentences – Adjective and Degrees of Comparison. (From Chapter 17 entitled '*Grammar and Vocabulary Development*')

Reading: Improving Comprehension Skills – Techniques for Good Comprehension- Skimming and Scanning- Non-verbal Signals – Structure of the Text – Structure of Paragraphs – Punctuation – Author's viewpoint (Inference) – Reader Anticipation: Determining the Meaning of Words – Summarizing- Typical Reading Comprehension Questions. (From Chapter 10 entitled '*Reading Comprehension*')

Writing: Introduction- Letter Writing-Writing the Cover Letter- Cover Letters Accompanying Resumes- Emails. (From Chapter 15 entitled '*Formal Letters, Memos, and Email*')

UNIT – IV

Chapter entitled '*Good Manners*' by **J.C. Hill** from *Fluency in English – A Course book for Engineering Students*" published by Orient Blackswan, Hyderabad.

Vocabulary: Idiomatic Expressions –One- word Substitutes --- Exercises for Practice (Chapter 17 '*Technical Communication- Principles and Practice*'. *Third Edition* published by Oxford University Press may also be followed.)

Grammar: Sequence of Tenses- Concord (Subject in Agreement with the Verb) – Exercises for Practice

Reading: '*If*' poem by **Rudyard Kipling**--Tips for Writing a Review --- Author's Viewpoint – Reader's Anticipation-- Herein the Students will be required to Read and Submit a Review of a Book (Literary or Non-literary) of their choice – Exercises for Practice.

Writing: Information Transfer-Bar Charts-Flow Charts-Tree Diagrams etc., -- Exercises for Practice.

Introduction - Steps to Effective Precis Writing – Guidelines- Samples (Chapter 12 entitled ‘*The Art of Condensation*’ from ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press)

UNIT – V

Chapter entitled ‘*Father Dear Father*’ by Raj Kinger from ***Fluency in English – A Course book for Engineering Students***” Published by Orient BlackSwan, Hyderabad

Vocabulary: Foreign Words—Words borrowed from other Languages- Exercises for Practice

Grammar: Direct and Indirect Speech- Question Tags- Exercises for Practice

Reading: Predicting the Content- Understanding the Gist – SQ3R Reading Technique- Study Skills – Note Making - Understanding Discourse Coherence – Sequencing Sentences. (From Chapter 10 entitled ‘**Reading Comprehension**’ - ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press.)

Writing: Technical Reports- Introduction – Characteristics of a Report – Categories of Reports –Formats- Prewriting – Structure of Reports (Manuscript Format) - Types of Reports - Writing the Report. (From Chapter 13 entitled ‘**Technical Reports**’ - ***Technical Communication- Principles and Practice. Third Edition*** published by Oxford University Press.)

 Exercises from both the texts not prescribed shall be used for classroom tasks.

Text Books:

1. “*Fluency in English – A Course book for Engineering Students*” by Board of Editors: **Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.**
2. Raman, Meenakshi & Sharma, Sangeeta. “***Technical Communication- Principles and Practice***”. **Third Edition. New Delhi: Oxford University Press. 2015. Print.**

References:

1. Green, David. *Contemporary English Grammar –Structures and Composition*. MacMillan India. 2014 (Print)
2. Rizvi, M. Ashraf. *Effective Technical Communication*. Tata Mc Graw –Hill. 2015 (Print).

EE106ES/EE205ES: BASIC ELECTRICAL AND ELECTRONICS ENGINEERING

B.Tech. I Year II Sem.

L T/P/D C
4 0/0/0 4

Pre-requisite: None

Course Objectives:

- To introduce the concept of electrical circuits and its components
- To introduce the concepts of diodes & transistors, and
- To impart the knowledge of various configurations, characteristics and applications.

Course Outcomes: After this course, the student will be able

- To analyze and solve electrical circuits using network laws and theorems.
- To identify and characterize diodes and various types of transistors.

UNIT - I

Basic Concepts of Electrical Circuits and Single Phase AC Circuits

Electrical Circuits: R-L-C Parameters, Voltage and Current, Independent and Dependent Sources, Source Transformation – V-I relationship for passive elements, Kirchoff's Laws, Network reduction techniques – series, parallel, series-parallel, star-to-delta, delta-to-star transformation, Nodal Analysis,

Single Phase AC Circuits: R.M.S. and Average values, Form Factor, steady state analysis of series, parallel and series-parallel combinations of R, L and C with sinusoidal excitation, concept of reactance, impedance, susceptance and admittance – phase and phase difference, Concept of power factor, j-notation, complex and polar forms of representation.

UNIT - II

Resonance: Series resonance and Parallel resonance circuits, concept of bandwidth and Q factor, Locus Diagrams for RL, RC and RLC Combinations for Various Parameters.

Network Theorems: Thevenin's, Norton's, Maximum Power Transfer, Superposition, Reciprocity, Tellegen's, Millman's and Compensation theorems for DC and AC excitations.

UNIT - III

P-N Junction Diode: Diode equation, Energy Band diagram, Volt-Ampere characteristics, Temperature dependence, Ideal versus practical, Static and dynamic resistances, Equivalent circuit, Load line analysis, Diffusion and Transition Capacitances.

Rectifiers and Filters: P-N junction diode as a rectifier - Half Wave Rectifier, Ripple Factor - Full Wave Rectifier, Bridge Rectifier, Harmonic components in Rectifier Circuits, Filters – Inductor Filters, Capacitor Filters, L- section Filters, π - section Filters.

UNIT - IV

Bipolar Junction Transistor (BJT): Construction, Principle of Operation, Symbol, Amplifying Action, Common Emitter, Common Base and Common Collector configurations.

Transistor Biasing And Stabilization - Operating point, DC & AC load lines, Biasing - Fixed Bias, Emitter Feedback Bias, Collector to Emitter feedback bias, Voltage divider bias, Bias stability, Stabilization against variations in V_{BE} and β , Bias Compensation using Diodes and Transistors.

Transistor Configurations: BJT modeling, Hybrid model, Determination of h-parameters from transistor characteristics, Analysis of CE, CB and CC configurations using h-parameters, Comparison of CE, CB and CC configurations.

UNIT- V

Junction Field Effect Transistor: Construction, Principle of Operation, Symbol, Pinch-Off Voltage, Volt-Ampere Characteristic, Comparison of BJT and FET, Small Signal Model, Biasing FET.

Special Purpose Devices: Breakdown Mechanisms in Semi-Conductor Diodes, Zener diode characteristics, Use of Zener diode as simple regulator, Principle of operation and Characteristics of Tunnel Diode (With help of Energy band diagram) and Varactor Diode, Principle of Operation of SCR.

Text Books:

1. Basic Electrical and electronics Engineering –M S Sukija TK Nagasarkar Oxford University
2. Basic Electrical and electronics Engineering-D P Kothari. I J Nagarath Mc Graw Hill Education

References:

1. Electronic Devices and Circuits – R.L. Boylestad and Louis Nashelsky, PEI/PHI, 9th Ed, 2006.
2. Millman's Electronic Devices and Circuits – J. Millman and C. C. Halkias, Satyabratajit, TMH, 2/e, 1998.
3. Engineering circuit analysis- by William Hayt and Jack E. Kemmerly, McGraw Hill Company, 6th edition.
4. Linear circuit analysis (time domain phasor and Laplace transform approaches)- 2nd edition by Raymond A. DeCarlo and Pen-Min-Lin, Oxford University Press-2004.
5. Network Theory by N. C. Jagan & C. Lakshminarayana, B.S. Publications.
6. Network Theory by Sudhakar, Shyam Mohan Palli, TMH.

LIST OF EXPERIMENTS

Volumetric Analysis:

1. Estimation of Ferrous ion by Dichrometry.
2. Estimation of hardness of water by Complexometric method using EDTA.
3. Estimation of Ferrous and Ferric ions in a given mixture by Dichrometry.
4. Estimation Ferrous ion by Permanganometry.
5. Estimation of copper by Iodomery.
6. Estimation of percentage of purity of MnO_2 in pyrolusite
7. Determination of percentage of available chlorine in bleaching powder.
8. Determination of salt concentration by ion- exchange resin.

Instrumental methods of Analysis:

1. Estimation of HCl by Conductometry.
2. Estimation of Ferrous ion by Potentiometry.
3. Determination of Ferrous iron in cement by Colorimetric method.
4. Determination of viscosity of an oil by Redwood / Oswald's Viscometer.
5. Estimation of manganese in KMnO_4 by Colorimetric method.
6. Estimation of HCl and Acetic acid in a given mixture by Conductometry.
7. Estimation of HCl by Potentiometry.

Preparation of Polymers:

1. Preparation of Bakelite and urea formaldehyde resin.

Note: All the above experiments must be performed.

Text Books:

1. Vogel's Text Book of Quantitative Chemical Analysis, 5th Edition (2015) G. H. Jeffery, J. Bassett, J. Mendham and R. C. Denney.
2. A Text Book on experiments and calculations in Engineering Chemistry by S.S. Dara S. Chand & Company Ltd., Delhi (2003).

EN107HS/EN207HS: ENGLISH LANGUAGE COMMUNICATION SKILLS LAB

B.Tech. I Year II Sem.

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The **English Language Communication Skills (ELCS) Lab** focuses on the production and practice of sounds of language and familiarizes the students with the use of English in everyday situations both in formal and informal contexts.

Course Objectives:

- To facilitate computer-assisted multi-media instruction enabling individualized and independent language learning
- To sensitize the students to the nuances of English speech sounds, word accent, intonation and rhythm
- To bring about a consistent accent and intelligibility in students' pronunciation of English by providing an opportunity for practice in speaking
- To improve the fluency of students in spoken English and neutralize their mother tongue influence
- To train students to use language appropriately for public speaking, group discussions and interviews

Course Outcomes: Students will be able to attain:

- Better understanding of nuances of English language through audio- visual experience and group activities
- Neutralization of accent for intelligibility
- Speaking skills with clarity and confidence which in turn enhances their employability skills.

Syllabus: English Language Communication Skills Lab (ELCS) shall have two parts:

- Computer Assisted Language Learning (CALL) Lab
- Interactive Communication Skills (ICS) Lab

Listening Skills: Objectives:

- To enable students develop their listening skills so that they may appreciate the role in the LSRW skills approach to language and improve their pronunciation
- To equip students with necessary training in listening, so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language, to be able to recognize them and find the distinction between different sounds, to be able to mark stress and recognize and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills: Objectives

- To involve students in speaking activities in various contexts
- To enable students express themselves fluently and appropriately in social and professional contexts :
 - Oral practice
 - Describing objects/situations/people
 - Role play – Individual/Group activities
 - Just A Minute (JAM) Sessions.

The following course content is prescribed for the **English Language Communication Skills Lab**.

Exercise – I

CALL Lab:

Understand: Listening Skill- Its importance – Purpose- Process- Types- Barriers- Effective Listening.

Practice: Introduction to Phonetics – Speech Sounds – Vowels and Consonants – Minimal Pairs- Consonant Clusters- Past Tense Marker and Plural Marker.

Testing Exercises

ICS Lab:

Understand: Spoken vs. Written language- Formal and Informal English.

Practice: Ice-Breaking Activity and JAM Session- Situational Dialogues – Greetings – Taking Leave – Introducing Oneself and Others.

Exercise – II

CALL Lab:

Understand: Structure of Syllables – Word Stress– Weak Forms and Strong Forms – Sentence Stress – Intonation.

Practice: Basic Rules of Word Accent - Stress Shift - Weak Forms and Strong Forms- Sentence Stress – Intonation.

Testing Exercises

ICS Lab:

Understand: Features of Good Conversation – Strategies for Effective Communication.

Practice: Situational Dialogues – Role-Play- Expressions in Various Situations –Making Requests and Seeking Permissions - Telephone Etiquette.

Exercise - III

CALL Lab:

Understand: Errors in Pronunciation-the Influence of Mother Tongue (MTI).

Practice: Common Indian Variants in Pronunciation – Differences between British and American Pronunciation.

Testing Exercises

ICS Lab:

Understand: Descriptions- Narrations- Giving Directions and Guidelines.

Practice: Giving Instructions – Seeking Clarifications – Asking for and Giving Directions – Thanking and Responding – Agreeing and Disagreeing – Seeking and Giving Advice – Making Suggestions.

Exercise – IV

CALL Lab:

Understand: Listening for General Details.

Practice: Listening Comprehension Tests.

Testing Exercises

ICS Lab:

Understand: Public Speaking – Exposure to Structured Talks - Non-verbal Communication-Presentation Skills.

Practice: Making a Short Speech – Extempore- Making a Presentation.

Exercise – V

CALL Lab:

Understand: Listening for Specific Details.

Practice: Listening Comprehension Tests.

Testing Exercises

ICS Lab:

Understand: Group Discussion- Interview Skills.

Practice: Group Discussion- Mock Interviews.

Minimum Requirement of infrastructural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer Assisted Language Learning Lab has to accommodate 40 students with 40 systems, with one Master Console, LAN facility and English language learning software for self- study by students.

System Requirement (Hardware component):

Computer network with LAN facility (minimum 40 systems with multimedia) with the following specifications:

Computers with Suitable Configuration

High Fidelity Headphones

2. Interactive Communication Skills (ICS) Lab:

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V. or LCD, a digital stereo –audio & video system and camcorder etc.

Prescribed Lab Manuals:

1. A book entitled “*ELCS Lab Manual – A Workbook for CALL and ICS Lab Activities*” by Board of Editors: Hyderabad: Orient BlackSwan Pvt. Ltd. 2016. Print.

2. Hart, Steve; Nair, Aravind R.; Bhambhani, Veena. ***“EMBARC- English for undergraduates”*** Delhi: Cambridge University Press. 2016. Print.

Suggested Software:

1. Cambridge Advanced Learners' English Dictionary with CD.
2. Grammar Made Easy by Darling Kindersley.
3. Punctuation Made Easy by Darling Kindersley.
4. Oxford Advanced Learner's Compass, 8th Edition.
5. English in Mind (Series 1-4), Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge.
6. English Pronunciation in Use (Elementary, Intermediate, Advanced) Cambridge University Press.
7. TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS).

References:

1. Jayashree Mohanraj. *Let Us Hear Them Speak*. New Delhi: Sage Texts. 2015. Print.
2. Hancock, M. *English Pronunciation in Use. Intermediate Cambridge*: Cambridge University Press. 2009. Print.

ME108ES/ME208ES: ENGINEERING WORKSHOP

B.Tech. I Year II Sem.

L T/P/D C
0 0/3/0 2

Pre-requisites: Practical skill

Course Objectives:

- To Study of different hand operated power tools, uses and their demonstration.
- To gain a good basic working knowledge required for the production of various engineering products.
- To provide hands on experience about use of different engineering materials, tools, equipments and processes those are common in the engineering field.
- To develop a right attitude, team working, precision and safety at work place.
- It explains the construction, function, use and application of different working tools, equipment and machines.
- To study commonly used carpentry joints.
- To have practical exposure to various welding and joining processes.
- Identify and use marking out tools, hand tools, measuring equipment and to work to prescribed tolerances.

Course Outcomes: At the end of the course, the student will be able to:

- Study and practice on machine tools and their operations
- Practice on manufacturing of components using workshop trades including plumbing, fitting, carpentry, foundry, house wiring and welding.
- Identify and apply suitable tools for different trades of Engineering processes including drilling, material removing, measuring, chiseling.
- Apply basic electrical engineering knowledge for house wiring practice.

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

- Carpentry
- Fitting
- Tin-Smithy and Development of jobs carried out and soldering.
- Black Smithy
- House-wiring
- Foundry
- Welding
- Power tools in construction, wood working, electrical engineering and mechanical
- Engineering.

2. TRADES FOR DEMONSTRATION & EXPOSURE:

- Plumbing, Machine Shop, Metal Cutting (Water Plasma)

Text Books:

1. Workshop Practice /B. L. Juneja / Cengage

2. Workshop Manual / K. Venugopal / Anuradha.

Reference Books:

1. Work shop Manual - P. Kannaiah/ K. L. Narayana/ Scitech
2. Workshop Manual / Venkat Reddy/ BSP

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.**B. TECH. CIVIL ENGINEERING****I YEAR**

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10302	Engineering Mechanics	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics & Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	Total	19	16	56

II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A30006	Mathematics – II	4	-	4
A30203	Electrical & Electronics Engineering	4	-	4
A30107	Strength of Materials –I	4	-	4
A30108	Surveying	4	-	4
A30101	Fluid Mechanics	4	-	4
A30010	Managerial Economics and Financial Analysis	4	-	4
A30185	Surveying Lab- I	-	3	2
A30183	Strength of Materials Lab	-	3	2
	Total	24	6	28

II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A40008	Probability & Statistics	4	-	4
A40114	Strength of Materials - II	4	-	4
A40111	Hydraulics & Hydraulic Machinery	4	-	4
A40009	Environmental Studies	4	-	4
A40115	Structural Analysis -I	4	-	4
A40109	Building Materials, Construction & Planning	4	-	4
A40186	Computer Aided Drafting of Buildings	-	3	2
A40190	Surveying Lab- II	-	3	2
	Total	24	6	28

III YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A50116	Concrete Technology	4	-	4
A50121	Reinforced Concrete Structures Design and Drawing	4	-	4
A50118	Engineering Geology	4	-	4
A50120	Geotechnical Engineering	4	-	4
A50122	Water Resources Engineering-I	4	-	4
	Open Elective	4	-	4
A50117	Disaster Management			
A50017	Intellectual Property Rights			
A50018	Human Values and Professional Ethics			
A50181	Fluid Mechanics & Hydraulic Machinery Lab	-	3	2
A50191	Engineering Geology Lab	-	3	2
	Total	24	6	28

III YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A60130	Steel Structures Design and Drawing	3	2	4
A60119	Environmental Engineering	4		4
A60132	Transportation Engineering -I	4		4
A60126	Foundation Engineering	4		4
A60131	Structural Analysis -II	4		4
	Elective -I	4	-	4
A60123	Elements of Earthquake Engineering			
A60127	Ground Improvement Techniques			
A60128	Ground Water Hydrology			
A60124	Environmental Impact Assessment			
A60129	Principles of Entrepreneurship			
A60194	Geotechnical Engineering Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	Total	23	8	28

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

L	T/P/D	C
4	-/-	4

(A30006) MATHEMATICS - II**Objectives:**

- The objective is to find the relation between the variables x and y out of the given data (x,y).
- This unit also aims to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
- This topic deals with methods to find roots of an equation and solving a differential equation.
- The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.
- Indeed, any periodic and non-periodic function can be best analyzed in one way by Fourier series and transforms methods.
- The unit aims at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations.
- In many Engineering fields the physical quantities involved are vector-valued functions.
- Hence the unit aims at the basic properties of vector-valued functions and their applications to line integrals, surface integrals and volume integrals.

UNIT – I

Vector Calculus: Vector Calculus: Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties. Solenoidal and irrotational vectors – finding the Potential function. Laplacian operator. Line integral – work done – Surface integrals -Volume integral. Green's

Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

UNIT – II:

Fourier series and Fourier Transforms: Definition of periodic function. Fourier expansion of periodic functions in a given interval of length 2π . Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – III:

Interpolation and Curve fitting

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations of symbols. Difference expressions – Differences of a polynomial-Newton's formulae for interpolation - Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – IV : Numerical techniques

Solution of Algebraic and Transcendental Equations and Linear system of equations: Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Solving system of non-homogeneous equations by L-U Decomposition method (Crout's Method). Jacobi's and Gauss-Seidel iteration methods.

UNIT – V

Numerical Integration and Numerical solutions of differential equations:

Numerical integration - Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8$ Rule , Gauss-Legendre one point, two point and three point formulas.

Numerical solution of Ordinary Differential equations: Picard's Method of successive approximations. Solution by Taylor's series method – Single step methods-Euler's Method-Euler's modified method, Runge-Kutta (second and classical fourth order) Methods.

Boundary values & Eigen value problems: Shooting method, Finite difference method and solving eigen values problems, power method

TEXT BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi.
4. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, 2013, CRC Press Taylor & Francis Group.
5. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
6. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Person Education.
7. Mathematics For Engineers By K.B.Datta And M.A S.Srinivas, Cengage Publications.

Outcomes: From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, can find the most appropriate formula for a guessed relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making

- After studying this unit one will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation.
- Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series and Fourier Transform of the function.
- Helps in phase transformation, Phase change and attenuation of coefficients in acoustics.
- After studying this unit, one will be able to find a corresponding Partial

Differential Equation for an unknown function with many independent variables and to find their solution.

- Most of the problems in physical and engineering applications, problems are highly non-linear and hence expressing them as PDEs'. Hence understanding the nature of the equation and finding a suitable solution is very much essential.
- After studying this unit, one will be able to evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.
- It is an essential requirement for an engineer to understand the behavior of the physical system.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30203) ELECTRICAL AND ELECTRONICS ENGINEERING****OBJECTIVE:**

This course introduces the concepts of electrical DC and AC circuits, basic law's of electricity, instruments to measure the electrical quantities, different methods to solve the electrical networks, construction operational features of energy conversion devices i.e. DC and AC machines, transformers. It also emphasis on basics of electronics, semiconductor devices and their characteristics and operational features.

UNIT-I:

Electrical Circuits: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.

Instruments: Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

UNIT-II:

DC Machines: Principle of operation of DC Generator – EMF equation - types – DC motor types –torque equation – applications – three point starter.

UNIT-III:

Transformers: Principle of operation of single phase transformers –EMF equation – losses – efficiency and regulation.

AC Machines: Principle of operation of alternators – regulation by synchronous impedance method –Principle of operation of induction motor – slip – torque characteristics – applications.

UNIT-IV:

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode Applications, and Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).

Transistors: PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications.

UNIT-V:

Cathode Ray Oscillos Scope: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

EEE: TEXT BOOKS:

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS

Publications.

2. Basic Electrical Engineering, S.N. Singh, PHI.

EEE: REFERENCE BOOKS:

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

ECE: TEXT BOOKS:

1. Electronic Devices and Circuits, S.Salivahanan, N.Suresh Kumar, A.Vallavaraj,Tata McGraw-Hill companies..
2. Electronic Devices and Circuits, K. Lal Kishore,BS Publications.

ECE: REFERENCE BOOKS:

1. Millman's Electronic Devices and Circuits,J. Millman, C.C.Halkias, and Satyabrata Jit, Tata McGraw-Hill companies.
2. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky,PEI/PHI.
3. Introduction to Electronic Devices and Circuits, Rober T. Paynter,PE.
4. Integrated Electronics, J. Millman and Christos C. Halkias, Tata McGraw-Hill companies.
5. Electronic Devices and Circuits, Anil K. Maini, Varsha Agarwal,Wiley India Pvt. Ltd.

Outcomes:

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc...and different semiconductor devices, their voltage-current characteristics, operation of diodes, transistors, realization of various electronic circuits with the various semiconductor devices, and cathode ray oscilloscope, With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

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4	-/-/-	4

(A30107) STRENGTH OF MATERIALS – I**UNIT – I**

Simple Stresses and Strains : Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Elastic constants.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

Shear Force and Bending Moment : Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

SHEAR STRESSES : Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT – IV

Principal Stresses and Strains : Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

UNIT – V

Deflection of Beams : Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam –

Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load-Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

Conjugate Beam Method: Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

TEXT BOOKS:

- 1) Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.
- 2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.
- 3) Mechanics of Materials by Pytel, Cengage Learning Pvt. Ltd.

REFERENCES:

- 1) Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.
- 2) Mechanics of Structures Vol –I by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.
- 3) Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.
- 4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.
- 5) Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd
- 6) Strength of Materials and Structures by John Case *et al.*, Butterworth-Heinemann.
- 7) Strength of Materials by R.Subramanian, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30108) SURVEYING****UNIT – I**

Introduction: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications, Scales, Conventional Symbols, Signals

Distances and Direction: Distance measurement methods; use of chain, tape and Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

UNIT – II

Leveling and Contouring: Concept and Terminology, Temporary adjustments- method of leveling.

Characteristics and Uses of contours- methods of conducting contour surveys and their plotting.

UNIT – III

Computation of Areas and Volumes: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT -IV

Theodolite: Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling, Traversing.

UNIT – V

Tacheometric Surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position. **Curves:** Types of curves, design and setting out – simple and compound curves.

Introduction to Advanced Surveying : Total Station and Global positioning system, Introduction to Geographic information system (GIS).

TEXT BOOKS:

1. Chandra A M, "Plane Surveying" and "Higher Surveying" New age International Pvt. Ltd., Publishers, New Delhi, 2002
2. Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.

3. Text book of surveying by C.Venkataramaiah, Universities Press

REFERENCES:

1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press - 2012
2. Surveying Theory and Practice Seventh edition by James M. and Anderson Edward M. Mikhail TATA McGraw Hill
3. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill – 2000
4. "Advanced Surveying Total Station GIS and Remote Sensing by Sathesh Gopi, R. Sathi Kumar and N. Madhu.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30101) FLUID MECHANICS****UNIT I**

Introduction : Dimensions and units – Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

Hydrostatic Forces : Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT – II

Fluid Kinematics : Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT –III

Fluid Dynamics: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier – stokes equations (Explanatory) Momentum equation and its application – forces on pipe bend.

Pitot tube, Venturi meter and orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches - –Broad crested weirs.

UNIT – IV

Boundary Layer Theory : Approximate Solutions of Navier Stoke's Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers (no deviation), BL in transition, separation of BL, control of BL, flow around submerged objects- Drag and Lift- Magnus effect.

UNIT –V

Closed Conduit Flow : Reynold's experiment – Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes. Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic

gradient line. Pipe network problems, variation of friction factor with Reynold's number – Moody's Chart.

TEXT BOOKS:

1. Fluid Mechanics by Modi and Seth, Standard book house.
2. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.)
3. Mechanics of Fluids by Potter, Cengage Learning Pvt. Ltd.

REFERENCES:

1. Fluid Mechanics Basic Concepts & Principles, Shiv Kumar, Ane Books Pvt Ltd.
2. Fluid Mechanics and Machinery, CSP Ojha, Oxford Higher Education
3. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
4. Fluid Mechanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
5. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) Ltd., New Delhi.
6. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30010) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS****Objectives:**

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

Unit I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand*: Definition, Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting*, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis*: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing*: Objectives and Policies of Pricing. Methods of Pricing. *Business*: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, *New Economic Environment*: Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis:* Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha : MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

Outcomes:

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting , elasticity of demand and supply, pricing methods

and pricing in different market structures.

- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of
- Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A30185) SURVEYING LAB – I**LIST OF EXERCISES:**

1. Survey of an area by chain survey (closed traverse) & Plotting
2. Chaining across obstacles
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane Table survey
6. Two point and three point problems in plane table survey
7. Traversing by plane table survey
8. Fly leveling (differential leveling)
9. An exercise of L.S and C.S and plotting
10. Two exercises on contouring.

List of Major Equipment:

1. Chains, tapes, Ranging rods, cross staff, arrows
2. Compasses and Tripods, Optical square.
3. Plane tables, Alidade, Plumbing fork, trough compasses
4. Leveling instruments and leveling staves
5. Box sextants, planimeter.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A30183) STRENGTH OF MATERIALS LAB

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

List of Major Equipment:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauges.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem**

L	T/P/D	C
4	-/-/-	4

(A40008) PROBABILITY AND STATISTICS**Objectives: To learn**

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system, The characteristics of queue, The mean arrival and service rates
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix (transition probability matrix), Limiting probabilities, Applications of Markov chains

UNIT-I:

Single Random variables and probability distributions: Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions. and hence finding the mean and variance.

UNIT-II

Multiple Random variables, Correlation & Regression: Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation. Regression- Regression

Coefficient, The lines of regression and multiple correlation & regression.

UNIT-III:

Sampling Distributions and Testing of Hypothesis : Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.

Parameter estimations – likelihood estimate, interval estimations .

Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, Two sided test,

Large sample tests:

- (i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
- (ii) Tests of significance of difference between sample S.D and population S.D.
- (iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

Small sample tests: Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F- distribution and its properties. Test of equality of two population variances

Chi-square distribution , its properties, Chi-square test of goodness of fit

UNIT-IV

Queuing Theory: Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue .

UNIT-V

Stochastic processes: Introduction to Stochastic Processes –Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

TEXT BOOKS:

1. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna

Publishers

2. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press
3. Operations Research by S.D. Sarma,

REFERENCE BOOKS:

1. Mathematics for Engineers by K.B. Datta and M.A. S. Srinivas, Cengage Publications
2. Probability and Statistics by T.K.V. Iyengar & B. Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S. C. Gupta and V.K. Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay I. Devore.
5. Probability Theory & Stochastic Processes by P. Sri Hari, Hi-Tech Publishers.
6. Probability & Statistics by Ahmed Waheedullah, M. Ahmed Mohiuddin, Sultan Ali, HI-TECH Publishers

Outcomes:

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variables involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations. It is mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
- The student would be able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in n^{th} state. It is quite useful for all branches of engineering.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40114) STRENGTH OF MATERIALS – II****UNIT – I**

Torsion of Circular Shafts : Theory of pure torsion – Derivation of Torsion equations : $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – II

Columns and Struts : Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

Beams Curved in Plan: Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semi-circular beam simply-supported on three equally spaced supports.

UNIT - III

Beam Columns: Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

Direct and Bending Stresses: Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis.

UNIT – IV

Unsymmetrical Bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis -

Deflection of beams under unsymmetrical bending.

Shear Centre: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

UNIT – V

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells.

Thick Cylinders: Introduction Lamé's theory for thick cylinders – Derivation of Lamé's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

TEXT BOOKS:

- 1) Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.
- 2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.
- 3) Mechanics of Materials by Gere, Cengage Learning Pvt. Ltd.

REFERENCES:

- 1) Fundamentals of Solid Mechanics by M.L.Gambhir, PHI Learning Pvt. Ltd
- 2) Introduction to Strength of Materials by U.C.Jindal, Galgotia Publications Pvt. Ltd.
- 3) Strength of Materials by Bhattacharya, Cengage Learning
- 3) Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.
- 4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.
- 5) Strength of Materials by R.Subramanian, Oxford University Press.
- 6) Mechanics of Materials by Ferdinand P. Beer *et al.*, Tata McGraw Hill Education Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem**

L	T/P/D	C
4	-/-/-	4

(A40111) HYDRAULICS AND HYRAULIC MACHINERY**UNIT – I**

Open Channel Flow: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows.

Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT - II

Dimensional Analysis and Similitude: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

UNIT-III

Hydrodynamic Force on Jets : Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines. Layout of a typical Hydropower installation – Heads and efficiencies.

UNIT-IV

Hydraualic Turbines: Classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

UNIT – V

Centrifugal-Pumps: Pump installation details-classification-work done-Manometric head-minimum starting speed-losses and efficiencies-specific speed, multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitation.

Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS:

1. Open Channel flow by K,Subramanya . Tata Mc.Grawhill Publishers.
2. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
3. Fluid Mechanics & Fluid machines by Narayana pillai, Universities press.

REFERENCES :

1. Fluid Mechanics and Machinery, CSP OJHA, Oxford University Press
2. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.
3. Fluid mechanics and fluid machines by Rajput, S.Chand &Co.
4. Open Channel flow by V.T.Chow, Mc.Graw Hill book company.
5. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.
6. Mechanics of Fluids by Merle C. Potter, David C. Wiggert,Bassem H. Ramadan, Cengage Learning.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40009) ENVIRONMENTAL STUDIES****Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

UNIT-I :

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II:

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III:

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV:

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and

characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. **EIA:** EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

SUGGESTED TEXT BOOKS:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40115) STRUCTURAL ANALYSIS – I****UNIT – I**

Analysis Of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed frames. - Analysis of determinate pin jointed frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT – II

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem-Unit Load Method. Deflections of simple beams and pin- jointed plane trusses. Deflections of statically determinate bent frames.

Three Hinged Arches – Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Three hinged arches. Normal Thrust and radial shear in an arch. Geometrical properties of parabolic and circular arch. Three hinged circular arch at different levels. Absolute maximum bending moment diagram for a three hinged arch.

UNIT-III

Propped Cantilever and Fixed Beams: Analysis of Propped cantilever and fixed beams, including the beams with varying moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams-Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – IV

Slope-Deflection Method and Moment Distribution Method: Introduction-Continuous beams. Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed-continuous beams with overhang. Effects of sinking of supports. Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using Moment Distribution Method. Shear force and Bending moment diagrams, Elastic curve.

UNIT – V

Moving Loads and Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length. Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section - Point loads, UDL longer than the span, UDL shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

TEXT BOOKS:

- 1) Structural Analysis Vol –I & II by Vazarani and Ratwani, Khanna Publishers.
- 2) Structural Analysis Vol I & II by Pundit and Gupta., Tata McGraw Hill Publishers.

REFERENCES:

- 1) Basic Structural Analysis by K.U.Muthu *et al.*, I.K.International Publishing House Pvt.Ltd.
- 2) Structural Analysis by Hibbeler, pearson Education Ltd
- 3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
- 4) Fundamentals of structural Analysis by M.L.Gamhir, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40109) BUILDING MATERIALS, CONSTRUCTION AND PLANNING****UNIT – I**

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing Bricks – Composition of Brick earth – manufacture and structural requirements.

Wood, Aluminum, Glass and Paints: Wood - structure – types and properties – seasoning – defects; alternate materials for wood – GI / fibre – reinforced glass bricks, steel & aluminum.

UNIT-II

Cement & Admixtures : Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests Admixtures – mineral & chemical admixtures – uses.

UNIT-III

Building Components : Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ; foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

Building Services : Plumbing Services : Water Distribution, Sanitary – Lines & Fittings ; Ventilations : Functional requirements systems of ventilations. Air-conditioning - Essentials and Types ; Acoustics – characteristic – absorption – Acoustic design ; Fire protection – Fire Hazards – Classification of fire resistant materials and constructions

UNIT -IV

Masonry and Finishing's : Brick masonry – types – bonds ; Stone masonry – types ; Composite masonry – Brick-stone composite ; Concrete, Reinforced brick.

Finishers : Plastering, Pointing, Painting, Claddings – Types – Tiles - ACP

Form work : Requirements – Standards – Scaffolding – Design ; Shoring, Underpinning.

UNIT –V

Building Planning : Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.

2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi

REFERENCES:

1. Building Materials by Duggal, New Age Internations.
2. Building Construction by PC Verghese PHI.
3. Construction Technology – Vol – I & II by R. Chuddy, Longman UK.
4. Basics of Civil Engg by Subhash Chander; Jain Brothers.
5. Alternate Building materials and Technology, K.S.Jagadish, Venkatarama Reddyand others; New Age Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	L	T/P/D	C
	-	-/3/-	2

(A40186) COMPUTER AIDED DRAFTING OF BUILDINGS

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different softwares
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
 - a) single storeyed buildings
 - b) multi storyed buildings
5. Developing sections and elevations for
 - a) single storeyed buildings
 - b) multi storyed buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD softwares
7. Exercises on development of working of buildings

TEXT BOOKS :

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A40190) SURVEYING LAB – II**LIST OF EXERCISES :**

1. Study of theodolite in detail - practice for measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and reiteration.
3. Trigonometric Leveling - Heights and distance problem (Two Exercises)
4. Heights and distance using Principles of tacheometric surveying (Two Exercises)
5. Curve setting – different methods. (Two Exercises)
6. Setting out works for buildings & pipe lines.
7. Determine of area using total station
8. Traversing using total station
9. contouring using total station
10. Determination of remote height using total station
11. State-out using total station
12. Distance, gradient, Diff, height between tow inaccessible points using total stations

LIST OF EQUIPMENT:

1. Theodolites and leveling staffs.
2. Tachometers.
3. Total station.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

L	T/P/D	C
4	-/-	4

(A50116) CONCRETE TECHNOLOGY**UNIT I**

Cement : Portland cement – chemical composition – Hydration of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

Admixtures : Types of admixtures – mineral and chemical admixtures – properties – dosages – effects - usage.

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – II

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT – III

Hardened Concrete : Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods – codal provisions for NDT.

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – IV

Mix Design : Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical Quality Control – Acceptance criteria – Proportioning of concrete mix by normal and pumpable concretes by –

BIS method of mix design.

UNIT – V

Special Concretes: Light weight concrete – Light weight aggregate concrete – Cellular concrete – No-fines concrete – Fibre reinforced concrete – Polymer concrete – Types of Polymer concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition.
2. Concrete Technology by M.S.Shetty. – S.Chand & Co.

REFERENCES:

1. Concrete Technology by Job Thomas, Cengage Learning.
2. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi.
3. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi.
4. Concrete: Micro structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, Mc-Graw Hill Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50121) REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING****UNIT –I**

Concepts of RC. Design – Limit State method – Material Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS – 456 – 2000 – Working Stress Method.

Beams : Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – II

Shear, Torsion and Bond : Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing Limit state design for serviceability for deflection, cracking and codal provision.

UNIT - III

Design of Two-way slabs, one way slab, continuous slab Using I S Coefficients, Cantilever slab /Canopy slab.

UNIT –IV

Short and Long columns –axial loads, uni axial and biaxial bending I S Code provisions.

UNIT – V

Design of Footings - isolated (square, rectangular) and Combined footings. Design of Stair case.

TEXT BOOKS:

1. Limit state designed of reinforced concrete – P.C.Varghese, Prentice Hall of India, New Delhi.
2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishers, New Delhi
3. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
4. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers

REFERENCES :

1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.

2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
3. Plasticity in Reinforced Concrete by Chen – Cengage Learning Pvt. Ltd.
4. Design of concrete structures – Arthus H.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.
5. Design of Reinforced Concrete Foundations – P.C. Varghese Prentice Hall of India, New Delhi.
6. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
7. Reinforced concrete structures – I.C. Syal & A.K.Goel, S.Chand Publishers.
8. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50118) ENGINEERING GEOLOGY****UNIT – I**

Introduction: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology, Petrology and Structural geology.

Weathering of Rocks: Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnels weathering of common rock like “Granite”

UNIT – II

Mineralogy : Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Chalcite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite. **Petrology :** Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

UNIT – III

Structural Geology : Indian stratigraphy, paleontology and geological time scale, Outcrop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types. Ground water: Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, land slides hazards, water in land slides their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, Earthquake and landslides.

UNIT – IV

Geology of Dams and Reservoirs : Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs, Geo hazards, ground subsidence. Geophysical studies: Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT – V

Tunnels: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels, Tunnels in rock, subsidence over old mines , minining substances

TEXT BOOKS:

- 1) Engineering Geology by N.Chennkesavulu, Mac-Millan, Publishers 2nd Edition India Ltd. 2010.
- 2) Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications
- 3) Engineering Geology by Subinoy Gangopadhyay, Oxford University press.

REFERENCES:

1. Engineering Geology for Civil Engineering, P.C. Varghese, PHI Learning& private Limited.
2. Geology basics of Engineering by Aurele Parriaux, CRC press
3. Krynine & Judd, principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution.
4. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

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(A50120) GEOTECHNICAL ENGINEERING**UNIT – I**

Introduction: Soil formation – clay mineralogy and soil structure and clay mineralogy – moisture content – weight- volume relationship – Relative density.

Index Properties of Soils: Grain size analysis – Sieve analysis, principle of Hydrometer method – consistency limits and indices – I.S. Classification of soils.

UNIT –II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting permeability – laboratory determination of coefficient of permeability –Permeability of layered soils – In-situ permeability tests (Pumping in & Pumping out test).

Effective Stress & Seepage Through Soils: Total, neutral and effective stress – principle of effective stress - quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT –III

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

Compaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties – Field compaction Equipment – compaction quality control.

UNIT – IV

Consolidation: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement.

UNIT - V

Shear Strength of Soils: Importance of shear strength – Mohr's– Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelopes – Shear strength of

sands - dilatancy – critical void ratio – Liquefaction- shear strength of clays.

TEXT BOOKS:

1. Principals of Geotechnical Engineering by Braja M.Das, Cengage Learning Publishers.
2. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
3. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi.

REFERENCES:

1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).
2. Geotechnical Engineering Handbook By Das – JRoss Publishing.
3. Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
4. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.
5. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
6. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50122) WATER RESOURCES ENGINEERING-I****UNIT I**

Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data - Adjustment of record -Rainfall Double Mass Curve. Runoff- Factors affecting Runoff – Runoff over a Catchment- Empirical and Rational Formulae.

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT II

Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow- Base Flow Separation - Direct Runoff Hydrograph - Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph, Synthetic Unit Hydrograph.

UNIT-III

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of wells,- Well Construction – Well Development.

UNIT-IV

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility –Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies-Water Logging.

UNIT-V

Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining.

Design Discharge over a catchment, Computation of design discharge-

rational formula, SCS curve number method, flood frequency analysis-Introductory Part only. Stream Gauging – measurement and estimation of stream flow.

TEXT BOOKS:

1. Engineering Hydrology by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Elementary hydrology by V.P.Singh, PHI publications.
2. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
3. Water Resources Engineering – I by Dr. G.Venkata Ramana, Academic Publishing Company.
4. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
5. Irrigation and Hydraulic structures by S.K.Grag.
6. Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata Mc. Graw Hill.
7. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50117) DISASTER MANAGEMENT****(Open Elective)****Unit-I**

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit –II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards –

Unit –III

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

Unit –IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters.

Infrequent events: Cyclones – Lightning – Hailstorms.

Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Palnetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters-Soil Erosion.

Soil Erosion:— Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion.

Chemical hazards/ disasters:— Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation Biological hazards/ disasters:- Population Explosion.

Unit –V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

TEXT BOOKS:

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni.
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning.

REFERENCES

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990.
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997.
3. Kates, B.I & White, G.F The Environment as Hazards, Oxford, New York, 1978.
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000.
5. H.K. Gupta (Ed) Disaster Management, Universities Press, India, 2003.
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994.
7. Dr. Satender, Disaster Management in Hills, Concept Publishing Co., New Delhi, 2003.
8. A.S. Arya Action Plan For Earthquake, Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994.
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi.
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50017) INTELLECTUAL PROPERTY RIGHTS****(Open Elective)****UNIT – I**

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks : Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets : Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition : Misappropriation right of publicity, False advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah. E. Bouchoux, cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50018) HUMAN VALUES AND PROFESSIONAL ETHICS****(Open Elective)****Objectives :** This introductory course input is intended

- a. To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- b. To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- c. To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

Unit I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration-what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Unit II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

Unit III:

Understanding Harmony in the Family and Society- Harmony in Human -

Human Relationship : Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!

Unit IV:

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence : Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

Unit V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a) Ability to utilize the professional competence for augmenting universal human order,
- b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

- a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- b) At the level of society: as mutually enriching institutions and organizations

TEXT BOOKS:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

2. Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA.
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991.
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

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(A50181) FLUID MECHANICS & HYDRAULIC MACHINERY LAB

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of friction factor of a pipe.
5. Determination of Coefficient for minor losses.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Performance characteristics of a single stage/ multi-stage centrifugal pump.
12. Performance characteristics of a reciprocating pump.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****- -/3/- 2****(A50191) ENGINEERING GEOLOGY LAB**

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic and microscopic description and identification of rocks referred under theory.
3. Megascopic and microscopic identification of rocks & minerals.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****3 -/-2 4****(A60130) STEEL STRUCTURES DESIGN AND DRAWING****UNIT – I**

Materials – Making of iron and steel – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads–and combinations loading wind loads on roof trusses, behavior of steel, local buckling. Concept of limit State Design – Different Limit States as per IS 800 -2007 – Design Strengths- deflection limits – serviceability - Bolted connections – Welded connections – Design Strength – Efficiency of joint – Prying action Types of Welded joints - Design of Tension members – Design Strength of members.

UNIT – II

Design of compression members – Buckling class – slenderness ratio / strength design – laced – battened columns –column splice – column base – slab base.

UNIT – III

Design of Beams – Plastic moment – Bending and shear strength laterally / supported beams design – Built up sections – large plates Web buckling Crippling and Deflection of beams, Design of Purlin.

UNIT – IV

Design of eccentric connections with brackets, Beam end connections – Web angle – Un-stiffened and stiffened seated connections (bolted and Welded types) Design of truss joints

UNIT – V

Design of welded plate girders – optimum depth Design of main section – Design of end bearing stiffness and intermediate stiffness

Connection between web and flange and Design of flange splice and web splices.

TEXT BOOKS :

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010.

REFERENCE BOOKS :

1. Design of Steel structures by K.S. Sai Ram, Person Education.

2. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt. Ltd.
3. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Standard Publications.
4. Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House, New Delhi, 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60119) ENVIRONMENTAL ENGINEERING****UNIT – I**

Introduction: Water supply schemes – Protected water supply – Population forecasts, design period – water demand – Types of demand – factors affecting – fluctuations – fire demand – Sources of Water– intakes – infiltration galleries, confined and unconfined aquifers – water quality parameters and testing – drinking water standards.

UNIT II

Layout and general outline of water treatment units – sedimentation, uniform settling velocity– principles – design factors – surface loading – Jar test – optimum dosage of coagulant - coagulation-flocculation, clarifier design – coagulants – feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – types of disinfection - theory of chlorination - chlorine demand - other disinfection treatment methods. Distribution systems – Types of layouts of Distribution systems – design of distribution systems - Hardy Cross and equivalent pipe methods - service reservoirs – Determination of Storage capacity.

UNIT - III

Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage –examination of sewage – B.O.D. – C.O.D. equations. Design of sewers – shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing.

UNIT – IV

Layout and general out line of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles and design of biological treatment – trickling filters – standard and high rate- Filters – ASP – ASP modification – Aeration.

UNIT - V

Construction and design of oxidation ponds – Oxidation ditches – Sludge Treatment - Sludge digestion tanks –design of Digestion tank –Factors affecting sludge digestion - Sludge disposal by drying – septic tanks - working principles and design – soak pits. Ultimate disposal of waste water – self purification of rivers – Sewage farming..

TEXT BOOKS:

1. Water Supply & Sanitary Engineering by G.S.Bindie.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi.
3. Water Supply Engineering Vol.1 & Waste water Engineering Vol. II, P.N. Modi, Standard Book Publishers, Newdelhi.

REFERENCES :

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
2. Water and Waste Water Technology by Steel.
3. Water and Waste Water Engineering by Fair Geyer and Okun.
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, PHI.
5. Waste water Engineering by Metcalf and Eddy.
6. Theory & Practice of Water & Wastewater Treatment by Ronald L Droste, Wiley India Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60132) TRANSPORTATION ENGINEERING – I****UNIT I**

Highway Development and Planning: Highway Development in India – Necessity for Highway Planning- Different Road Development Plans; Classification of Roads - Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports – Highway Project.

UNIT – II

Highway Geometric Design: Importance of Geometric Design - Design controls and Criteria - Highway Cross Section Elements - Sight Distance Elements- Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance - Design of Horizontal Alignment - Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT – III

Traffic Engineering & Regulations: Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies - Data Collection and Presentation - Speed studies - Data Collection and Presentation - Origin & Destination studies, Parking Studies – Onstreet & Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams - Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings-Types of Road Markings - Design of Traffic Signals – Webster Method.

UNIT – IV

Intersection Design: Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.

Unit - V

Highway Material, Construction and Maintenance: Highway Material Characterization: Subgrade Soil, Stone Aggregates, Bitumen Materials, Construction of Gravel Roads - Construction of Water Bound Macadam Roads - Construction of Bituminous Pavements: Surface Dressing, Bitumen Bound Macadam, Bituminous Concrete - Construction of Cement Concrete Pavements - Construction of Joints in Cement Concrete Pavements - Joint

Filler and Seal - Pavement Failures – Maintenance of Highways – Highway Drainage.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 6th Edition – 1997.

REFERENCES:

1. Principles of Traffic and Highway Engineering – Garber & Hoel, Cengage Learning.
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.
3. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60126) FOUNDATION ENGINEERING****UNIT – I**

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

Slope Stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – III

Earth Pressure Theories: Rankine's theory of earth pressure – earth pressures different soils and layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

RETAINING WALLS: Types of retaining walls – stability of retaining walls against overturning, sliding, bearing capacity and drainage from backfill

UNIT – IV

Shallow Foundations - Strength Criteria - Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

Shallow Foundations - Settlement Criteria - Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity - allowable settlements of structures.

Pile Foundation: Types of piles – Load carrying capacity of piles based on static pile formulae in different soils- Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT - V

Well Foundations: Types – Different shapes of wells – Components of wells – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. Das, B.M., - (2012) Principles of Foundation Engineering –Cengage Learning
2. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).

3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group.

REFERENCES:

1. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd 1998.
2. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
3. Teng,W.C – Foundation Design , Prentice Hall, New Jersey.
4. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60131) STRUCTURAL ANALYSIS - II****UNIT – I**

Moment Distribution Method - Analysis of Single Bay Single Storey Portal Frames including side Sway. Analysis of inclined frames.

Kani's Method: Analysis of continuous beams including settlement of supports. Analysis of single bay single storey and single bay two Storey Frames by Kani's Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

UNIT – II

Slope Deflection Method: Analysis of Single Bay – single storey Portal Frames by Slope Deflection Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

Two Hinged Arches: Introduction – Classification of Two hinged Arches – Analysis of two hinged parabolic arches – Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT – III

Approximate Methods of Analysis: Introduction – Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever method and Factor method. Analysis of multi-storey frames for gravity (vertical) loads. Substitute Frame method. Analysis of Mill bents.

UNIT – IV

Matrix Methods of Analysis: Introduction – Static and Kinematic Indeterminacy - Analysis of continuous beams including settlement of supports, using stiffness method. Analysis of pin-jointed determinate plane frames using stiffness method- Analysis of single bay single storey frames including side sway, using stiffness method. Analysis of continuous beams upto three degree of indeterminacy using flexibility method. Shear force and bending moment diagrams. Elastic curve.

UNIT- V

Influence Lines for Indeterminate Beams: Introduction – ILD for two span continuous beam with constant and variable moments of inertia. ILD for propped cantilever beams.

Indeterminate Trusses: Determination of static and kinematic indeterminacies – Analysis of trusses having single and two degrees of internal and external indeterminacies –Castigliano's second theorem.

TEXT BOOKS:

- 1) Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.
- 2) Structural Analysis Vol I & II by Pundit and Gupta., Tata McGraw Hill Publishers.
- 3) Structural Analysis SI edition by Aslam Kassimali, Cengage Learning.

REFERENCES:

- 1) Matrix Analysis of Structures by Singh, Cengage Learning Pvt. Ltd.
- 2) Structural Analysis by Hibbeler.
- 3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
- 4) Matrix Analysis of Structures by Pundit and Gupta., Tata McGraw Hill Publishers.
- 5) Advanced Structural Analysis by A.K.Jain, Nem Chand Bros.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60123) ELEMENTS OF EARTHQUAKE ENGINEERING****(Elective-I)****UNIT I**

Engineering Seismology: Earthquake phenomenon cause of earthquakes- Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes- Magnitude/Intensity of an earthquake-scales-Energy released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground motions- Seismic zones of India.

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom- Continuous system-Lumped mass idealization-Oscillatory motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system-undamped and damped-critical damping-Logarithmic decrement-Forced vibrations-Harmonic excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

UNIT II

Conceptual design: Introduction-Functional planning-Continuous load path- Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members-Twisting of buildings-Ductility-definition-ductility relationships-flexible buildings-framing systems-choice of construction materials-unconfined concrete-confined concrete-masonry-reinforcing steel.

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT III

Reinforced Concrete Buildings: Principles of earthquake resistant design of RC members- Structural models for frame buildings- Seismic methods of analysis- Seismic design methods- IS code based methods for seismic design- Seismic evaluation and retrofitting- Vertical irregularities- Plan configuration problems- Lateral load resisting systems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral distribution of base shear.

UNIT IV

Masonry Buildings: Introduction- Elastic properties of masonry assemblage- Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of infill

walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT V

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls- sectional shapes- variations in elevation- cantilever walls without openings – Failure mechanism of non-structures- Effects of non-structural elements on structural system- Analysis of non-structural elements- Prevention of non-structural damage- Isolation of non-structures. Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction- Impact of Ductility- Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behaviour of beams, columns and joints in RC buildings during earthquakes- Vulnerability of open ground storey and short columns during earthquakes

TEXT BOOKS:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press.
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCES:

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons.
2. Earthquake Resistant Design of Building structures by Vinod Hosur, Wiley India Pvt. Ltd.
3. Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd.
4. Masonry and Timber structures including earthquake Resistant Design –Anand S.Arya, Nem chand & Bros.
5. Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murthy.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60127) GROUND IMPROVEMENT TECHNIQUES****(Elective-I)****UNIT – I**

Introduction to Ground Modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterise problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

UNIT – II

Mechanical Modification – Deep Compaction Techniques- Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

UNIT – III

Hydraulic Modification – Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering. Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains,

UNIT – IV

Physical and Chemical Modification – Modification by admixtures, Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing.

UNIT – V

Modification by Inclusions and Confinement - Soil reinforcement, reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

TEXT BOOKS

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications.

REFERENCES:

1. Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey.
2. Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.
3. Xianthakos, Abreimson and Bruce - Ground Control and Improvement
4. Mosley – Ground Improvement.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60128) GROUND WATER HYDROLOGY****(Elective-I)****UNIT – I**

Ground Water Occurrence and Movement: Ground water hydrologic cycle, origin of ground Water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention. Permeability, Darcy's law, storage coefficient, Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinates system, ground water flow contours their applications.

UNIT – II

Analysis of Pumping Test data-I: Steady flow ground water flow towards a well in confined and unconfined aquifers-Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests. Unsteady flow towards a well – Non equilibrium equations-Theism solution-Jacob and Chow's simplifications, Leak aquifers.

UNIT – III

Surface and Subsurface Investigation: Surface methods of exploration-Electrical resistivity and Seismic refraction methods. Subsurface methods-geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT – IV

Artificial Recharge of Ground Water: Concept of artificial recharge-recharge methods, relative merits. Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – V

Saline Water Intrusion In aquifers: Occurrence of saline water intrusions, Ghyben-Herzberg relation, Shape of interface, control of seawater intrusion.

TEXT BOOKS:

1. Ground Water Hydrology by H. M. Raghunath, Wiley Eastern Ltd.
2. Introduction to Hydraulics & Hydrology: With Applications for Stormwater Management, 4th Edition, Cengage Learning.

REFERENCES:

1. Ground water Hydrology by David Keith Todd, John Wiley & sons. New York.
2. Ground water by Bawver, John Wiley & sons.
3. Hydrology by Subramanya K.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60124) ENVIRONMENTAL IMPACT ASSESSMENT****(Elective-I)****UNIT I**

Definition of EIA, Types of EIA, Various types of Environmental Impacts: Direct Impacts, Indirect Impacts, Cumulative Impacts, Induced Impacts, EIA Principles, Process, Benefits and Flaws, Environmental Impact Statement, Objectives of EIA, Environmental Sustainability, Identification of Potential Impacts, Affected Environment, Impact prediction, Impact Assessment, Impact Mitigation, Selecting the Proposed Action, Environmental Monitoring, Public consultation.

UNIT II

Creation of EIA Data Base, Compilation, Environmental Inventory: Baseline Data Generation, Environmental Monitoring Networking Design (EMND), Monitoring Stations, Data Products and Sources, Impact Identification (II) Methodologies, Interaction-Matrix Methods, Use of the Leopold Matrix, Checklist Methodologies: Simple Checklists, Descriptive Checklists, Uses of Checklists, Network Methodologies.

UNIT III

Meteorological Data, Ambient Air Quality Monitoring, Air Quality Standards and Regulations, Impact Prediction, Impact Prediction Approach, Utilization of Dispersion Models, Impact Prediction Tools, Impact Assessment (IA): Significance and Assessment of the Impacts, Impact Mitigation Measures, **Impacts on Water Environment** - Sources of Pollution, Major Pollutants- Water Quality parameters, Surface Water Contaminants and their Impacts, Existing Groundwater Quality Environment – Standards – Prediction and Assessment of Impacts – Mitigation measures.

UNIT IV

Soil Pollution, Causes, Soil erosion, Desertification, Salinisation, Acidification, Land Filling of Waste, Impacts on Soils, Conceptual Approach: Identification, prediction and assessment of Soil Quantity-Quality Impacts, Description of Existing Resources, Identification and Incorporation of Mitigation Measures, Impacts on Noise Environment: Basics of Noise Pollution, Noise Exposure Forecast (NEF), Standards and Guidelines, Impact Prediction, Assessment of Impact Significance, Identification and Incorporation of Mitigation Measures.

UNIT V

Status of Wetlands, Threats to Wetlands, Ecology Impact Assessment System: **Importance of Biological Impact Assessment**, Identification, Prediction and Assessment and Significance of Biological Impacts, Mitigation Measures, Conservation of Flora & Fauna, **Impacts on Socio Economic and Other Environment**: Components, Considerations, Human Environment: Socio Economic Factors - Advantages of Impact Assessment – Assessment of Impact on Historical Structures – Mitigation Measures.

TEXT BOOKS:

1. Environmental Impact Assessment, Canter, L.W., 1977, McGraw Hills, New York.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers.

REFERENCES:

1. Technological guidance manuals of EIA. MoEF, Gol.
2. Environmental Impact Assessment, 2003, Y. Anjaneyulu, B.S Publications.
3. Environmental Impact Assessment Principles and applications, Erickson, P.A.
4. Environmental Impact Assessment: Theory and Practice, Dr.M.Anji Reddy, BS Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60129) PRINCIPLES OF ENTREPRENEURSHIP****(Elective -I)****Unit I:**

Introduction to Entrepreneurship: Definition of Entrepreneur Entrepreneurial Traits. Entrepreneur vs. Manager, Creating and Starting the venture: Sources of new ideas, methods of generating ideas, creative problem solving - Writing Business Plan, Evaluating Business Plans. Launching formalities.

Unit II:

Financing and Managing the new venture: Sources of capital, Record keeping, recruitment, motivating and leading teams, financial controls. Marketing and sales controls. E-commerce and entrepreneurship, Internet advertising- New venture Expansion Strategies and Issues.

Unit III:

Institutional/financial support: Schemes and functions of Directorate of Industries, District Industries Centres (DICs), Industrial Development Corporation (IDC), State Financial Corporation (SFCs), Small Scale Industries Development Corporations (SSIDCs), Khadi and Village Industries Commission (KVIC), Technical Consultancy Organisation (TCO), Small Industries Service Institute (SISI), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI).

Unit IV:

Production and Marketing Management: Thrust areas of production management, Selection of production Techniques, Plant utilization and maintenance, Designing the work place, Inventory control , material handling and quality control. Marketing functions, market segmentation, market research and channels of distribution, Sales promotion and product pricing.

Unit V :

Labour legislation, Salient Provisions of Health, Safety, and Welfare under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and Payment of Bonus Act.

TEXT BOOKS:

1. Robert Hisrich, & Michael Peters: Entrepreneurship, TMH,2009.
2. Dollinger: Entrepreneurship, Pearson,2009.

REFERENCE BOOKS:

1. Vasant Desai, Dynamics of Entrepreneurial Development and

- Management, Himalaya Publishing House, 2009.
2. Harvard Business Review on Entrepreneurship, HBR Paper Back.
 3. Robert J. Calvin: Entrepreneurial Management, TMH, 2009.
 4. Gurmeet Naroola: The entrepreneurial Connection, TMH, 2009.
 5. Bolton & Thompson: Entrepreneurs—Talent, Temperament and Techniques, Butterworth Heinemann, 2009.
 6. Agarwal: Indian Economy, Wishwa Prakashan 2009.
 7. Dutt & Sundaram: Indian Economy, S. Chand, 2009
 8. B D Singh, :Industrial Relations & Labour Laws, Excel, 2009.
 9. Aruna Kaulgud: Entrepreneurship Management by, Vikas publishing house, 2009.
 10. Essential of entrepreneurship and small business management by Thomas W. Zimmerer & Norman M. Searborough, PHI-2009.
 11. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem**

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-	-3/-	2

(A60194) GEOTECHNICAL ENGINEERING LAB**LIST OF EXPERIMENTS**

1. Atterberg's Limits (LL & PL)
2. Field density-core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant and variable head test
5. Compaction test
6. CBR Test
7. Consolidation test
8. Unconfined compression test
9. Tri-axial Compression test
10. Direct shear test.
11. Vane shear test

Note: Any eight experiments may be completed.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****- -/3/- 2****(A60086) ADVANCED COMMUNICATION SKILLS (ACS) LAB****Introduction**

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

Gathering ideas and information to organise ideas relevantly and coherently.

Engaging in debates.

Participating in group discussions.

- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding

appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

Prescribed Lab Manual: A book titled **A Course Book of Advanced Communication Skills (ACS) Lab** published by Universities Press, Hyderabad.

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
 - **Preparing for being Interviewed**
 - **Positive Thinking**
 - **Interviewing Skills**
 - **Telephone Skills**
 - **Time Management**

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
3. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
6. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
7. English Vocabulary in Use series, Cambridge University Press 2008.
8. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
9. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
10. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New

Delhi, 2009.

11. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
12. Job Hunting by Colm Downes, Cambridge University Press 2008.
13. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
14. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
15. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
16. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

1. **Seminar/ Professional Presentation**
2. **A Report on the same has to be prepared and presented.**
- * ***Teachers may use their discretion to choose topics relevant and suitable to the needs of students.***
- * ***Not more than two students to work on each mini project.***
- * ***Students may be assessed by their performance both in oral presentation and written report.***

Outcomes

- ☞ Accomplishment of sound vocabulary and its proper use contextually.
- ☞ Flair in Writing and felicity in written expression.
- ☞ Enhanced job prospects.
- ☞ Effective Speaking Abilities

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70140) REMOTE SENSING & GIS****UNIT – I**

Introduction to Photogrammetry: Principles & types of aerial photograph, geometry of vertical aerial photograph, Scale & Height measurement on single vertical aerial photograph, Height measurement based on relief displacement, Fundamentals of stereoscopy, fiducial points, parallax measurement using fiducial line.

UNIT – II

Remote Sensing –: Basic concept of Remote sensing, Data and Information, Remote sensing data Collection, Remote sensing advantages & Limitations, Remote Sensing process.

Electro-magnetic Spectrum, Energy interactions with atmosphere and with earth surface features (soil, water, vegetation), Indian Satellites and Sensors characteristics, Resolution, Map and Image and False color composite, introduction to digital data, elements of visual interpretation techniques.

UNIT – III

Geographic Information Systems: Introduction to GIS; Components of a GIS; Geospatial Data: Spatial Data-Attribute data – Joining Spatial and Attribute data; GIS Operations: Spatial Data Input-Attribute data Management –Data display- Data Exploration- Data Analysis. COORDINATE SYSTEMS: Geographic Coordinate System: Approximation of the Earth, Datum; Map Projections: Types of Map Projections-Map projection parameters-Commonly used Map Projections - Projected coordinate Systems

UNIT –IV

Vector Data Model: Representation of simple features- Topology and its importance; coverage and its data structure, Shape file; Data models for composite features Object Based Vector Data Model; Classes and their Relationship; The geobase data model; Geometric representation of Spatial Feature and data structure, Topology rules

UNIT –V

Raster Data Model: Elements of the Raster data model, Types of Raster Data, Raster Data Structure, Data Conversion, Integration of Raster and Vector data.

Data Input: Metadata, Conversion of Existing data, Creating new data; Remote Sensing data, Field data, Text data, Digitizing, Scanning, on screen digitizing, importance of source map, Data Editing

TEXT BOOKS:

- 1 Remote sensing of the environment – An earth resource perspective – 2nd edition – by John R. Jensen, Pearson Education.
- 2 Introduction to Geographic Information System – Kang-Tsung Chang, Tata McGraw-Hill Education Private Limited.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Yonng, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. Principals of Geo physical Information Systems – Peter A Burragh and Rachael A. Mc Donnell, Oxford Publishers 2004.
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70143) TRANSPORTATION ENGINEERING - II****UNIT – I**

Introduction to Railway : Permanent way components – Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast, Gauge –Creep of Rails- Theories related to Creep – Sleeper density.

UNIT – II

Geometric Design of Railway Track: Gradients- Grade Compensation- Cant and Negative Super elevation- Cant Deficiency – Degree of Curve, Points and Crossing, Rail Joints & Welding of Joints, Railway station& Yards, Signalizing & interlocking.

UNIT – III

Airport Engineering: Airport Site selection – Runway Orientation – Basic Runway Length – Corrections for Elevation, Temperature – Airport Classification - Runway Geometric design – Factors Controlling Taxiway Layout - Terminal Area – Apron – Hangar – Blast Considerations, Typical Airport Layouts – Wind rose diagram - Runway Lightening system & Marking.

UNIT – IV

Port and Harbour Engineering: Requirements of Port and Harbour, Classification of Port & Harbour, Features of a Harbour, Planning of Harbour, Breakwaters, Dry docks, Jetties, Aprons, Transit shed and Warehouses, Navigational aids, Maintenance of Port and Harbours, Inland Water Transport

UNIT –V

Intelligent Transport Systems: ITS Definition, Benefits of ITS, user services, Detectors, Automatic Vehicle Location (AVL), Automatic Vehicle Identification (AVI), Introduction to ITS applications; Advanced Traffic Management systems (ATMS), Advanced Public Transportation systems (APTS), ITS architecture components and standards, Overview of ITS implementations in developed countries.

TEXT BOOKS:

1. Satish Chandra and Agarwal, M.M. (2007) "Railway Engineering" Oxford Higher Education, University Press New Delhi.
2. Airport Planning and Design- S.K. Khanna and M.G Arora, Nemchand Bros.
3. A Text book of Transportation Engineering – S.P.Chandola – S.Chand & Co. Ltd. – (2001).

4. Transportation Engineering and Planning – C.S. Papacostas, P.D.Prevedouros.

REFERENCES:

1. A Text Book of Railway Engineering-S.C.Saxena and S.Arora, Dhanpatrai and Sons, New Delhi.
2. Highway, railway, Airport and Harbour Engineering – K.P. Subramanian.
3. Harbour, Dock and Tunnel Engineering – R. Srinivasan.
4. Dock and Harbour Engineering – Hasmukh P Oza, Gutam H Oza.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem**

L	T/P/D	C
4	-/-	4

(A70138) ESTIMATING AND COSTING**UNIT – I**

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating. Detailed Estimates of Buildings.

UNIT – II

Earthwork for roads and canals.

UNIT - III

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT -IV

Reinforcement bar bending and bar requirement schedules. Contracts – Types of contracts – Contract Documents – Conditions of contract.

UNIT – V

Valuation of buildings. Standard specifications for different items of building construction.

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie.

REFERENCES :

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.).
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
4. National Building Code.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70133) WATER RESOURCES ENGINEERING-II****UNIT-I**

Storage Works-Reservoirs - Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation – Life of Reservoir.. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT-II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT-III

Earth dams: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

Spillways: types of spillways, Design principles of Ogee spillways - Spillway gates. Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT-IV

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components. Causes and failure of Weirs and Barrages on permeable foundations,-Silt Ejectors and Silt Excluders

Weirs on Permeable Foundations – Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors – Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT-V

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall.

Canal regulation works, design principles of distributory and head regulators, Cross Regulators -canal outlets, types of canal modules,

Cross Drainage works: types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage.

TEXT BOOKS:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers.
2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta.
3. Irrigation engineering by K.R.Arora.
4. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers.
5. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.
6. Engineering Hydrology by CS Pojha, R. Berndtsson and P. Bhunya, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70330) FINITE ELEMENT METHODS****(Elective-II)****UNIT – I**

Introduction to Finite Element Method – Basic Equations in Elasticity – stress strain equations – concept of plane stress – plane strain— advantages and disadvantages of FEM.

Element shapes – nodes – nodal degree of freedom – strain displacement relations.

UNIT – II

Finite Element Analysis (FEA) of – one dimensional problems – Bar element – Shape functions stiffness matrix

FEA Beam elements – stress strain relation- shape functions -stiffness matrix– continuous beams.

UNIT – III

FEA Two dimensional problem – CST – LST element – shape function – stress – strain.

Lagrangian – Serendipity elements – Hermite polynomials – regular, Irregular 2 D & 3D – Element –shape functions.

UNIT – IV

Isoparametric formulation – Concepts of isoparametric elements for 2D analysis -formulation of CST element, 4 –noded and 8-noded iso-parametric quadrilateral elements.

UNIT-V

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOKS:

1. Introduction to Finite elements in engineering by Chandrupatla, Belegundu, Prentice Hall.
2. Finite element method by Daryl L. Logan, CENGAGE Learning.

REFERENCES:

1. Finite element analysis by S.S. Bhavikatti-New age International publishers.
2. Finite element analysis by P. Seshu, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70134) ADVANCED FOUNDATION ENGINEERING****(Elective-II)****UNIT – I**

Introduction-Bearing capacity of Footings subjected to Eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soils - Elastic settlement of Footings embedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertmann's method, Janbu method.

UNIT – II

Pile Foundations – pile groups- settlement of pile groups resting in sands and clays - negative skin friction-under reamed piles-laterally loaded piles – ultimate lateral capacity - Broms Method - Reese and Matlock Approach.

UNIT – III

Lateral earth pressures theories – Rankine's and Coulomb's theories – Graphical Methods, Culmann's, Trial Wedge methods - Stability checks of cantilever and gravity retaining walls.

UNIT - IV

Cantilever and anchored sheet piles - earth pressure diagram - determination of depth of embedment in sands and clays – braced cuts - earth pressure diagrams – forces in struts.

UNIT – V

Foundations in Expansive Soils – problems in expansive soils – mechanism of swelling – swell pressure and swelling potential – heave – foundation practices – sand cushion – CNS technique – under-reamed pile foundations – granular pile anchor technique, stabilization of expansive soils.

TEXT BOOKS:

- 1) Das, B.M., - (1999) Principles of Foundation Engineering –4th edition PWS Publishing, Singapore.
- 2) Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill International.
- 3) Soil Mechanics and Foundation Engineering by V N S Murthy, CBS Publishers and Distributors.

REFERENCE BOOKS:

- 1) Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
- 2). Geotechnical Engineering by C. Venkataramah, NewAge International Pvt.Ltd, Publishers (2002).
- 3) Analysis and Design of Substructures – Swami Saran, Oxford & IBH Publishing Company Pvt.Ltd (1998).
- 4) Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.Ltd, Publishers (2002).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70145) WATERSHED MANAGEMENT****(Elective-II)****UNIT-I**

Introduction: Concept of watershed development, objectives of watershed development, need for watershed development in India, Integrated and multidisciplinary approach for watershed management.

Characteristics of Watershed: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-II

Watershed delineation – Runoff Computations from a watershed – Flood Frequency Analysis – Gumbell, Log Pearson and Weibull Methods of Analysis.

Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements

UNIT-III

Principles of Erosion: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.

Measures to Control Erosion: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT-IV

Water Harvesting: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.

UNIT-V

Forest and Grass Land Management: Interpretation of Satellite Imageries- Land use and Land Cover. Land capability classification, management of forest, agricultural, grassland and wild land. Reclamation of saline and alkaline soils.

Ecosystem Management: Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silviculture, horticulture, social forestry and afforestation.

TEXT BOOKS:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awurbs and WP James, - Prentice Hall Publishers.

REFERENCE:

1. Land and Water Management by VVN Murthy, - Kalyani Publications.
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70136) AIR POLLUTION AND CONTROL****(Elective -II)****UNIT – I**

Air Pollution – Definitions, Scope, Significance and Episodes, Air Pollutants – Classifications – Natural and Artificial – Primary and Secondary air pollutants, Point, Line and Areal Sources of air pollution- Stationary and mobile sources. Effects of Air pollutants on man, material and vegetation: Global effects of air pollution – Green House effect, Heat Islands, Acid Rains, Ozone Holes etc.

UNIT – II

Meteorology and Plume Dispersion; Properties of atmosphere; Heat, Pressure, Wind forces, Moisture and Relative Humidity, Influence of Meteorological phenomena on Air Quality-wind rose diagrams. Lapse Rates, Pressure Systems, Winds and moisture, plume behavior and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-III

Control of particulates – Control at Sources, Process Changes, Equipment modifications, Design and operation of control.

Equipment's – Settling Chambers, Cyclone separators, filters, Dry and Wet scrubbers, Electrostatic precipitators.

UNIT – IV

Control of gaseous emissions - General Methods of Control of NO_x and SO_x emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling – Adsorption – Absorption – Combustion.

UNIT – V

Air Quality Management – Monitoring of SPM, SO_x; NO_x and CO Emission Standards– Air sampling – Sampling Techniques – High volume air sampler – Stack sampling - Analysis of Air pollutants – Air quality standards – Air pollution control act.

TEXT BOOKS:

1. Air pollution By M.N.Rao and H.V.N.Rao – Tata Mc.Graw Hill Company.
2. Air pollution by Wark and Warner.- Harper & Row, New York.

REFERENCE:

1. An introduction to Air pollution by R.K. Trivedy and P.K. Goel, B.S. Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70135) ADVANCED STRUCTURAL DESIGN****(Elective-III)****UNIT-I**

Design and Detailing of cantilever type of Retaining walls – Stability Check.
Principles of Counterfort Retaining walls and shelf type retaining walls.

UNIT-II

Design of Circular and Rectangular Water tanks at Ground level and elevated with staging.

UNIT-III

Design of Flat slabs- Design of Raft and pile foundations .

UNIT-IV

Design of Concrete Bridges – IRC loading Design of Stab bridge, T-beam girder bridge.

Introduction to Steel bridges.

UNIT-V

Design of RCC Chimneys Bunkers & Silos.

TEXT BOOKS:

1. Advanced Reinforced Concrete Structures by Varghese, Pranties Hall of India Pvt. Ltd.
2. Bridge Engineering by S Ponnuswamy Mc Graw Hill Co.
3. Reinforced Concrete Design by S.A. Pillai and D. Menon, Tata Mc. Grawhill Publishing Company.
4. Advanced Reinforced Concrete Structures by Krishna Raju.

REFERENCES :

1. Reinforced Concrete Structures Vol. 2 by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, Publications Pvt. Ltd., New Delhi.
2. Essentials of Bridge Engineering by D. John Son Victor, Oxford and IBM Publication Co., Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70137) EARTH AND ROCKFILL DAMS AND SLOPE STABILITY****(Elective-III)****UNIT-I**

Earth and Rockfill Dams: General features, Selection of site; Merits and demerits of the earth and rock fill dams, Classification of earth dams, Causes of failure, Safe design criteria. Instrumentation in earth dams: Pore pressure measurements, Settlement gauges, Inclinoimeters, Stress measurements, Seismic measurements.

UNIT-II

Failures, Damages and Protection of Earth Dams: Nature and importance of failure, Piping through embankment and foundations, Methods of seepage control through embankments and foundations, Design Criteria for filters, Treatment of upstream and down stream of slopes, Drainage control, Filter design.

UNIT-III

Slope Stability Analysis: Types of Failure: Failure surfaces - Planar surfaces, Circular surfaces, Non-circular surfaces, Limit equilibrium methods, Total stress analysis versus effective Stress analysis, Use of Bishop's pore pressure parameters, Short term and Long term stability in slopes. Taylor Charts.

UNIT-IV

Methods of Slope Stability: Method of Slices, Effect of Tension Cracks, Vertical Cuts. Bishop's Analysis, Bishop and Morgenstern Analysis, Non-circular Failure Surfaces: Janbu Analysis, Sliding Block Analysis, Seismic stability, Stabilization of slopes: Soil reinforcement (geosynthetics/soil nailing/micro piles etc), soil treatment (cement/lime treatment), surface protection (vegetation/erosion control mats/shotcrete).

UNIT-V

Rockfill Dams: Requirements of compacted rockfill, Shear strength of rockfill, Rockfill mixtures, Rockfill embankments, Earth-core Rockfill dams, Stability, Upstream & Downstream slopes.

Text Books:

1. Sherard, Woodward, Gizienski and Clevenger. Earth and Earth-Rock Dams. John Wiley & Sons. 1963.

References:

1. Bharat Singh and Sharma, H. D. – Earth and Rockfill Dams, 1999
2. Sowers, G. F. and Salley, H. I. – Earth and Rockfill Dams, Willams, R.C., and Wallace, T.S. 1965.
3. Abramson, L. W., Lee, T. S. and Sharma, S. - Slope Stability and Stabilisation methods – John Wiley & sons. (2002)
4. Bromhead, E. N. (1992). The Stability of Slopes, Blackie academic and professional, London.
5. Christian, Earth & Rockfill Dams – Principles of Design and Construction, Kutzner Published Oxford and IBH.
6. Ortiago, J. A. R. and Sayao, A. S. F. J. - Handbook of Slope Stabilisation, 2004.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70144) WATER RESOURCES SYSTEMS ANALYSIS****(Elective-III)****UNIT - I**

Introduction: Definition of system, Types of systems, System approach, System analysis and types of systems, Techniques of water resources system analysis.

Systems Techniques in Water Resources: Objective function and constraints, optimization using calculus, Optimization of a function of single variable, Optimization of a function of multiple variables, Constrained optimization, Kuhn – Tucker conditions.

UNIT - II

Linear programming –I: Formulation of linear programming models, graphical method, simplex method, application of Linear programming in water resources.

UNIT - III

Linear programming –II:

Revised simplex method, duality in linear programming, sensitivity and post optimality analysis.

UNIT - IV

Dynamics programming: Belman's principles of optimality forward and backward recursive dynamic programming, curse of dimensionality, application of dynamic programming for resource allocation.

UNIT - V

Water Resources Economics: Basics of Engineering economics, Discount factors, Uniform annual series, Amortization, Comparison of alternate plans. Principles of Economics analysis, Conditions of project optimality, benefit cost analysis socio economic intuitional and pricing of water resources.

TEXT BOOKS:

- 1 Water Resources System Analysis – Vedula & Mujumdar – Tata Mc. Graw Hill Company Ltd.
- 2 Water Resources Economics - James & Lee. Oxford Publishers 2005.

REFERENCES:

- 1 Operational Research by Taha, Printice Hall of India publishers.
2. Water Resources project Economic by Kuiper.E.
3. Engineering optimization: Theory and Practice, Rao, Singiresu S. New Age International.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A70139) INDUSTRIAL WASTE WATER TREATMENT****(Elective-III)****UNIT – I**

Sources of Pollution – Physical, Chemical, Organic and Biological properties of Industrial Wastes – Differences between industrial and municipal waste waters – Effects of industrial effluents on sewers and Natural Water Bodies.

UNIT – II

Pre and Primary Treatment – Equalization, Proportioning, Neutralization, Oil Separation by Floatation – Waste Reduction - Volume Reduction – Strength Reduction.

UNIT – III

Waste Treatment Methods – Nitrification and De-nitrification – Phosphorous removal – Heavy metal removal – Membrane Separation Process – Air Stripping and Absorption Processes – Special Treatment Methods – Disposal of Treated Waste Water.

UNIT – IV

Characteristics and Composition of waste water and Manufacturing Processes of Industries like Sugar, Characteristics and Composition of Industries like Food Processing Industries, Steel, Petroleum Refineries,

UNIT – V

Characteristics and Composition of Industries like Textiles, Tanneries, Atomic Energy Plants and other Mineral Processing Industries - Joint Treatment of Raw Industrial waste water and Domestic Sewage – Common Effluent Treatment Plants (CETP) – Location, Design, Operation and Maintenance Problems – Economical aspects.

TEXT BOOKS

1. Industrial Waste Water Pollution Control by W. Wesley Eckenfelder – McGraw-Hill.
2. Industrial Waste Treatment by Rao & Datta.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A70195) CONCRETE AND HIGHWAY MATERIALS LAB**I. ROAD AGGREGATES:**

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. CEMENT AND CONCRETES :**TESTS ON CEMENTS :**

1. Normal Consistency of fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-I Sem****L T/P/D C****- -/3/- 2****(A70192) ENVIRONMENTAL ENGINEERING LAB****LIST OF EXPERIMENTS**

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination of iron.
6. Determination of Dissolved Oxygen.
7. Determination of Nitrates.
8. Determination of Optimum dose of coagulant
9. Determination of Chlorine demand
10. Determination of total Phosphorous.
11. Determination of B.O.D
12. Determination of C.O.D
13. Determination of Optimum coagulant dose.
14. Determination of Chlorine demand.
15. Presumptive coliform test.

NOTE : At least 8 of the above experiments are to be conducted.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80151) REHABILITATION AND RETROFITTING OF STRUCTURES****(Elective -IV)****UNIT – I**

Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention. Mechanism of Damage – Types of Damage

UNIT – II

Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention. Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – III

Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT – IV

Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Guniting – Shot Create – Underpinning. Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – V

Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

TEXT BOOKS:

1. Maintenance and Repair of Civil Structures, B.L. Gupta and Amit Gupta, Standard Publications.
2. Concrete Technology by A.R. Santakumar, Oxford University press.

REFERENCES

1. Defects and Deterioration in Buildings, EF & N Spon, London.
2. Non-Destructive Evaluation of Concrete Structures by Bungey – Surrey University Press.
3. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W.H. Ranso, (1981).
4. Building Failures : Diagnosis and Avoidance, EF & N Spon, London, B.A. Richardson, (1991).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80148) GEOENVIRONMENTAL ENGINEERING****(Elective-IV)****UNIT-I**

Sources and Site Characterization: Scope of Geo-environmental Engineering, Various Sources of Contaminations, Need for contaminated site characterization; and Characterization methods.

UNIT-II

Solid and Hazardous Waste Management: Classification of waste, Characterization solid wastes, Environmental Concerns with waste, waste management strategies.

UNIT-III

Contaminant Transport: Transport process, Mass-transfer process, Modeling, NAPL

UNIT-IV

Remediation Techniques: Objectives of site remediation, various active and passive methods, Bioremediation, Phytoremediation, Remediation of NAPL sites.

UNIT-V

Landfills: Types of landfills, Site Selection, Waste Containment Liners, Leachate collection system, Cover system, Gas collection system.

TEXT BOOKS:

1. Phillip B. Bedient, Refai, H. S. & Newell C. J. - Ground Water Contamination - Prentice Hall Publications, 4th Edition, 2008.
2. Sharma, H. D. and Reddy, K. R. - Geoenvironmental Engineering, John Wiley & Sons (2004).

REFERENCES:

1. Rowe, R. K. - Geotechnical & Geoenvironmental Engineering Handbook, Kluwer Academic, 2001.
2. Reddi, L. N. and Inyang, H. I. - Geoenvironmental Engineering Principles and Applications, Marcel. Dekker, Inc., New York (2000).
3. LaGrega, M. D., Buckingham, P. L. and Evans, J. C. - Hazardous Waste Management, New York: McGraw-Hill, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80147) DESIGN AND DRAWING OF IRRIGATION STRUCTURES****(Elective-IV)****Design and drawing of the following hydraulic structures.**

Group A

1. Surplus weir.
2. Syphon Well Drop
3. Trapezoidal notch fall.
4. Tank sluice with tower head

Group B

1. Sloping glacis weir.
2. Canal regulator
3. Under Tunnel.
4. Type III Syphon aqueduct

Final Examination pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks.

The duration of examination will be FOUR hours.

However, the students are supposed to practise the drawings for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Water Resources Engineering – Principles and Practice by Challa Satyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80141) SOLID WASTE MANAGEMENT****(Elective-IV)****UNIT I:**

Solid Waste and their Handling: Definition of solid wastes – types of solid wastes – Sources - Industrial, mining, agricultural and domestic – Characteristics. Solid waste Problems - impact on environmental health

UNIT II:

Collection, Segregation and Transport AND Management of Municipal Solid Wastes: Handling and segregation, Collection and storage of municipal solid wastes; analysis of Collection systems. Transfer stations – labeling and handling of hazardous wastes. Solid waste processing technologies. Mechanical and thermal volume reduction. Biological and chemical techniques for energy and other resource recovery: composting - types, vermicomposting, termigradation, fermentation. Incineration of solid wastes. Disposal in landfills: site selection, design, and operation of sanitary landfills; Leachate and landfill gas management; landfill closure and post-closure environmental monitoring; landfill remediation. Regulatory aspects of municipal solid waste management.

UNIT III:

Hazardous Waste and Management: Hazardous waste definition. Physical and biological routes of transport of hazardous substances – sources and characterization. Sampling and analysis of hazardous wastes –proximate analysis – survey analysis – directed analysis handling, collection, storage and transport. Hazardous waste treatment technologies TSDF concept - Physical, chemical and thermal treatment of hazardous waste: solidification, chemical fixation, encapsulation, pyrolysis and incineration. Hazardous waste land fills - Site selections, design and operation. HW reduction, recycling and reuse, Regulatory aspects of HWM/HWM rules.

UNIT IV:

Biomedical Waste Management: Classification, collection, segregation Treatment and disposal. Radioactive waste: Definition, Low level and high level radioactive wastes and their management, Radiation standards.

UNIT V:

E-Waste Management: Waste characteristics, generation, collection, transport and disposal, regulatory aspects of e waste, global strategy, recycling.

TEXT BOOKS:

1. Hazardous waste management Charles A. Wentz. Second edition 1995. McGraw Hill International.
2. Integrated solid waste management George Tchobanoglous, Hilary Theisen & Samuel A. Vigil.

REFERENCES:

1. Hazardous waste management by Prof. Anjaneyulu.
2. Criteria for hazardous waste landfills – CPCB guidelines 2000.
3. Standard handbook of Hazardous waste treatment and disposal by Harry M. Freeman, McGraw Hill 1997.
4. Management of Solid waste in developing countries by Frank Flintoff, WHO regional publications 1976.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80150) PRESTRESSED CONCRETE STRUCTURES****UNIT I:**

Introduction: Historic development- General principles of prestressing pretensioning and post tensioning- Advantages and limitations of Prestressed concrete- General principles of PSC- Classification and types of prestressing- Materials- high strength concrete and high tensile steel their characteristics.

Methods and Systems of prestressing: Pretensioning and Posttensioning methods and systems of prestressing like Hoyer system, Magnel Blaton system, Freyssinet system and Gifford- Udall System- Lee McCall system.

UNIT II:

Losses of Prestress: Loss of prestress in pretensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, relaxation of stress in steel, slip in anchorage, frictional losses.

UNIT III:

Flexure: Analysis of sections for flexure- beams prestressed with straight, concentric, eccentric, bent and parabolic tendons- stress diagrams- Elastic design of PSC beams of rectangular and I sections- Kern line – Cable profile and cable layout.

Shear: General Considerations- Principal tension and compression- Improving shear resistance of concrete by horizontal and vertical prestressing and by using inclined or parabolic cables- Analysis of rectangular and I beams for shear – Design of shear reinforcements- Bureau of Indian Standards (BIS) Code provisions.

UNIT IV:

Transfer of Prestress in Pretensioned Members : Transmission of prestressing force by bond – Transmission length – Flexural bond stresses – IS code provisions – Anchorage zone stresses in post tensioned members – stress distribution in End block – Analysis by Guyon, Magnel, Zielinski and Rowe's methods – Anchorage zone reinforcement- BIS Provisions

UNIT V

Composite Beams: Different Types- Propped and Unpropped- stress distribution- Differential shrinkage- Analysis of composite beams- General design considerations.

Deflections: Importance of control of deflections- Factors influencing deflections – Short term deflections of uncracked beams- prediction of long

time deflections- BIS code requirements.

TEXT BOOK:

- 1) Prestressed concrete by N.Krishna Raju, 5th Edition, Tata McGraw Hill Book Education Pvt. Ltd.

REFERENCES :

- 1) Design of prestress concrete structures by T.Y. Lin and Burn, John Wiley, New York.
- 2) Prestressed concrete by S. Ramamrutham, Dhanpat Rai & Sons, Delhi.
- 3) Prestressed Concrete by N. Rajagopalan, Narosa Publishing House.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**IV Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A80146) CONSTRUCTION MANAGEMENT****UNIT-I**

Management process- Roles . management theories . Social responsibilities. planning and strategic management . strategy implementation . Decision making: tools and techniques – Organizational structure . Human resource management- motivation performance- leadership.

UNIT-II

Classification of Construction projects, Construction stages, Resources- Functions of Construction Management and its Applications .Preliminary Planning- Collection of Data-Contract Planning – Scientific Methods of Management: Network Techniques in construction management - Bar chart, Gant chart, CPM, PERT- Cost & Time optimization.

UNIT-III

Resource planning - planning for manpower, materials, costs, equipment. Labour, -Scheduling .Forms of scheduling - Resource allocation . budget and budgetary control methods

UNIT-IV

Contract - types of contract, contract document, specification, important conditions of contract – tender and tender document - Deposits by the contractor - Arbitration . negotiation - M.Book - Muster roll -stores.

UNIT-V

Management Information System - Labour Regulations: Social Security - welfare Legislation - Laws relating to Wages, Bonus and Industrial disputes, Labour Administration - Insurance and Safety Regulations - Workmen's Compensation Act -other labour Laws - Safety in construction : legal and financial aspects of accidents in construction . occupational and safety hazard assessment. Human factors in safety . legal and financial aspects of accidents in construction . occupational and safety hazard assessment

TEXT BOOKS

1. Ghalot, P.S., Dhir,D.M., Construction Planning and Management, Wiley Eastern Limited,1992.
2. Chitkara,K.K., Construction Project Management, Tata McGraw Hill Publishing Co, Ltd., New Delhi, 1998.
3. Punmia,B,C., Project Planning and Control with PERT and CPM, Laxmi Publications, new delhi,1987.

REFERENCE:

1. Construction Management And Planning by: sengupta, b. /guha, h. tata mcgraw-hill publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/-	2

(A80087) INDUSTRY ORIENTED MINI PROJECT

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/6/-	2

(A80089) SEMINAR

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/15/-	10

(A80088) PROJECT WORK

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

IV Year B.Tech. CE-II Sem	L	T/P/D	C
	-	-/-	2

(A80090) COMPREHENSIVE VIVA

BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

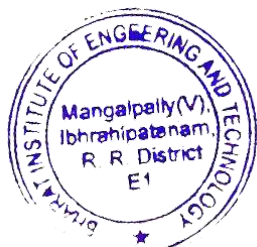
Mangalpally (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Telangana-501510

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

B.Tech-CIVIL ENGINEERING

2015-16

S. No.	Regulations	No. of Course	Year of Study
1.	R13	15	II & III Year I & II Semesters
2.	R09	07	IV year I & II Semesters



Vettikanti Subu
PRINCIPAL
Principal
Bharat Institute of Engg. and Tech
Mangalpally(V), Ibrahimpatnam(M)
Ranga Reddy (Dist)-Telangana-501510

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.**B. TECH. CIVIL ENGINEERING****I YEAR**

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10302	Engineering Mechanics	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics & Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	Total	19	16	56

II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A30006	Mathematics – II	4	-	4
A30203	Electrical & Electronics Engineering	4	-	4
A30107	Strength of Materials –I	4	-	4
A30108	Surveying	4	-	4
A30101	Fluid Mechanics	4	-	4
A30010	Managerial Economics and Financial Analysis	4	-	4
A30185	Surveying Lab- I	-	3	2
A30183	Strength of Materials Lab	-	3	2
	Total	24	6	28

II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A40008	Probability & Statistics	4	-	4
A40114	Strength of Materials - II	4	-	4
A40111	Hydraulics & Hydraulic Machinery	4	-	4
A40009	Environmental Studies	4	-	4
A40115	Structural Analysis -I	4	-	4
A40109	Building Materials, Construction & Planning	4	-	4
A40186	Computer Aided Drafting of Buildings	-	3	2
A40190	Surveying Lab- II	-	3	2
	Total	24	6	28

III YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A50116	Concrete Technology	4	-	4
A50121	Reinforced Concrete Structures Design and Drawing	4	-	4
A50118	Engineering Geology	4	-	4
A50120	Geotechnical Engineering	4	-	4
A50122	Water Resources Engineering-I	4	-	4
	Open Elective	4	-	4
A50117	Disaster Management			
A50017	Intellectual Property Rights			
A50018	Human Values and Professional Ethics			
A50181	Fluid Mechanics & Hydraulic Machinery Lab	-	3	2
A50191	Engineering Geology Lab	-	3	2
	Total	24	6	28

III YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A60130	Steel Structures Design and Drawing	3	2	4
A60119	Environmental Engineering	4		4
A60132	Transportation Engineering -I	4		4
A60126	Foundation Engineering	4		4
A60131	Structural Analysis -II	4		4
	Elective -I	4	-	4
A60123	Elements of Earthquake Engineering			
A60127	Ground Improvement Techniques			
A60128	Ground Water Hydrology			
A60124	Environmental Impact Assessment			
A60129	Principles of Entrepreneurship			
A60194	Geotechnical Engineering Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	Total	23	8	28

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****2 -/- 4****(A10001) ENGLISH****Introduction:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

Objectives:

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

SYLLABUS:**Listening Skills:****Objectives**

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
 2. To enable students to express themselves fluently and appropriately in social and professional contexts.
- Oral practice
 - Describing objects/situations/people
 - Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: **Skills Annexe -Functional English for Success**)
 - Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
 2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text
 - Understanding the gist of an argument
 - Identifying the topic sentence
 - Inferring lexical and contextual meaning
 - Understanding discourse features
 - Scanning
 - Recognizing coherence/sequencing of sentences

NOTE : The students will be trained in reading skills using the prescribed text for detailed study.

They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill.
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
 - Writing sentences
 - Use of appropriate vocabulary
 - Paragraph writing
 - Coherence and cohesiveness
 - Narration / description
 - Note Making
 - Formal and informal letter writing
 - Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units, are prescribed:

For Detailed study: First Textbook: "Skills Annexe -Functional English for Success", Published by Orient Black Swan, Hyderabad

For Non-detailed study

1. **Second text book "Epitome of Wisdom"**, Published by Maruthi Publications, Guntur
 - The course content and study material is divided into Five Units.

Unit –I:

1. Chapter entitled '**Wit and Humour**' from '**Skills Annexe**' -Functional English for Success, Published by Orient Black Swan, Hyderabad
2. Chapter entitled '**Mokshagundam Visvesvaraya**' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad.
- L- Listening For Sounds, Stress and Intonation
- S- Greeting and Taking Leave, Introducing Oneself and Others (Formal

and Informal Situations)

- R- Reading for Subject/ Theme
- W- Writing Paragraphs
- G- Types of Nouns and Pronouns
- V- Homonyms, homophones synonyms, antonyms

Unit –II

1. Chapter entitled “**Cyber Age**” from “**Skills Annexe -Functional English for Success**” Published by Orient Black Swan, Hyderabad.
 2. Chapter entitled '**Three Days To See**' from “**Epitome of Wisdom**”, Published by Maruthi Publications, Hyderabad.
- L – Listening for themes and facts
 - S – Apologizing, interrupting, requesting and making polite conversation
 - R- for theme and gist
 - W- Describing people, places, objects, events
 - G- Verb forms
 - V- noun, verb, adjective and adverb

Unit –III

1. Chapter entitled '**Risk Management**' from “**Skills Annexe - Functional English for Success**” Published by Orient Black Swan, Hyderabad
 2. Chapter entitled '**Leela's Friend**' by R.K. Narayan from “**Epitome of Wisdom**”, Published by Maruthi Publications, Hyderabad
- L – for main points and sub-points for note taking
 - S – giving instructions and directions; Speaking of hypothetical situations
 - R – reading for details
 - W – note-making, information transfer, punctuation
 - G – present tense
 - V – synonyms and antonyms

Unit –IV

1. Chapter entitled '**Human Values and Professional Ethics**' from “**Skills Annexe -Functional English for Success**” Published by Orient Black Swan, Hyderabad
 2. Chapter entitled '**The Last Leaf**' from “**Epitome of Wisdom**”, Published by Maruthi Publications, Hyderabad
- L - Listening for specific details and information
 - S- narrating, expressing opinions and telephone interactions

- R - Reading for specific details and information
- W- Writing formal letters and CVs
- G- Past and future tenses
- V- Vocabulary - idioms and Phrasal verbs

Unit –V

1. Chapter entitled '**Sports and Health**' from "**Skills Annexe - Functional English for Success**" Published by Orient Black Swan, Hyderabad
2. Chapter entitled '**The Convocation Speech**' by N.R. Narayanmurthy' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad
- L- Critical Listening and Listening for speaker's tone/ attitude
- S- Group discussion and Making presentations
- R- Critical reading, reading for reference
- W- Project proposals; Technical reports, Project Reports and Research Papers
- G- Adjectives, prepositions and concord
- V- Collocations and Technical vocabulary

Using words appropriately

- * Exercises from the texts not prescribed shall also be used for classroom tasks.

REFERENCES :

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press

9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixon, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw – Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

Outcomes:

- Usage of English Language, written and spoken.
- Enrichment of comprehension and fluency
- Gaining confidence in using language in verbal situations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****3 1/-/ 6****(A10002) MATHEMATICS -I****Objectives:** To learn

- The types of Matrices and their properties.
- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
- The concept of eigenvalues and eigenvectors of a matrix is to reduce a quadratic form into a canonical form through a linear transformation.
- The mean value theorems and to understand the concepts geometrically.
- The functions of several variables and optimization of these functions.
- The evaluation of improper integrals, Beta and Gamma functions.
- Multiple integration and its applications.
- Methods of solving the differential equations of 1st and higher order
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, Bending of beams etc.
- The definition of integral transforms and Laplace Transform.
- Properties of Laplace transform.
- Inverse Laplace Transform.
- Convolution theorem.
- Solution of Differential equations using Laplace transform.

UNIT-I

Theory of Matrices: Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices. Idempotent matrix, Elementary row and column transformations-Elementary matrix, Finding rank of a matrix by reducing to Echelon and normal forms. Finding the inverse of a non-singular square matrix using row/ column transformations (Gauss- Jordan method). Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix. Solving $m \times n$ and $n \times n$ linear system of equations by Gauss elimination.

Cayley-Hamilton Theorem (without proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation –

Orthogonal Transformation. Eigen values and eigen vectors of a matrix. Properties of eigen values and eigen vectors of real and complex matrices. Finding linearly independent eigen vectors of a matrix when the eigen values of the matrix are repeated.

Diagonalization of matrix – Quadratic forms up to three variables. Rank – Positive definite, negative definite, semi definite, index, signature of quadratic forms. Reduction of a quadratic form to canonical form.

UNIT – II

Differential calculus methods: Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.

Functions of several variables: Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers.

UNIT – III

Improper integration, Multiple integration & applications: Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

Multiple integrals – double and triple integrals – change of order of integration-change of variables (polar, cylindrical and spherical) Finding the area of a region using double integration and volume of a region using triple integration.

UNIT – IV

Differential equations and applications : Overview of differential equations-exact, linear and Bernoulli (NOT TO BE EXAMINED). Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type $f(X) = e^{ax}$, $\sin ax$, $\cos ax$, and x^n , $e^{ax} V(x)$, $x^n V(x)$, method of variation of parameters. Applications to bending of beams, Electrical circuits and simple harmonic motion.

UNIT – V

Laplace transform and its applications to Ordinary differential equations
Definition of Integral transform, Domain of the function and Kernel for the Laplace transforms. Existence of Laplace transform. Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac's delta function, Periodic function – Inverse Laplace transform by

Partial fractions(Heaviside method) Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem --- Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
4. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition, Pearson Education.

Outcome:

- After learning the contents of this Unit the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to evaluate the multiple integrals and can apply the concepts to find the Areas, Volumes, Moment of Inertia etc., of regions on a plane or in space.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equation. Also able to apply the theory of differential equations to the real world problems.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE**

L	T/P/D	C
3	-/-	6

(A10302) ENGINEERING MECHANICS**UNIT – I**

Introduction to Engineering Mechanics – Basic Concepts. **Resultants of Force System:** Parallelogram law – Forces and components- Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force - principle of moments – Coplanar Applications – Couples - Resultant of any Force System.

Equilibrium of Force Systems : Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems - Equilibrium of Spatial Systems.

UNIT – II

FRICTION: Introduction – Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions – Motion of Bodies: Wedge, Screw, Screw-jack, and Differential Screw-jack.

Transmission of Power: Flat Belt Drives - Types of Flat Belt Drives – Length of Belt, tensions, Tight side, Slack Side, Initial and Centrifugal – Power Transmitted and Condition for Max. Power.

UNIT – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Moments of Inertia : Definition – Polar Moment of Inertia – Radius of gyration - Transfer formula for moment of inertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia : Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia - mass moment of inertia of composite bodies.

UNIT – IV

Kinematics of a Particle: Motion of a particle – Rectilinear motion – motion curves – Rectangular components of curvilinear motion– Kinematics of Rigid Body - Types of rigid body motion -Angular motion - Fixed Axis Rotation

Kinetics of particles: Translation -Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations of plane motion - Angular motion - Fixed Axis Rotation – Rolling Bodies.

UNIT – V

Work - Energy Method : Work energy Equations for Translation - Work-Energy Applications to Particle Motion – Work energy applied to Connected Systems - Work energy applied to Fixed Axis Rotation and Plane Motion. Impulse and momentum.

Mechanical Vibrations : Definitions and Concepts – Simple Harmonic Motion – Free vibrations, simple and Compound Pendulums – Torsion Pendulum – Free vibrations without damping: General cases.

TEXT BOOKS:

1. Engineering Mechanics - Statics and Dynamics by Ferdinand.L. Singer / Harper International Edition.
2. Engineering Mechanics/ S. Timoshenko and D.H. Young, Mc Graw Hill Book Compan.

REFERENCES:

1. Engineering Mechanics / Irving Shames / Prentice Hall.
2. A text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain, Academic Publishing Company.
3. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiah/ Universities Press.
4. Engineering Mechanics, Umesh Regl / Tayal.
5. Engg. Mechanics / KL Kumar / Tata McGraw Hill.
6. Engg. Mechanics / S.S. Bhavikati & K.G. Rajasekharappa.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****3 -/- 6****(A10004) ENGINEERING PHYSICS****Objectives:**

It gives

- to the students basic understanding of bonding in solids, crystal structures and techniques to characterize crystals.
- to understand the behavior of electron in a solid and thereby one can determine the conductivity and specific heat values of the solids.
- to study applications in Engineering like memory devices, transformer core and Electromagnetic machinery.
- to help the student to design powerful light sources for various Engineering Applications and also enable them to develop communication systems using Fiber Technology.
- to understand the working of Electronic devices, how to design acoustic proof halls and understand the behavior of the materials at Nano scale.

UNIT-I

Crystallography: Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy of diatomic molecule-Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Structure of Diamond and NaCl.

X-ray Diffraction & Defects in Crystals: Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects, line defects (Qualitative) & Burger's Vector.

UNIT-II

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function – Infinite square well potential, extension to three dimensions

Elements of Statistical Mechanics & Electron theory of Solids: Phase space, Ensembles, Micro Canonical, Canonical and Grand Canonical Ensembles - Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Concept of Electron Gas, Density of States, Fermi

Energy- Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K curve, Origin of Energy Band Formation in Solids, Concept of Effective Mass of an Electron, Classification of Materials into Conductors, Semi Conductors & Insulators.

UNIT-III

Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities: Ionic and Electronic - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo - electricity and Ferro- electricity.

Magnetic Properties & Superconducting Properties: Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their Applications, Superconductivity, Meissner Effect, Effect of Magnetic field, Type-I & Type-II Superconductors, Applications of Superconductors.

UNIT-IV

Optics: Interference-Interference in thin films (Reflected light), Newton rings experiment- Fraunhofer diffraction due to single slit, N-slits, Diffraction grating experiment, Double refraction-construction and working of Nicol's Prism

Lasers & Fiber Optics: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers- Principle of Optical Fiber, Construction of fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

UNIT-V:

Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Calculation of carrier concentration in Intrinsic &, Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect-Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, Diode Equation, I-V Characteristics of PN Junction diode, Solar cell, LED & Photo Diodes. **Acoustics of Buildings & Acoustic Quieting** Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time, Measurement of Absorption Coefficient of a Material, factors affecting the Architectural Acoustics and their Remedies

Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume

Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Top-down Fabrication: Chemical Vapour Deposition, Characterization by TEM.

TEXT BOOKS:

1. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.
2. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

REFERENCES:

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons.
2. Sears and Zemansky's University Physics (10th Edition) by Hugh D. Young Roger A. Freedman, T. R. Sandin, A. Lewis Ford Addison-Wesley Publishers.
3. Applied Physics for Engineers – P. Madhusudana Rao (Academic Publishing company, 2013).
4. Solid State Physics – M. Arumugam (Anuradha Publications).
5. Modern Physics – R. Murugesan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
6. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar – S. Chand & Co. (for acoustics).
7. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co. Ltd.
8. Nanotechnology – M. Ratner & D. Ratner (Pearson Ed.).
9. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
10. Solid State Physics – A.J. Dekker (Macmillan).
11. Applied Physics – Mani Naidu Pearson Education.

Outcomes:

- The student would be able to learn the fundamental concepts on behavior of crystalline solids.
- The knowledge on Fundamentals of Quantum Mechanics, Statistical Mechanics enables the student to apply to various systems like Communications Solar Cells, Photo Cells and so on.
- Design, Characterization and study of properties of materials help the student to prepare new materials for various Engineering applications.
- This course also helps the student exposed to non-destructive testing methods.
- Finally, Engineering Physics Course helps the student to develop problem solving skills and analytical skills.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD
I Year B.Tech. CE
L T/P/D C
3 -/- 6
(A10005) ENGINEERING CHEMISTRY
Objective:

An engineer is as someone who uses scientific, natural and physical principles to design something of use for people or other living creatures. Much of what any engineer does involves chemistry because everything in our environment has a molecular make up. Engineering requires the concepts of applied chemistry and the more chemistry an engineer understands, the more beneficial it is. In the future, global problems and issues will require an in-depth understanding of chemistry to have a global solution. This syllabus aims at bridging the concepts and theory of chemistry with examples from fields of practical application, thus reinforcing the connection between science and engineering. It deals with the basic principles of various branches of chemistry which are fundamental tools necessary for an accomplished engineer.

UNIT I:

Electrochemistry & Corrosion: Electro Chemistry – Conductance - Specific, Equivalent and Molar conductance and their Units; Applications of Conductance (Conductometric titrations). **EMF:** Galvanic Cells, types of Electrodes – (Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concept of concentration cells, electro chemical series, Potentiometric titrations, determination of P^H using glass electrode-Numerical problems.

Batteries: Primary cells (dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. **Fuel cells** – Hydrogen – Oxygen fuel cell; methanol – oxygen fuel cell ; Advantages and Applications.

Corrosion and its control: Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Water line, Pitting and Intergranular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating (copper plating) Electroless plating (Ni plating) - Organic coatings – Paints - constituents and their functions.

UNIT II:

Engineering Materials: Polymers: Types of Polymerization (Chain & Step growth). **Plastics:** Thermoplastic & Thermo setting resins; Compounding &

fabrication of plastics (Compression and injection moulding). Preparation, properties, engineering applications of PVC, Teflon and Bakelite.

Fibers- Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers** – Natural rubber and its vulcanization. Elastomers – Buna-s, Butyl rubber and Thiokol rubber.

Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. **Bio-degradable Polymers**- preparation and Applications of Poly vinyl acetate and Poly lactic acid - **Cement**: composition of Portland cement, setting & hardening of cement (reactions), **Lubricants**: Classification with examples- Characteristics of a good lubricant & mechanism of lubrication (thick film, thin film and extreme pressure) – properties of lubricants: viscosity, Cloud point, flash and fire points. **Refractories**: Classification, characteristics of a good refractory and applications.

Nanomaterials: Introduction, preparation by sol-gel & chemical vapour deposition methods. Applications of nanomaterials.

UNIT III:

Water and its Treatment: Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and calgon conditioning) – External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. **Potable Water**- Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis & its significance.

Unit – IV :

Fuels & Combustion: Fuels – Classification – solid fuels : coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems.

Combustion – Definition, Calorific value of fuel – HCV , LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

UNIT V:

Phase Rule & Surface Chemistry : Phase Rule: Definition of terms: Phase,

component, degree of freedom, phase rule equation. Phase diagrams – one component system- water system. Two component system Lead- Silver, cooling curves, heat treatment based on iron-carbon phase diagram - hardening, annealing and normalization.

Surface Chemistry: Adsorption – Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption; **Colloids**: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

TEXT BOOKS:

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi / CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006).
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006).
4. Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.

Outcome:

- Students will demonstrate a depth of knowledge and apply the methods of inquiry in a discipline of their choosing, and they will demonstrate a breadth of knowledge across their choice of varied disciplines.
- Students will demonstrate the ability to access and interpret information, respond and adapt to changing situations, make complex decisions, solve problems, and evaluate actions.
- Students will demonstrate awareness and understanding of the skills necessary to live and work in a diverse engineering world.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****3 -/- 6****(A10501) COMPUTER PROGRAMMING****Objectives:**

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements (making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - II

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function,

memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

UNIT - IV

Enumerated, Structure, and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command –line arguments.

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions, C program examples.

UNIT – V

Searching and Sorting – Sorting- selection sort, bubble sort, Searching-linear and binary search methods.

Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Push and Pop Operations, Queues- Enqueue and Dequeue operations.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

REFERENCE BOOKS:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
9. Programming in C – Stephen G. Kochan, III Edition, Pearson

Education.

10. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
11. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.

Outcomes:

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****2 -/3 6****(A10301) ENGINEERING DRAWING****UNIT – I**

Introduction to Engineering Drawing: Principles of Engineering Drawing/ Graphics – Various Drawing Instruments – Conventions in Drawing – **Lettering practice** – BIS Conventions.

Curves: Constructions of Curves used in Engineering Practice:

- a) Conic Sections including the Rectangular Hyperbola – General method only.
- b) Cycloid, Epicycloid and Hypocycloid
- c) Involute.

Scales: Construction of different types of Scales, Plain, Diagonal, Vernier scale.

UNIT – II**Orthographic Projections in First Angle**

Projection: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projections of Points : including Points in all four quadrants.

Projections of Lines : Parallel, perpendicular, inclined to one plane and inclined to both planes. True length and true angle of a line. Traces of a line.

Projections of Planes: Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

UNIT – III

Projections of Solids: Projections of regular solids, cube, prisms, pyramids, tetrahedron, cylinder and cone, axis inclined to both planes.

Sections and Sectional Views: Right Regular Solids – Prism, Cylinder, Pyramid, Cone – use of Auxiliary views.

UNIT – IV

Development of Surfaces: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

Intersection of Solids:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – V

Isometric Projections : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound

Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

Transformation of Projections : Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

Perspective Projections : Perspective View : Points, Lines and Plane Figures, Vanishing Point Methods (General Method only).

TEXT BOOKS

1. Engineering Drawing – Basant, Agrawal, TMH
2. Engineering Drawing, N.D. Bhatt

REFERENCES :

1. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5. Engineering Drawing by K.Venu Gopal & V.Prabu Raja New Age Publications.
6. Engineering Drawing by John. PHI Learning Publisher.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE**

L	T/P/D	C
-	-/3/-	4

(A10581) COMPUTER PROGRAMMING LAB**Objectives:**

- To write programs in C to solve the problems.
- To implement linear data structures such as lists, stacks, queues.
- To implement simple searching and sorting methods.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

Week 1

- a) Write a C program to find the sum of individual digits of a positive integer.
- b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 2

- a) Write a C program to calculate the following Sum:

$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- b) Write a C program to find the roots of a quadratic equation.

Week 3

- a) The total distance travelled by vehicle in 't' seconds is given by distance $s = ut + 1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec²). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)

Week 4

- a) Write C programs that use both recursive and non-recursive functions
- To find the factorial of a given integer.

- ii) To find the GCD (greatest common divisor) of two given integers.

Week 5

- a) Write a C program to find the largest integer in a list of integers.
- b) Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices

Week 6

- a) Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string in to a given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

Week 7

- a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

Week 8

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

Week 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots+x^n$$

For example: if n is 3 and x is 5, then the program computes 1+5+25+125.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if $n < 0$, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 10

- a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11

Write a C program that uses functions to perform the following operations:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Week 13

a) Write a C program to display the contents of a file.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 14

a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

Week 15

a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.

b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

Week 16

Write a C program that uses functions to perform the following operations:

- i) Create a singly linked list of integer elements.
- ii) Traverse the above list and display the elements.

Week 17

Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 10

Week 18

Write a C program that implements Queue (its operations) using a singly linked list to display a given list of integers in the same order. Ex. input: 10

23 4 6 output: 10 23 4 6

Week 19

Write a C program to implement the linear regression algorithm.

Week 20

Write a C program to implement the polynomial regression algorithm.

Week 21

Write a C program to implement the Lagrange interpolation.

Week 22

Write C program to implement the Newton- Gregory forward interpolation.

Week 23

Write a C program to implement Trapezoidal method.

Week 24

Write a C program to implement Simpson method.

TEXT BOOKS:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications.
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad,S.Chand Publishers.
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****- -/3/- 4****(A10081) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB****ENGINEERING PHYSICS LAB****(Any TEN experiments compulsory)****Objectives**

This course on Physics lab is designed with 13 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.

The experiments are selected from various areas of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.

Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physics Balance, Spectrometer and Microscope.

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum.
12. Wavelength of light –diffraction grating - using laser.
13. Characteristics of a solar cell

LABORATORY MANUAL:

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)

Outcomes

The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering.

With the exposure to these experiments the student can compare the theory and correlate with experiment.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any 12 of the following)

Titrimetry:

1. Estimation of ferrous iron by dichrometry.
2. Estimation of hardness of water by EDTA method.

Mineral analysis:

3. Determination of percentage of copper in brass.
4. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:**Colorimetry:**

5. Determination of ferrous iron in cement by colorimetric method
6. Estimation of copper by colorimetric method.

Conductometry:

7. Conductometric titration of strong acid vs strong base.
8. Conductometric titration of mixture of acids vs strong base.

Potentiometry:

9. Titration of strong acid vs strong base by potentiometry.
10. Titration of weak acid vs strong base by potentiometry.

Physical properties:

11. Determination of viscosity of sample oil by redwood / oswald's viscometer.
12. Determination of Surface tension of lubricants.

Preparations:

13. Preparation of Aspirin
14. Preparation of Thiokol rubber

Adsorption:

15. Adsorption of acetic acid on charcoal.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harmendra Goel, Ane Books Private Ltd.,
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****- -/3/- 4****(A10083) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objectives

- ✍ To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- ✍ To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✍ To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- ✍ To improve the fluency in spoken English and neutralize mother tongue influence
- ✍ To train students to use language appropriately for interviews, group discussion and public speaking

Syllabus: English Language Communication Skills Lab shall have two parts:

- a. Computer Assisted Language Learning (CALL) Lab**
- b. Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **English Language Communication Skills Lab**

Exercise – I

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants

ICS Lab: Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II

CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt-confused/misused

Exercise - III

CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV

CALL Lab: Intonation and Common errors in Pronunciation.

ICS Lab: Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice

ICS Lab: Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- i) P – IV Processor
 - a) Speed – 2.8 GHZ
 - b) RAM – 512 MB Minimum
 - c) Hard Disk – 80 GB
- ii) Headphones of High quality

2. **Interactive Communication Skills (ICS) Lab :**

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories*. New Delhi: Foundation.
2. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews*. Tata McGraw Hill.
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate*. Cambridge: CUP.
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. *English Pronunciation in Use. Advanced*. Cambridge: CUP.
7. Marks, J. 2009. *English Pronunciation in Use. Elementary*. Cambridge: CUP.
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication*. New Delhi : Foundation.
9. Soundararaj, Francis. 2012. *Basics of Communication in English*. New Delhi: Macmillan.
10. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
12. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan).
13. **Prescribed Lab Manual:** A Manual entitled “*English Language Communication Skills (ELCS) Lab Manual- cum- Work Book*”, published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

DISTRIBUTION AND WEIGHTAGE OF MARKS***English Language Laboratory Practical Examination:***

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

Outcomes:

- Better Understanding of nuances of language through audio- visual experience and group activities.
- Neutralization of accent for intelligibility.
- Speaking with clarity and confidence thereby enhancing employability skills of the students.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****- -/3/- 4****(A10082) IT WORKSHOP / ENGINEERING WORKSHOP****Objectives:**

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. **(Recommended to use Microsoft office 2007 in place of MS Office 2003)**

PC Hardware

Week 1 – Task 1 : Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Week 2 – Task 2 : Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 3 – Task 3 : Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 4 – Task 4 : Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Week 5 – Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Week 6 – Task 6 : Software Troubleshooting : Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Week 7 - Task 1 : Orientation & Connectivity Boot Camp : Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Week 8 - Task 2 : Web Browsers, Surfing the Web : Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Week 9 - Task 3 : Search Engines & Netiquette : Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Week 10 - Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Week 11- Task 5: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Productivity tools**LaTeX and Word**

Week 12 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 1 : Using LaTeX and Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Week 13 - Task 2: Creating project abstract Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 14 - Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Week 15 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Week 16 - Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Week 17 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and

Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 18- Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts

Week 19 - Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
4. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

Outcomes:

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.

4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

L	T/P/D	C
4	-/-	4

(A30006) MATHEMATICS - II**Objectives:**

- The objective is to find the relation between the variables x and y out of the given data (x,y).
- This unit also aims to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
- This topic deals with methods to find roots of an equation and solving a differential equation.
- The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.
- Indeed, any periodic and non-periodic function can be best analyzed in one way by Fourier series and transforms methods.
- The unit aims at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations.
- In many Engineering fields the physical quantities involved are vector-valued functions.
- Hence the unit aims at the basic properties of vector-valued functions and their applications to line integrals, surface integrals and volume integrals.

UNIT – I

Vector Calculus: Vector Calculus: Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties. Solenoidal and irrotational vectors – finding the Potential function. Laplacian operator. Line integral – work done – Surface integrals -Volume integral. Green's

Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

UNIT – II:

Fourier series and Fourier Transforms: Definition of periodic function. Fourier expansion of periodic functions in a given interval of length 2π . Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – III:

Interpolation and Curve fitting

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations of symbols. Difference expressions – Differences of a polynomial-Newton's formulae for interpolation - Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – IV : Numerical techniques

Solution of Algebraic and Transcendental Equations and Linear system of equations: Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Solving system of non-homogeneous equations by L-U Decomposition method (Crout's Method). Jacobi's and Gauss-Seidel iteration methods.

UNIT – V

Numerical Integration and Numerical solutions of differential equations:

Numerical integration - Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8$ Rule , Gauss-Legendre one point, two point and three point formulas.

Numerical solution of Ordinary Differential equations: Picard's Method of successive approximations. Solution by Taylor's series method – Single step methods-Euler's Method-Euler's modified method, Runge-Kutta (second and classical fourth order) Methods.

Boundary values & Eigen value problems: Shooting method, Finite difference method and solving eigen values problems, power method

TEXT BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi.
4. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, 2013, CRC Press Taylor & Francis Group.
5. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
6. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Person Education.
7. Mathematics For Engineers By K.B.Datta And M.A S.Srinivas, Cengage Publications.

Outcomes: From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, can find the most appropriate formula for a guessed relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making

- After studying this unit one will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation.
- Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series and Fourier Transform of the function.
- Helps in phase transformation, Phase change and attenuation of coefficients in acoustics.
- After studying this unit, one will be able to find a corresponding Partial

Differential Equation for an unknown function with many independent variables and to find their solution.

- Most of the problems in physical and engineering applications, problems are highly non-linear and hence expressing them as PDEs'. Hence understanding the nature of the equation and finding a suitable solution is very much essential.
- After studying this unit, one will be able to evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.
- It is an essential requirement for an engineer to understand the behavior of the physical system.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30203) ELECTRICAL AND ELECTRONICS ENGINEERING****OBJECTIVE:**

This course introduces the concepts of electrical DC and AC circuits, basic law's of electricity, instruments to measure the electrical quantities, different methods to solve the electrical networks, construction operational features of energy conversion devices i.e. DC and AC machines, transformers. It also emphasis on basics of electronics, semiconductor devices and their characteristics and operational features.

UNIT-I:

Electrical Circuits: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.

Instruments: Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

UNIT-II:

DC Machines: Principle of operation of DC Generator – EMF equation - types – DC motor types –torque equation – applications – three point starter.

UNIT-III:

Transformers: Principle of operation of single phase transformers –EMF equation – losses – efficiency and regulation.

AC Machines: Principle of operation of alternators – regulation by synchronous impedance method –Principle of operation of induction motor – slip – torque characteristics – applications.

UNIT-IV:

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode Applications, and Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).

Transistors: PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications.

UNIT-V:

Cathode Ray Oscillos Scope: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

EEE: TEXT BOOKS:

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS

Publications.

2. Basic Electrical Engineering, S.N. Singh, PHI.

EEE: REFERENCE BOOKS:

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

ECE: TEXT BOOKS:

1. Electronic Devices and Circuits, S.Salivahanan, N.Suresh Kumar, A.Vallavaraj,Tata McGraw-Hill companies..
2. Electronic Devices and Circuits, K. Lal Kishore,BS Publications.

ECE: REFERENCE BOOKS:

1. Millman's Electronic Devices and Circuits,J. Millman, C.C.Halkias, and Satyabrata Jit, Tata McGraw-Hill companies.
2. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky,PEI/PHI.
3. Introduction to Electronic Devices and Circuits, Rober T. Paynter,PE.
4. Integrated Electronics, J. Millman and Christos C. Halkias, Tata McGraw-Hill companies.
5. Electronic Devices and Circuits, Anil K. Maini, Varsha Agarwal,Wiley India Pvt. Ltd.

Outcomes:

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc...and different semiconductor devices, their voltage-current characteristics, operation of diodes, transistors, realization of various electronic circuits with the various semiconductor devices, and cathode ray oscilloscope, With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

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(A30107) STRENGTH OF MATERIALS – I**UNIT – I**

Simple Stresses and Strains : Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Elastic constants.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

Shear Force and Bending Moment : Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

SHEAR STRESSES : Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT – IV

Principal Stresses and Strains : Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

UNIT – V

Deflection of Beams : Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam –

Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load-Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

Conjugate Beam Method: Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

TEXT BOOKS:

- 1) Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.
- 2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.
- 3) Mechanics of Materials by Pytel, Cengage Learning Pvt. Ltd.

REFERENCES:

- 1) Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.
- 2) Mechanics of Structures Vol –I by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.
- 3) Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.
- 4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.
- 5) Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd
- 6) Strength of Materials and Structures by John Case *et al.*, Butterworth-Heinemann.
- 7) Strength of Materials by R.Subramanian, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30108) SURVEYING****UNIT – I**

Introduction: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications, Scales, Conventional Symbols, Signals

Distances and Direction: Distance measurement methods; use of chain, tape and Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

UNIT – II

Leveling and Contouring: Concept and Terminology, Temporary adjustments- method of leveling.

Characteristics and Uses of contours- methods of conducting contour surveys and their plotting.

UNIT – III

Computation of Areas and Volumes: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT -IV

Theodolite: Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling, Traversing.

UNIT – V

Tacheometric Surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position. **Curves:** Types of curves, design and setting out – simple and compound curves.

Introduction to Advanced Surveying : Total Station and Global positioning system, Introduction to Geographic information system (GIS).

TEXT BOOKS:

1. Chandra A M, "Plane Surveying" and "Higher Surveying" New age International Pvt. Ltd., Publishers, New Delhi, 2002
2. Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.

3. Text book of surveying by C.Venkataramaiah, Universities Press

REFERENCES:

1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press - 2012
2. Surveying Theory and Practice Seventh edition by James M. and Anderson Edward M. Mikhail TATA McGraw Hill
3. Arthur R Benton and Philip J Taety, Elements of Plane Surveying, McGraw Hill – 2000
4. "Advanced Surveying Total Station GIS and Remote Sensing by Satheesh Gopi, R. Sathi Kumar and N. Madhu.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30101) FLUID MECHANICS****UNIT I**

Introduction : Dimensions and units – Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

Hydrostatic Forces : Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT – II

Fluid Kinematics : Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT –III

Fluid Dynamics: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier – stokes equations (Explanatory) Momentum equation and its application – forces on pipe bend.

Pitot tube, Venturi meter and orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches - –Broad crested weirs.

UNIT – IV

Boundary Layer Theory : Approximate Solutions of Navier Stoke's Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers (no deviation), BL in transition, separation of BL, control of BL, flow around submerged objects- Drag and Lift- Magnus effect.

UNIT –V

Closed Conduit Flow : Reynold's experiment – Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes. Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic

gradient line. Pipe network problems, variation of friction factor with Reynold's number – Moody's Chart.

TEXT BOOKS:

1. Fluid Mechanics by Modi and Seth, Standard book house.
2. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.)
3. Mechanics of Fluids by Potter, Cengage Learning Pvt. Ltd.

REFERENCES:

1. Fluid Mechanics Basic Concepts & Principles, Shiv Kumar, Ane Books Pvt Ltd.
2. Fluid Mechanics and Machinery, CSP Ojha, Oxford Higher Education
3. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
4. Fluid Mechanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
5. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) Ltd., New Delhi.
6. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30010) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS****Objectives:**

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

Unit I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand*: Definition, Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting*, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis*: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing*: Objectives and Policies of Pricing. Methods of Pricing. *Business*: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, *New Economic Environment*: Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis:* Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha : MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

Outcomes:

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting , elasticity of demand and supply, pricing methods

and pricing in different market structures.

- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of
- Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A30185) SURVEYING LAB – I**LIST OF EXERCISES:**

1. Survey of an area by chain survey (closed traverse) & Plotting
2. Chaining across obstacles
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane Table survey
6. Two point and three point problems in plane table survey
7. Traversing by plane table survey
8. Fly leveling (differential leveling)
9. An exercise of L.S and C.S and plotting
10. Two exercises on contouring.

List of Major Equipment:

1. Chains, tapes, Ranging rods, cross staff, arrows
2. Compasses and Tripods, Optical square.
3. Plane tables, Alidade, Plumbing fork, trough compasses
4. Leveling instruments and leveling staves
5. Box sextants, planimeter.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A30183) STRENGTH OF MATERIALS LAB

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

List of Major Equipment:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauges.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem**

L	T/P/D	C
4	-/-/-	4

(A40008) PROBABILITY AND STATISTICS**Objectives: To learn**

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system, The characteristics of queue, The mean arrival and service rates
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix (transition probability matrix), Limiting probabilities, Applications of Markov chains

UNIT-I:

Single Random variables and probability distributions: Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions. and hence finding the mean and variance.

UNIT-II

Multiple Random variables, Correlation & Regression: Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation. Regression- Regression

Coefficient, The lines of regression and multiple correlation & regression.

UNIT-III:

Sampling Distributions and Testing of Hypothesis : Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.

Parameter estimations – likelihood estimate, interval estimations .

Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, Two sided test,

Large sample tests:

- (i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
- (ii) Tests of significance of difference between sample S.D and population S.D.
- (iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

Small sample tests: Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F- distribution and its properties. Test of equality of two population variances

Chi-square distribution , its properties, Chi-square test of goodness of fit

UNIT-IV

Queuing Theory: Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue .

UNIT-V

Stochastic processes: Introduction to Stochastic Processes –Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

TEXT BOOKS:

1. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna

Publishers

2. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press
3. Operations Research by S.D. Sarma,

REFERENCE BOOKS:

1. Mathematics for Engineers by K.B. Datta and M.A.S. Srinivas, Cengage Publications
2. Probability and Statistics by T.K.V. Iyengar & B. Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S C Gupta and V.K. Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay I. Devore.
5. Probability Theory & Stochastic Processes by P. Sri Hari, Hi-Tech Publishers.
6. Probability & Statistics by Ahmed Waheedullah, M. Ahmed Mohiuddin, Sultan Ali, HI-TECH Publishers

Outcomes:

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variable involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations. It is mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
- The student would be able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in n^{th} state. It is quite useful for all branches of engineering

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40114) STRENGTH OF MATERIALS – II****UNIT – I**

Torsion of Circular Shafts : Theory of pure torsion – Derivation of Torsion equations : $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – II

Columns and Struts : Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

Beams Curved in Plan: Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semi-circular beam simply-supported on three equally spaced supports.

UNIT - III

Beam Columns: Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

Direct and Bending Stresses: Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis.

UNIT – IV

Unsymmetrical Bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis -

Deflection of beams under unsymmetrical bending.

Shear Centre: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

UNIT – V

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells.

Thick Cylinders: Introduction Lamé's theory for thick cylinders – Derivation of Lamé's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

TEXT BOOKS:

- 1) Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.
- 2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.
- 3) Mechanics of Materials by Gere, Cengage Learning Pvt. Ltd.

REFERENCES:

- 1) Fundamentals of Solid Mechanics by M.L.Gambhir, PHI Learning Pvt. Ltd
- 2) Introduction to Strength of Materials by U.C.Jindal, Galgotia Publications Pvt. Ltd.
- 3) Strength of Materials by Bhattacharya, Cengage Learning
- 3) Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.
- 4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.
- 5) Strength of Materials by R.Subramanian, Oxford University Press.
- 6) Mechanics of Materials by Ferdinand P. Beer *et al.*, Tata McGraw Hill Education Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem**

L	T/P/D	C
4	-/-/-	4

(A40111) HYDRAULICS AND HYRAULIC MACHINERY**UNIT – I**

Open Channel Flow: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows.

Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT - II

Dimensional Analysis and Similitude: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

UNIT-III

Hydrodynamic Force on Jets : Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines. Layout of a typical Hydropower installation – Heads and efficiencies.

UNIT-IV

Hydraualic Turbines: Classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

UNIT – V

Centrifugal-Pumps: Pump installation details-classification-work done-Manometric head-minimum starting speed-losses and efficiencies-specific speed, multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitation.

Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS:

1. Open Channel flow by K,Subramanya . Tata Mc.Grawhill Publishers.
2. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
3. Fluid Mechanics & Fluid machines by Narayana pillai, Universities press.

REFERENCES :

1. Fluid Mechanics and Machinery, CSP OJHA, Oxford University Press
2. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.
3. Fluid mechanics and fluid machines by Rajput, S.Chand &Co.
4. Open Channel flow by V.T.Chow, Mc.Graw Hill book company.
5. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.
6. Mechanics of Fluids by Merle C. Potter, David C. Wiggert,Bassem H. Ramadan, Cengage Learning.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40009) ENVIRONMENTAL STUDIES****Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

UNIT-I :

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II:

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III:

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV:

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and

characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. **EIA:** EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

SUGGESTED TEXT BOOKS:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40115) STRUCTURAL ANALYSIS – I****UNIT – I**

Analysis Of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed frames. - Analysis of determinate pin jointed frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT – II

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem-Unit Load Method. Deflections of simple beams and pin- jointed plane trusses. Deflections of statically determinate bent frames.

Three Hinged Arches – Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Three hinged arches. Normal Thrust and radial shear in an arch. Geometrical properties of parabolic and circular arch. Three hinged circular arch at different levels. Absolute maximum bending moment diagram for a three hinged arch.

UNIT-III

Propped Cantilever and Fixed Beams: Analysis of Propped cantilever and fixed beams, including the beams with varying moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams-Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – IV

Slope-Deflection Method and Moment Distribution Method: Introduction-Continuous beams. Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed-continuous beams with overhang. Effects of sinking of supports. Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using Moment Distribution Method. Shear force and Bending moment diagrams, Elastic curve.

UNIT – V

Moving Loads and Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length. Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section - Point loads, UDL longer than the span, UDL shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

TEXT BOOKS:

- 1) Structural Analysis Vol –I & II by Vazarani and Ratwani, Khanna Publishers.
- 2) Structural Analysis Vol I & II by Pundit and Gupta., Tata McGraw Hill Publishers.

REFERENCES:

- 1) Basic Structural Analysis by K.U.Muthu *et al.*, I.K.International Publishing House Pvt.Ltd.
- 2) Structural Analysis by Hibbeler, pearson Education Ltd
- 3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
- 4) Fundamentals of structural Analysis by M.L.Gamhir, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40109) BUILDING MATERIALS, CONSTRUCTION AND PLANNING****UNIT – I**

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing Bricks – Composition of Brick earth – manufacture and structural requirements.

Wood, Aluminum, Glass and Paints: Wood - structure – types and properties – seasoning – defects; alternate materials for wood – GI / fibre – reinforced glass bricks, steel & aluminum.

UNIT-II

Cement & Admixtures : Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests Admixtures – mineral & chemical admixtures – uses.

UNIT-III

Building Components : Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ; foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

Building Services : Plumbing Services : Water Distribution, Sanitary – Lines & Fittings ; Ventilations : Functional requirements systems of ventilations. Air-conditioning - Essentials and Types ; Acoustics – characteristic – absorption – Acoustic design ; Fire protection – Fire Hazards – Classification of fire resistant materials and constructions

UNIT -IV

Masonry and Finishing's : Brick masonry – types – bonds ; Stone masonry – types ; Composite masonry – Brick-stone composite ; Concrete, Reinforced brick.

Finishers : Plastering, Pointing, Painting, Claddings – Types – Tiles - ACP

Form work : Requirements – Standards – Scaffolding – Design ; Shoring, Underpinning.

UNIT –V

Building Planning : Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.

2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi

REFERENCES:

1. Building Materials by Duggal, New Age Internations.
2. Building Construction by PC Verghese PHI.
3. Construction Technology – Vol – I & II by R. Chuddy, Longman UK.
4. Basics of Civil Engg by Subhash Chander; Jain Brothers.
5. Alternate Building materials and Technology, K.S.Jagadish, Venkatarama Reddyand others; New Age Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****- -/3/- 2****(A40186) COMPUTER AIDED DRAFTING OF BUILDINGS**

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different softwares
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
 - a) single storeyed buildings
 - b) multi storyed buildings
5. Developing sections and elevations for
 - a) single storeyed buildings
 - b) multi storyed buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD softwares
7. Exercises on development of working of buildings

TEXT BOOKS :

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A40190) SURVEYING LAB – II**LIST OF EXERCISES :**

1. Study of theodolite in detail - practice for measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and reiteration.
3. Trigonometric Leveling - Heights and distance problem (Two Exercises)
4. Heights and distance using Principles of tacheometric surveying (Two Exercises)
5. Curve setting – different methods. (Two Exercises)
6. Setting out works for buildings & pipe lines.
7. Determine of area using total station
8. Traversing using total station
9. contouring using total station
10. Determination of remote height using total station
11. State-out using total station
12. Distance, gradient, Diff, height between tow inaccessible points using total stations

LIST OF EQUIPMENT:

1. Theodolites and leveling staffs.
2. Tachometers.
3. Total station.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

L	T/P/D	C
4	-/-	4

(A50116) CONCRETE TECHNOLOGY**UNIT I**

Cement : Portland cement – chemical composition – Hydration of cement – Structure of hydrate cement – Test on physical properties – Different grades of cement.

Admixtures : Types of admixtures – mineral and chemical admixtures – properties – dosages – effects - usage.

Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregate – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand – Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded aggregate – Maximum aggregate size.

UNIT – II

Fresh Concrete: Workability – Factors affecting workability – Measurement of workability by different tests – Setting times of concrete – Effect of time and temperature on workability – Segregation & bleeding – Mixing and vibration of concrete – Steps in manufacture of concrete – Quality of mixing water.

UNIT – III

Hardened Concrete : Water / Cement ratio – Abram's Law – Gelspaoe ratio – Nature of strength of concrete – Maturity concept – Strength in tension & compression – Factors affecting strength – Relation between compression & tensile strength - Curing.

Testing of Hardened Concrete: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Pull-out test, Non-destructive testing methods – codal provisions for NDT.

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – IV

Mix Design : Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical Quality Control – Acceptance criteria – Proportioning of concrete mix by normal and pumpable concretes by –

BIS method of mix design.

UNIT – V

Special Concretes: Light weight concrete – Light weight aggregate concrete – Cellular concrete – No-fines concrete – Fibre reinforced concrete – Polymer concrete – Types of Polymer concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition.
2. Concrete Technology by M.S.Shetty. – S.Chand & Co.

REFERENCES:

1. Concrete Technology by Job Thomas, Cengage Learning.
2. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi.
3. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi.
4. Concrete: Micro structure, Properties and Materials – P.K.Mehta and J.M.Monteiro, Mc-Graw Hill Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

L	T/P/D	C
4	-/-	4

(A50121) REINFORCED CONCRETE STRUCTURES DESIGN AND DRAWING**UNIT –I**

Concepts of RC. Design – Limit State method – Material Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS – 456 – 2000 – Working Stress Method.

Beams : Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – II

Shear, Torsion and Bond : Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing Limit state design for serviceability for deflection, cracking and codal provision.

UNIT - III

Design of Two-way slabs, one way slab, continuous slab Using I S Coefficients, Cantilever slab /Canopy slab.

UNIT –IV

Short and Long columns –axial loads, uni axial and biaxial bending I S Code provisions.

UNIT – V

Design of Footings - isolated (square, rectangular) and Combined footings. Design of Stair case.

TEXT BOOKS:

1. Limit state designed of reinforced concrete – P.C.Varghese, Prentice Hall of India, New Delhi.
2. Reinforced concrete design by N. Krishna Raju and R.N. Pranesh, New age International Publishers, New Delhi
3. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
4. Fundamentals of reinforced concrete by N.C. Sinha and S.K Roy, S. Chand publishers

REFERENCES :

1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Printice Hall of India Private Ltd., New Delhi.

2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Purushotham, Tata Mc.Graw-Hill, 1994.
3. Plasticity in Reinforced Concrete by Chen – Cengage Learning Pvt. Ltd.
4. Design of concrete structures – Arthus H.Nilson, David Darwin, and Chorles W. Dolar, Tata Mc.Graw-Hill, 3rd Edition, 2005.
5. Design of Reinforced Concrete Foundations – P.C. Varghese Prentice Hall of India, New Delhi.
6. Reinforced concrete structures, Vol.1, by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi
7. Reinforced concrete structures – I.C. Syal & A.K.Goel, S.Chand Publishers.
8. Limit State Design by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50118) ENGINEERING GEOLOGY****UNIT – I**

Introduction: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology, Petrology and Structural geology.

Weathering of Rocks: Its effect over the properties of rocks importance of weathering with reference to dams, reservoirs and tunnels weathering of common rock like “Granite”

UNIT – II

Mineralogy : Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economic minerals such as Pyrite, Hematite, Magnetite, Chalcite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite. **Petrology :** Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

UNIT – III

Structural Geology : Indian stratigraphy, paleontology and geological time scale, Outcrop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types. Ground water: Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, land slides hazards, water in land slides their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, Earthquake and landslides.

UNIT – IV

Geology of Dams and Reservoirs : Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs, Geo hazards, ground subsidence. Geophysical studies: Importance of Geophysical studies Principles of geophysical study by Gravity methods. Magnetic methods, Electrical methods. Seismic methods, Radio metric methods and Geothermal method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT – V

Tunnels: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels, Tunnels in rock, subsidence over old mines , minining substances

TEXT BOOKS:

- 1) Engineering Geology by N.Chennkesavulu, Mac-Millan, Publishers 2nd Edition India Ltd. 2010.
- 2) Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications
- 3) Engineering Geology by Subinoy Gangopadhyay, Oxford University press.

REFERENCES:

1. Engineering Geology for Civil Engineering, P.C. Varghese, PHI Learning& private Limited.
2. Geology basics of Engineering by Aurele Parriaux, CRC press
3. Krynine & Judd, principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution.
4. F.G. Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

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(A50120) GEOTECHNICAL ENGINEERING**UNIT – I**

Introduction: Soil formation – clay mineralogy and soil structure and clay mineralogy – moisture content – weight- volume relationship – Relative density.

Index Properties of Soils: Grain size analysis – Sieve analysis, principle of Hydrometer method – consistency limits and indices – I.S. Classification of soils.

UNIT –II

Permeability: Soil water – capillary rise – flow of water through soils – Darcy's law- permeability – Factors affecting permeability – laboratory determination of coefficient of permeability –Permeability of layered soils – In-situ permeability tests (Pumping in & Pumping out test).

Effective Stress & Seepage Through Soils: Total, neutral and effective stress – principle of effective stress - quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT –III

Stress Distribution in Soils: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

Compaction: Mechanism of compaction – factors affecting compaction – effects of compaction on soil properties – Field compaction Equipment – compaction quality control.

UNIT – IV

Consolidation: Types of compressibility – Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves – normally consolidated soil, over consolidated soil and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory – coefficient of consolidation: square root time and logarithm of time fitting methods - computation of total settlement and time rate of settlement.

UNIT - V

Shear Strength of Soils: Importance of shear strength – Mohr's– Coulomb Failure theories – Types of laboratory tests for strength parameters – strength tests based on drainage conditions – strength envelopes – Shear strength of

sands - dilatancy – critical void ratio – Liquefaction- shear strength of clays.

TEXT BOOKS:

1. Principals of Geotechnical Engineering by Braja M.Das, Cengage Learning Publishers.
2. Soil Mechanics and Foundation Engineering by VNS Murthy, CBS Publishers and Distributors.
3. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt . Ltd, New Delhi.

REFERENCES:

1. Geotechnical Engineering by C. Venkataramiah, New age International Pvt . Ltd, (2002).
2. Geotechnical Engineering Handbook By Das – JRoss Publishing.
3. Geotechnical Engineering Principles and Practices by Cuduto, PHI International.
4. Geotechnical Engineering by Manoj Dutta & Gulati S.K – Tata Mc.Grawhill Publishers New Delhi.
5. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
6. Soil Mechanics and Foundation by by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50122) WATER RESOURCES ENGINEERING-I****UNIT I**

Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data - Adjustment of record -Rainfall Double Mass Curve. Runoff- Factors affecting Runoff – Runoff over a Catchment- Empirical and Rational Formulae.

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices.

UNIT II

Distribution of Runoff – Hydrograph Analysis Flood Hydrograph – Effective Rainfall – Base Flow- Base Flow Separation - Direct Runoff Hydrograph - Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph, Synthetic Unit Hydrograph.

UNIT-III

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of wells,- Well Construction – Well Development.

UNIT-IV

Necessity and Importance of Irrigation, advantages and ill effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility –Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies-Water Logging.

UNIT-V

Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining.

Design Discharge over a catchment, Computation of design discharge-

rational formula, SCS curve number method, flood frequency analysis-Introductory Part only. Stream Gauging – measurement and estimation of stream flow.

TEXT BOOKS:

1. Engineering Hydrology by Jayaram Reddy, Laxmi publications pvt. Ltd., New Delhi.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi.

REFERENCES:

1. Elementary hydrology by V.P.Singh, PHI publications.
2. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
3. Water Resources Engineering – I by Dr. G.Venkata Ramana, Academic Publishing Company.
4. Irrigation Water Management by D.K. Majundar, Printice Hall of India.
5. Irrigation and Hydraulic structures by S.K.Grag.
6. Applied hydrology by Ven Te Chow, David R. Maidment larry W. Mays Tata Mc. Graw Hill.
7. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50117) DISASTER MANAGEMENT****(Open Elective)****Unit-I**

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit –II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards –

Unit –III

Endogenous Hazards - Volcanic Eruption – Earthquakes – Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India - - Human adjustment, perception & mitigation of earthquake.

Unit –IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters.

Infrequent events: Cyclones – Lightning – Hailstorms.

Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes , distribution human adjustment, perception & mitigation) Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation) Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Planetary Hazards/ Disasters- Man induced Hazards / Disasters- Physical hazards/ Disasters-Soil Erosion.

Soil Erosion:— Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion.

Chemical hazards/ disasters:— Release of toxic chemicals, nuclear explosion- Sedimentation processes Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation Biological hazards/ disasters:- Population Explosion.

Unit –V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

TEXT BOOKS:

1. Disaster Mitigation: Experiences And Reflections by Pardeep Sahni.
2. Natural Hazards & Disasters by Donald Hyndman & David Hyndman – Cengage Learning.

REFERENCES

1. R.B.Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990.
2. Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997.
3. Kates, B.I & White, G.F The Environment as Hazards, oxford, New York, 1978.
4. R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000.
5. H.K. Gupta (Ed) Disaster Management, Universiters Press, India, 2003.
6. R.B. Singh, Space Technology for Disaster Mitigation in India (INCED), University of Tokyo, 1994.
7. Dr. Satender , Disaster Management t in Hills, Concept Publishing Co., New Delhi, 2003.
8. A.S. Arya Action Plan For Earthquake, Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994.
9. R.K. Bhandani An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi .
10. M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50017) INTELLECTUAL PROPERTY RIGHTS****(Open Elective)****UNIT – I**

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT – II

Trade Marks : Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT – III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

UNIT – IV

Trade Secrets : Trade secrete law, determination of trade secrete status, liability for misappropriations of trade secrets, protection for submission, trade secrete litigation.

Unfair competition : Misappropriation right of publicity, False advertising.

UNIT – V

New development of intellectual property: new developments in trade mark law ; copy right law, patent law, intellectual property audits.

International overview on intellectual property, international – trade mark law, copy right law, international patent law, international development in trade secrets law.

TEXT BOOKS & REFERENCES:

1. Intellectual property right, Deborah. E. Bouchoux, cengage learning.
2. Intellectual property right – Unleashing the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A50018) HUMAN VALUES AND PROFESSIONAL ETHICS****(Open Elective)****Objectives :** This introductory course input is intended

- To help the students appreciate the essential complementarity between 'VALUES' and 'SKILLS' to ensure sustained happiness and prosperity which are the core aspirations of all human beings.
- To facilitate the development of a Holistic perspective among students towards life, profession and happiness, based on a correct understanding of the Human reality and the rest of Existence. Such a holistic perspective forms the basis of Value based living in a natural way.
- To highlight plausible implications of such a Holistic understanding in terms of ethical human conduct, trustful and mutually satisfying human behavior and mutually enriching interaction with Nature.

Unit I:

Course Introduction - Need, Basic Guidelines, Content and Process for Value Education: Understanding the need, basic guidelines, content and process for Value Education. Self Exploration-what is it? - its content and process; 'Natural Acceptance' and Experiential Validation- as the mechanism for self exploration. Continuous Happiness and Prosperity- A look at basic Human Aspirations. Right understanding, Relationship and Physical Facilities- the basic requirements for fulfillment of aspirations of every human being with their correct priority. Understanding Happiness and Prosperity correctly- A critical appraisal of the current scenario. Method to fulfill the above human aspirations: understanding and living in harmony at various levels.

Unit II:

Understanding Harmony in the Human Being - Harmony in Myself! : Understanding human being as a co-existence of the sentient 'I' and the material 'Body'. Understanding the needs of Self ('I') and 'Body' - Sukh and Suvidha. Understanding the Body as an instrument of 'I' (I being the doer, seer and enjoyer). Understanding the characteristics and activities of 'I' and harmony in 'I'. Understanding the harmony of I with the Body: Sanyam and Swasthya; correct appraisal of Physical needs, meaning of Prosperity in detail. Programs to ensure Sanyam and Swasthya.

Unit III:

Understanding Harmony in the Family and Society- Harmony in Human -

Human Relationship : Understanding harmony in the Family- the basic unit of human interaction. Understanding values in human-human relationship; meaning of Nyaya and program for its fulfillment to ensure Ubhay-tripti; **Trust (Vishwas) and Respect (Samman) as the foundational values of relationship.** Understanding the meaning of Vishwas; Difference between intention and competence. Understanding the meaning of Samman, Difference between respect and differentiation; the other salient values in relationship. Understanding the harmony in the society (society being an extension of family): Samadhan, Samridhi, Abhay, Sah-astitva as comprehensive Human Goals. Visualizing a universal harmonious order in society- Undivided Society (Akhand Samaj), Universal Order (Sarvabhaum Vyawastha)- from family to world family!

Unit IV:

Understanding Harmony in the Nature and Existence - Whole existence as Co-existence : Understanding the harmony in the Nature. Interconnectedness and mutual fulfillment among the four orders of nature- recyclability and self-regulation in nature. Understanding Existence as Co-existence (Sah-astitva) of mutually interacting units in all-pervasive space. Holistic perception of harmony at all levels of existence.

Unit V:

Implications of the above Holistic Understanding of Harmony on Professional Ethics : Natural acceptance of human values. Definitiveness of Ethical Human Conduct. Basis for Humanistic Education, Humanistic Constitution and Humanistic Universal Order. Competence in professional ethics:

- a) Ability to utilize the professional competence for augmenting universal human order,
- b) Ability to identify the scope and characteristics of people-friendly and eco-friendly production systems,
- c) Ability to identify and develop appropriate technologies and management patterns for above production systems.

Case studies of typical holistic technologies, management models and production systems. Strategy for transition from the present state to Universal Human Order:

- a) At the level of individual: as socially and ecologically responsible engineers, technologists and managers
- b) At the level of society: as mutually enriching institutions and organizations

TEXT BOOKS:

1. R R Gaur, R Sangal, G P Bagaria, 2009, A Foundation Course in Human Values and Professional Ethics.

2. Prof. KV Subba Raju, 2013, Success Secrets for Engineering Students, Smart Student Publications, 3rd Edition.

REFERENCE BOOKS

1. Ivan Illich, 1974, Energy & Equity, The Trinity Press, Worcester, and HarperCollins, USA.
2. E.F. Schumacher, 1973, Small is Beautiful: a study of economics as if people mattered, Blond & Briggs, Britain.
3. A Nagraj, 1998, Jeevan Vidya ek Parichay, Divya Path Sansthan, Amarkantak.
4. Susan George, 1976, How the Other Half Dies, Penguin Press. Reprinted 1986, 1991.
5. PL Dhar, RR Gaur, 1990, Science and Humanism, Commonwealth Publishers.
6. A.N. Tripathy, 2003, Human Values, New Age International Publishers.
7. Subhas Palekar, 2000, How to practice Natural Farming, Pracheen(Vaidik) Krishi Tantra Shodh, Amravati.
8. Donella H. Meadows, Dennis L. Meadows, Jorgen Randers, William W. Behrens III, 1972, Limits to Growth – Club of Rome's report, Universe Books.
9. E G Seebauer & Robert L. Berry, 2000, Fundamentals of Ethics for Scientists & Engineers, Oxford University Press.
10. M Govindrajran, S Natrajan & V.S. Senthil Kumar, Engineering Ethichs (including Human Values), Eastern Economy Edition, Prentice Hall of India Ltd.

Relevant CDs, Movies, Documentaries & Other Literature:

1. Value Education website, <http://www.uptu.ac.in>
2. Story of Stuff, <http://www.storyofstuff.com>
3. Al Gore, An Inconvenient Truth, Paramount Classics, USA
4. Charlie Chaplin, Modern Times, United Artists, USA
5. IIT Delhi, Modern Technology – the Untold Story

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

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(A50181) FLUID MECHANICS & HYDRAULIC MACHINERY LAB

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of friction factor of a pipe.
5. Determination of Coefficient for minor losses.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Performance characteristics of a single stage/ multi-stage centrifugal pump.
12. Performance characteristics of a reciprocating pump.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-I Sem**

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(A50191) ENGINEERING GEOLOGY LAB

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic and microscopic description and identification of rocks referred under theory.
3. Megascopic and microscopic identification of rocks & minerals.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****3 -/-2 4****(A60130) STEEL STRUCTURES DESIGN AND DRAWING****UNIT – I**

Materials – Making of iron and steel – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads–and combinations loading wind loads on roof trusses, behavior of steel, local buckling. Concept of limit State Design – Different Limit States as per IS 800 -2007 – Design Strengths- deflection limits – serviceability - Bolted connections – Welded connections – Design Strength – Efficiency of joint – Prying action Types of Welded joints - Design of Tension members – Design Strength of members.

UNIT – II

Design of compression members – Buckling class – slenderness ratio / strength design – laced – battened columns –column splice – column base – slab base.

UNIT – III

Design of Beams – Plastic moment – Bending and shear strength laterally / supported beams design – Built up sections – large plates Web buckling Crippling and Deflection of beams, Design of Purlin.

UNIT – IV

Design of eccentric connections with brackets, Beam end connections – Web angle – Un-stiffened and stiffened seated connections (bolted and Welded types) Design of truss joints

UNIT – V

Design of welded plate girders – optimum depth Design of main section – Design of end bearing stiffness and intermediate stiffness

Connection between web and flange and Design of flange splice and web splices.

TEXT BOOKS :

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010.

REFERENCE BOOKS :

1. Design of Steel structures by K.S. Sai Ram, Person Education.

2. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt. Ltd.
3. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Standard Publications.
4. Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House, New Delhi, 2010.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60119) ENVIRONMENTAL ENGINEERING****UNIT – I**

Introduction: Water supply schemes – Protected water supply – Population forecasts, design period – water demand – Types of demand – factors affecting – fluctuations – fire demand – Sources of Water– intakes – infiltration galleries, confined and unconfined aquifers – water quality parameters and testing – drinking water standards.

UNIT II

Layout and general outline of water treatment units – sedimentation, uniform settling velocity– principles – design factors – surface loading – Jar test – optimum dosage of coagulant - coagulation-flocculation, clarifier design – coagulants – feeding arrangements. Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – types of disinfection - theory of chlorination - chlorine demand - other disinfection treatment methods. Distribution systems – Types of layouts of Distribution systems – design of distribution systems - Hardy Cross and equivalent pipe methods - service reservoirs – Determination of Storage capacity.

UNIT - III

Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage –examination of sewage – B.O.D. – C.O.D. equations. Design of sewers – shapes and materials – sewer appurtenances manholes – inverted siphon – catch basins – flushing tanks – ejectors, pumps and pump houses – house drainage – components requirements – sanitary fittings-traps – one pipe and two pipe systems of plumbing.

UNIT – IV

Layout and general out line of various units in a waste water treatment plant – primary treatment design of screens – grit chambers – skimming tanks – sedimentation tanks – principles and design of biological treatment – trickling filters – standard and high rate- Filters – ASP – ASP modification – Aeration.

UNIT - V

Construction and design of oxidation ponds – Oxidation ditches – Sludge Treatment - Sludge digestion tanks –design of Digestion tank –Factors affecting sludge digestion - Sludge disposal by drying – septic tanks - working principles and design – soak pits. Ultimate disposal of waste water – self purification of rivers – Sewage farming..

TEXT BOOKS:

1. Water Supply & Sanitary Engineering by G.S.Bindie.
2. Water Supply Engineering, Vol. 1, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi.
3. Water Supply Engineering Vol.1 & Waste water Engineering Vol. II, P.N. Modi, Standard Book Publishers, Newdelhi.

REFERENCES :

1. Water and Waste Water Technology by Mark J Hammar and Mark J. Hammar Jr.
2. Water and Waste Water Technology by Steel.
3. Water and Waste Water Engineering by Fair Geyer and Okun.
4. Waste water treatment- concepts and design approach by G.L. Karia and R.A. Christian, PHI.
5. Waste water Engineering by Metcalf and Eddy.
6. Theory & Practice of Water & Wastewater Treatment by Ronald L Droste, Wiley India Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60132) TRANSPORTATION ENGINEERING – I****UNIT I**

Highway Development and Planning: Highway Development in India – Necessity for Highway Planning- Different Road Development Plans; Classification of Roads - Road Network Patterns – Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports – Highway Project.

UNIT – II

Highway Geometric Design: Importance of Geometric Design - Design controls and Criteria - Highway Cross Section Elements - Sight Distance Elements- Stopping Sight Distance, Overtaking Sight Distance and Intermediate Sight Distance - Design of Horizontal Alignment - Design of Super elevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT – III

Traffic Engineering & Regulations: Basic Parameters of Traffic-Volume, Speed and Density - Traffic Volume Studies - Data Collection and Presentation - Speed studies - Data Collection and Presentation - Origin & Destination studies, Parking Studies – Onstreet & Off street Parking - Road Accidents - Causes and Preventive Measures - Accident Data Recording – Condition Diagram and Collision Diagrams - Traffic Signs – Types and Specifications – Road Markings - Need for Road Markings-Types of Road Markings - Design of Traffic Signals – Webster Method.

UNIT – IV

Intersection Design: Types of Intersections – Conflicts at Intersections – Requirements of At-Grade Intersections - Types of At-Grade Intersections: Channelized and Unchannelized Intersections – Traffic Islands - Types of Grade Separated Intersections - Rotary Intersection – Concept of Rotary – Design Factors of Rotary – Advantages and Limitations of Rotary Intersections.

Unit - V

Highway Material, Construction and Maintenance: Highway Material Characterization: Subgrade Soil, Stone Aggregates, Bitumen Materials, Construction of Gravel Roads - Construction of Water Bound Macadam Roads - Construction of Bituminous Pavements: Surface Dressing, Bitumen Bound Macadam, Bituminous Concrete - Construction of Cement Concrete Pavements - Construction of Joints in Cement Concrete Pavements - Joint

Filler and Seal - Pavement Failures – Maintenance of Highways – Highway Drainage.

TEXT BOOKS:

1. Highway Engineering – S.K.Khanna & C.E.G.Justo, Nemchand & Bros., 7th edition (2000).
2. Traffic Engineering & Transportation Planning – Dr.L.R.Kadyali, Khanna Publications – 6th Edition – 1997.

REFERENCES:

1. Principles of Traffic and Highway Engineering – Garber & Hoel, Cengage Learning.
2. Principles and Practices of Highway Engineering – Dr.L.R.Kadiyali and Dr.N.BLal - Khanna Publications.
3. Highway Engineering – S.P.Bindra , Dhanpat Rai & Sons. – 4th Edition (1981).

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60126) FOUNDATION ENGINEERING****UNIT – I**

Soil Exploration: Need – Methods of soil exploration – Boring and Sampling methods – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT – II

Slope Stability: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT – III

Earth Pressure Theories: Rankine's theory of earth pressure – earth pressures different soils and layered soils – Coulomb's earth pressure theory – Culmann's graphical method.

RETAINING WALLS: Types of retaining walls – stability of retaining walls against overturning, sliding, bearing capacity and drainage from backfill

UNIT – IV

Shallow Foundations - Strength Criteria - Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

Shallow Foundations - Settlement Criteria - Safe bearing pressure based on N- value – allowable bearing pressure; safe bearing capacity - allowable settlements of structures.

Pile Foundation: Types of piles – Load carrying capacity of piles based on static pile formulae in different soils- Dynamic pile formulae – Pile load tests - Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

UNIT - V

Well Foundations: Types – Different shapes of wells – Components of wells – Sinking of wells – Tilts and shifts.

TEXT BOOKS:

1. Das, B.M., - (2012) Principles of Foundation Engineering –Cengage Learning
2. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt. Ltd, (2004).

3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group.

REFERENCES:

1. Analysis and Design of Substructures – Swami Saran, Oxford and IBH Publishing company Pvt Ltd 1998.
2. Geotechnical Engineering by S. K.Gulhati & Manoj Datta – Tata Mc.Graw Hill Publishing company New Delhi. 2005.
3. Teng,W.C – Foundation Design , Prentice Hall, New Jersey.
4. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill Publishing company, Newyork.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60131) STRUCTURAL ANALYSIS - II****UNIT – I**

Moment Distribution Method - Analysis of Single Bay Single Storey Portal Frames including side Sway. Analysis of inclined frames.

Kani's Method: Analysis of continuous beams including settlement of supports. Analysis of single bay single storey and single bay two Storey Frames by Kani's Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

UNIT – II

Slope Deflection Method: Analysis of Single Bay – single storey Portal Frames by Slope Deflection Method Including Side Sway. Shear force and bending moment diagrams. Elastic curve.

Two Hinged Arches: Introduction – Classification of Two hinged Arches – Analysis of two hinged parabolic arches – Secondary stresses in two hinged arches due to temperature and elastic shortening of rib.

UNIT – III

Approximate Methods of Analysis: Introduction – Analysis of multi-storey frames for lateral loads: Portal Method, Cantilever method and Factor method. Analysis of multi-storey frames for gravity (vertical) loads. Substitute Frame method. Analysis of Mill bents.

UNIT – IV

Matrix Methods of Analysis: Introduction – Static and Kinematic Indeterminacy - Analysis of continuous beams including settlement of supports, using stiffness method. Analysis of pin-jointed determinate plane frames using stiffness method- Analysis of single bay single storey frames including side sway, using stiffness method. Analysis of continuous beams upto three degree of indeterminacy using flexibility method. Shear force and bending moment diagrams. Elastic curve.

UNIT- V

Influence Lines for Indeterminate Beams: Introduction – ILD for two span continuous beam with constant and variable moments of inertia. ILD for propped cantilever beams.

Indeterminate Trusses: Determination of static and kinematic indeterminacies – Analysis of trusses having single and two degrees of internal and external indeterminacies –Castigliano's second theorem.

TEXT BOOKS:

- 1) Structural Analysis Vol –I &II by Vazarani and Ratwani, Khanna Publishers.
- 2) Structural Analysis Vol I & II by Pundit and Gupta., Tata McGraw Hill Publishers.
- 3) Structural Analysis SI edition by Aslam Kassimali, Cengage Learning.

REFERENCES:

- 1) Matrix Analysis of Structures by Singh, Cengage Learning Pvt. Ltd.
- 2) Structural Analysis by Hibbeler.
- 3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
- 4) Matrix Analysis of Structures by Pundit and Gupta., Tata McGraw Hill Publishers.
- 5) Advanced Structural Analysis by A.K.Jain, Nem Chand Bros.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60123) ELEMENTS OF EARTHQUAKE ENGINEERING****(Elective-I)****UNIT I**

Engineering Seismology: Earthquake phenomenon cause of earthquakes- Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes- Magnitude/Intensity of an earthquake-scales-Energy released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground motions- Seismic zones of India.

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom- Continuous system-Lumped mass idealization-Oscillatory motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system-undamped and damped-critical damping-Logarithmic decrement-Forced vibrations-Harmonic excitation-Dynamic magnification factor-Excitation by rigid based translation for SDOF system-Earthquake ground motion.

UNIT II

Conceptual design: Introduction-Functional planning-Continuous load path- Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members-Twisting of buildings-Ductility-definition-ductility relationships-flexible buildings-framing systems-choice of construction materials-unconfined concrete-confined concrete-masonry-reinforcing steel.

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT III

Reinforced Concrete Buildings: Principles of earthquake resistant design of RC members- Structural models for frame buildings- Seismic methods of analysis- Seismic design methods- IS code based methods for seismic design- Seismic evaluation and retrofitting- Vertical irregularities- Plan configuration problems- Lateral load resisting systems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral distribution of base shear.

UNIT IV

Masonry Buildings: Introduction- Elastic properties of masonry assemblage- Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of infill

walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT V

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls- sectional shapes- variations in elevation- cantilever walls without openings – Failure mechanism of non-structures- Effects of non-structural elements on structural system- Analysis of non-structural elements- Prevention of non-structural damage- Isolation of non-structures. Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction- Impact of Ductility- Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behaviour of beams, columns and joints in RC buildings during earthquakes- Vulnerability of open ground storey and short columns during earthquakes

TEXT BOOKS:

1. Earthquake Resistant Design of structures – S. K. Duggal, Oxford University Press.
2. Earthquake Resistant Design of structures – Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCES:

1. Seismic Design of Reinforced Concrete and Masonry Building – T. Paulay and M.J.N. Priestly, John Wiley & Sons.
2. Earthquake Resistant Design of Building structures by Vinod Hosur, Wiley India Pvt. Ltd.
3. Elements of Mechanical Vibration by R.N.Iyengar, I.K.International Publishing House Pvt. Ltd.
4. Masonry and Timber structures including earthquake Resistant Design –Anand S.Arya, Nem chand & Bros.
5. Earthquake Tips – Learning Earthquake Design and Construction C.V.R. Murthy.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60127) GROUND IMPROVEMENT TECHNIQUES****(Elective-I)****UNIT – I**

Introduction to Ground Modification: Need and objectives, Identification of soil types, In situ and laboratory tests to characterise problematic soils; Mechanical, Hydraulic, Physico-chemical, Electrical, Thermal methods, and their applications.

UNIT – II

Mechanical Modification – Deep Compaction Techniques- Blasting Vibrocompaction, Dynamic Tamping and Compaction piles.

UNIT – III

Hydraulic Modification – Objectives and techniques, traditional dewatering methods and their choice, Design of dewatering system, Electro-osmosis, Electro-kinetic dewatering. Filtration, Drainage and Seepage control with Geosynthetics, Preloading and vertical drains,

UNIT – IV

Physical and Chemical Modification – Modification by admixtures, Shotcreting and Guniting Technology, Modification at depth by grouting, Crack Grouting and compaction grouting, Jet grouting, Thermal Modification, Ground freezing.

UNIT – V

Modification by Inclusions and Confinement - Soil reinforcement, reinforcement with strip, and grid reinforced soil. In-situ ground reinforcement, ground anchors, rock bolting and soil nailing.

TEXT BOOKS

1. Hausmann, M. R. (1990) – Engineering Principles of Ground Modifications, McGraw Hill publications.

REFERENCES:

1. Koerner, R. M (1994) – Designing with Geosynthetics – Prentice Hall, New Jersey.
2. Jones C. J. F. P. (1985) – Earth Reinforcement and soil structures – Butterworths, London.
3. Xianthakos, Abreimson and Bruce - Ground Control and Improvement
4. Mosley – Ground Improvement.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60128) GROUND WATER HYDROLOGY****(Elective-I)****UNIT – I**

Ground Water Occurrence and Movement: Ground water hydrologic cycle, origin of ground Water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention. Permeability, Darcy's law, storage coefficient, Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinates system, ground water flow contours their applications.

UNIT – II

Analysis of Pumping Test data-I: Steady flow ground water flow towards a well in confined and unconfined aquifers-Dupit's and Theism's equations, Assumptions, Formation constants, yield of an open well interface and well tests. Unsteady flow towards a well – Non equilibrium equations-Theism solution-Jacob and Chow's simplifications, Leak aquifers.

UNIT – III

Surface and Subsurface Investigation: Surface methods of exploration-Electrical resistivity and Seismic refraction methods. Subsurface methods-geophysical logging and resistivity logging. Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT – IV

Artificial Recharge of Ground Water: Concept of artificial recharge-recharge methods, relative merits. Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – V

Saline Water Intrusion In aquifers: Occurrence of saline water intrusions, Ghyben-Herzberg relation, Shape of interface, control of seawater intrusion.

TEXT BOOKS:

1. Ground Water Hydrology by H. M. Raghunath, Wiley Eastern Ltd.
2. Introduction to Hydraulics & Hydrology: With Applications for Stormwater Management, 4th Edition, Cengage Learning.

REFERENCES:

1. Ground water Hydrology by David Keith Todd, John Wiley & sons. New York.
2. Ground water by Bawver, John Wiley & sons.
3. Hydrology by Subramanya K.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60124) ENVIRONMENTAL IMPACT ASSESSMENT****(Elective-I)****UNIT I**

Definition of EIA, Types of EIA, Various types of Environmental Impacts: Direct Impacts, Indirect Impacts, Cumulative Impacts, Induced Impacts, EIA Principles, Process, Benefits and Flaws, Environmental Impact Statement, Objectives of EIA, Environmental Sustainability, Identification of Potential Impacts, Affected Environment, Impact prediction, Impact Assessment, Impact Mitigation, Selecting the Proposed Action, Environmental Monitoring, Public consultation.

UNIT II

Creation of EIA Data Base, Compilation, Environmental Inventory: Baseline Data Generation, Environmental Monitoring Networking Design (EMND), Monitoring Stations, Data Products and Sources, Impact Identification (II) Methodologies, Interaction-Matrix Methods, Use of the Leopold Matrix, Checklist Methodologies: Simple Checklists, Descriptive Checklists, Uses of Checklists, Network Methodologies.

UNIT III

Meteorological Data, Ambient Air Quality Monitoring, Air Quality Standards and Regulations, Impact Prediction, Impact Prediction Approach, Utilization of Dispersion Models, Impact Prediction Tools, Impact Assessment (IA): Significance and Assessment of the Impacts, Impact Mitigation Measures, **Impacts on Water Environment** - Sources of Pollution, Major Pollutants- Water Quality parameters, Surface Water Contaminants and their Impacts, Existing Groundwater Quality Environment – Standards – Prediction and Assessment of Impacts – Mitigation measures.

UNIT IV

Soil Pollution, Causes, Soil erosion, Desertification, Salinisation, Acidification, Land Filling of Waste, Impacts on Soils, Conceptual Approach: Identification, prediction and assessment of Soil Quantity-Quality Impacts, Description of Existing Resources, Identification and Incorporation of Mitigation Measures, Impacts on Noise Environment: Basics of Noise Pollution, Noise Exposure Forecast (NEF), Standards and Guidelines, Impact Prediction, Assessment of Impact Significance, Identification and Incorporation of Mitigation Measures.

UNIT V

Status of Wetlands, Threats to Wetlands, Ecology Impact Assessment System: **Importance of Biological Impact Assessment**, Identification, Prediction and Assessment and Significance of Biological Impacts, Mitigation Measures, Conservation of Flora & Fauna, **Impacts on Socio Economic and Other Environment**: Components, Considerations, Human Environment: Socio Economic Factors - Advantages of Impact Assessment – Assessment of Impact on Historical Structures – Mitigation Measures.

TEXT BOOKS:

1. Environmental Impact Assessment, Canter, L.W., 1977, McGraw Hills, New York.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers.

REFERENCES:

1. Technological guidance manuals of EIA. MoEF, Gol.
2. Environmental Impact Assessment, 2003, Y. Anjaneyulu, B.S Publications.
3. Environmental Impact Assessment Principles and applications, Erickson, P.A.
4. Environmental Impact Assessment: Theory and Practice, Dr.M.Anji Reddy, BS Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A60129) PRINCIPLES OF ENTREPRENEURSHIP****(Elective -I)****Unit I:**

Introduction to Entrepreneurship: Definition of Entrepreneur Entrepreneurial Traits. Entrepreneur vs. Manager, Creating and Starting the venture: Sources of new ideas, methods of generating ideas, creative problem solving - Writing Business Plan, Evaluating Business Plans. Launching formalities.

Unit II:

Financing and Managing the new venture: Sources of capital, Record keeping, recruitment, motivating and leading teams, financial controls. Marketing and sales controls. E-commerce and entrepreneurship, Internet advertising- New venture Expansion Strategies and Issues.

Unit III:

Institutional/financial support: Schemes and functions of Directorate of Industries, District Industries Centres (DICs), Industrial Development Corporation (IDC), State Financial Corporation (SFCs), Small Scale Industries Development Corporations (SSIDCs), Khadi and Village Industries Commission (KVIC), Technical Consultancy Organisation (TCO), Small Industries Service Institute (SISI), National Small Industries Corporation (NSIC), Small Industries Development Bank of India (SIDBI).

Unit IV:

Production and Marketing Management: Thrust areas of production management, Selection of production Techniques, Plant utilization and maintenance, Designing the work place, Inventory control , material handling and quality control. Marketing functions, market segmentation, market research and channels of distribution, Sales promotion and product pricing.

Unit V :

Labour legislation, Salient Provisions of Health, Safety, and Welfare under Indian Factories Act, Industrial Disputes Act, Employees State Insurance Act, Workmen's Compensation Act and Payment of Bonus Act.

TEXT BOOKS:

1. Robert Hisrich, & Michael Peters: Entrepreneurship, TMH,2009.
2. Dollinger: Entrepreneurship, Pearson,2009.

REFERENCE BOOKS:

1. Vasant Desai, Dynamics of Entrepreneurial Development and

- Management, Himalaya Publishing House, 2009.
2. Harvard Business Review on Entrepreneurship, HBR Paper Back.
3. Robert J. Calvin: Entrepreneurial Management, TMH, 2009.
4. Gurmeet Naroola: The entrepreneurial Connection, TMH, 2009.
5. Bolton & Thompson: Entrepreneurs—Talent, Temperament and Techniques, Butterworth Heinemann, 2009.
6. Agarwal: Indian Economy, Wishwa Prakashan 2009.
7. Dutt & Sundaram: Indian Economy, S. Chand, 2009
8. B D Singh, :Industrial Relations & Labour Laws, Excel, 2009.
9. Aruna Kaulgud: Entrepreneurship Management by, Vikas publishing house, 2009.
10. Essential of entrepreneurship and small business management by Thomas W. Zimmerer & Norman M. Searborough, PHI-2009.
11. ND Kapoor: Industrial Law, Sultan Chand & Sons, 2009.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem**

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(A60194) GEOTECHNICAL ENGINEERING LAB**LIST OF EXPERIMENTS**

1. Atterberg's Limits (LL & PL)
2. Field density-core cutter and sand replacement method
3. Grain size analysis
4. Permeability of soil, constant and variable head test
5. Compaction test
6. CBR Test
7. Consolidation test
8. Unconfined compression test
9. Tri-axial Compression test
10. Direct shear test.
11. Vane shear test

Note: Any eight experiments may be completed.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**III Year B.Tech. CE-II Sem****L T/P/D C****- -/3/- 2****(A60086) ADVANCED COMMUNICATION SKILLS (ACS) LAB****Introduction**

The introduction of the Advanced Communication Skills Lab is considered essential at 3rd year level. At this stage, the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be a laboratory course to enable students to use 'good' English and perform the following:

Gathering ideas and information to organise ideas relevantly and coherently.

Engaging in debates.

Participating in group discussions.

- Facing interviews.
- Writing project/research reports/technical reports.
- Making oral presentations.
- Writing formal letters.
- Transferring information from non-verbal to verbal texts and vice-versa.
- Taking part in social and professional communication.

Objectives:

This Lab focuses on using multi-media instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.
- To prepare all the students for their placements.

Syllabus:

The following course content to conduct the activities is prescribed for the Advanced Communication Skills (ACS) Lab:

1. **Activities on Fundamentals of Inter-personal Communication and Building Vocabulary** - Starting a conversation – responding

appropriately and relevantly – using the right body language – Role Play in different situations & Discourse Skills- using visuals - Synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, business vocabulary, analogy, idioms and phrases, collocations & usage of vocabulary.

2. **Activities on Reading Comprehension** –General Vs Local comprehension, reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading & effective googling.
3. **Activities on Writing Skills** – Structure and presentation of different types of writing – *letter writing/Resume writing/ e-correspondence/ Technical report writing/ Portfolio writing* – planning for writing – improving one's writing.
4. **Activities on Presentation Skills** – Oral presentations (individual and group) through JAM sessions/seminars/**PPTs** and written presentations through posters/projects/reports/ e-mails/assignments etc.
5. **Activities on Group Discussion and Interview Skills** – Dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and organization of ideas and rubrics for evaluation- Concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele-conference & video-conference and Mock Interviews.

Minimum Requirement:

The Advanced Communication Skills (ACS) Laboratory shall have the following infra-structural facilities to accommodate at least 35 students in the lab:

- **Spacious room with appropriate acoustics.**
- **Round Tables with movable chairs**
- **Audio-visual aids**
- **LCD Projector**
- **Public Address system**
- **P – IV Processor, Hard Disk – 80 GB, RAM–512 MB Minimum, Speed – 2.8 GHZ**
- **T. V, a digital stereo & Camcorder**
- **Headphones of High quality**

Prescribed Lab Manual: A book titled **A Course Book of Advanced Communication Skills (ACS) Lab** published by Universities Press, Hyderabad.

Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

- **Oxford Advanced Learner's Compass**, 7th Edition
- **DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.**
- **Lingua TOEFL CBT Insider**, by Dreamtech
- **TOEFL & GRE**(KAPLAN, AARCO & BARRONS, USA, Cracking GRE by CLIFFS)
- **The following software from 'train2success.com'**
 - **Preparing for being Interviewed**
 - **Positive Thinking**
 - **Interviewing Skills**
 - **Telephone Skills**
 - **Time Management**

Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeeta Sharma, Oxford University Press 2009.
2. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
3. Advanced Communication Skills Laboratory Manual by Sudha Rani, D, Pearson Education 2011.
4. Technical Communication by Paul V. Anderson. 2007. Cengage Learning pvt. Ltd. New Delhi.
5. Business and Professional Communication: Keys for Workplace Excellence. Kelly M. Quintanilla & Shawn T. Wahl. Sage South Asia Edition. Sage Publications. 2011.
6. The Basics of Communication: A Relational Perspective. Steve Duck & David T. McMahan. Sage South Asia Edition. Sage Publications. 2012.
7. English Vocabulary in Use series, Cambridge University Press 2008.
8. Management Shapers Series by Universities Press(India)Pvt Ltd., Himayatnagar, Hyderabad 2008.
9. Handbook for Technical Communication by David A. McMurrey & Joanne Buckley. 2012. Cengage Learning.
10. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New

Delhi, 2009.

11. Handbook for Technical Writing by David A McMurrey & Joanne Buckely CENGAGE Learning 2008.
12. Job Hunting by Colm Downes, Cambridge University Press 2008.
13. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
14. English for Technical Communication for Engineering Students, Aysha Vishwamohan, Tata Mc Graw-Hil 2009.
15. Books on TOEFL/GRE/GMAT/CAT/ IELTS by Barron's/DELTA/ Cambridge University Press.
16. International English for Call Centres by Barry Tomalin and Suhashini Thomas, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals:

1. The practical examinations for the ACS Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned, by inviting the External Examiner from outside. In case of the non-availability of the External Examiner, other teacher of the same department can act as the External Examiner.

Mini Project: As a part of Internal Evaluation

1. **Seminar/ Professional Presentation**
 2. **A Report on the same has to be prepared and presented.**
- * ***Teachers may use their discretion to choose topics relevant and suitable to the needs of students.***
 - * ***Not more than two students to work on each mini project.***
 - * ***Students may be assessed by their performance both in oral presentation and written report.***

Outcomes

- ☞ Accomplishment of sound vocabulary and its proper use contextually.
- ☞ Flair in Writing and felicity in written expression.
- ☞ Enhanced job prospects.
- ☞ Effective Speaking Abilities

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY**HYDERABAD**

IV Year B.Tech. C.E. I-Sem

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**(57001) GROUND WATER DEVELOPMENT AND
MANAGEMENT
(ELECTIVE-II)**

UNIT – I

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

UNIT – II

Ground Water Movement: Permeability, Darcy's law, storage coefficient, Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system, Ground water flow contours their applications.

UNIT – III

Steady groundwater flow towards a well in confined and unconfined aquifers – Dupuit's and Theim's equations, Assumptions, Formation constants, yield of an open well Well interface and well tests – Recuperation Test.

UNIT – IV

Unsteady flow towards a well – Non equilibrium equations – Theis' solution – Jacob and Chow's simplifications, Leaky aquifers – Well Interference.

UNIT – V

Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic refraction methods, Subsurface methods – Geophysical logging and resistivity logging, Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT – VI

Artificial Recharge of Ground Water: Concept of artificial recharge – recharge methods, relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – VII

Well Construction – Drilling Equipment used for Well Construction – Bore log – Interpretation of Log Data.

UNIT – VIII

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben-Herzberg relation, Shape of interface, control of seawater intrusion, Groundwater Basin Management: Concepts of conjunction use, Case studies.

TEXT BOOKS:

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.

REFERENCES :

1. Groundwater Hydrology by BOWER, John Wiley & sons.
2. Groundwater System Planning & Management – R.Willes & W.W.G.Yeh, Prentice Hall.
3. Applied Hydrogeology by C.W.Fetta, CBS Publishers & Distributors.

(57002) ADVANCED STRUCTURAL DESIGN (ELECTIVE-II)

UNIT - I

Design and Detailing of Cantilever Type Retaining Walls - Principles of Counterfort Retaining Walls

UNIT - II

Design of Circular Rectangular Water Tanks,

UNIT - III

Design of Bunkers and Silos.

UNIT - IV

Design of RCC Chimneys

UNIT - V

Design of Concrete Bridges - TRC Loading - Design of Slab Bridge.

UNIT - VI

Design of T-Beam Girder Bridge.

UNIT - VII

Design of Steel Bridges - Loadings Design of Plate Girder Bridges.

UNIT - VIII

Design of Steel Gantry Girders.

TEXTBOOKS:

1. Advanced Reinforced Concrete Structures by Varghese, Pradies Hall of India Pvt. Ltd.
2. Reinforced Concrete Structures Vol. 2 by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Taxmi, Publications Pvt. Ltd., New Delhi.

REFERENCES :

1. Essentials of Bridge Engineering by D. John Son Victor, Oxford and IBM Publication Co., Pvt. Ltd.
 2. Reinforced Concrete Design by S. U. Pillai and D. Menon, Tata Mc. Grawhill Publishing Company.
- Codes : Relevant IS : Codes

(57003) ELEMENTS OF EARTHQUAKE ENGINEERING (ELECTIVE-II)

UNIT-I

Engineering Seismology: Earthquake phenomenon cause of earthquakes-Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes- Magnitude/Intensity of an earthquake-scales-Energy released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground motions- Seismic zones of India.

UNIT - II

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom-Continuous system-Lumped mass idealization-Oscillatory motion-Simple Harmonic Motion-Free vibration of single degree of freedom (SDOF) system-undamped and damped-critical damping-Logarithmic decrement-Forced vibrations.

UNIT - III

Conceptual design: Introduction-Functional planning-Continuous load path-Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members-Twisting of buildings- flexible buildings-framing systems-choice of construction materials-unconfined concrete-confined concrete-masonry-reinforcing steel - Lateral load resisting systems.

UNIT - IV

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT - V

Reinforced Concrete Buildings: Principles of earthquake resistant design of RC members- Structural models for frame buildings- IS code (IS 1893) based methods for seismic design- retrofitting Vertical irregularities- Plan configuration problems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral distribution of base shear.

UNIT - VI

Masonry Buildings: Introduction- Elastic properties of masonry assemblage- Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of

infill walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT - VII

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls- sectional shapes- variations in elevation- cantilever walls without openings - Failure mechanism of non-structures- Effects of non-structural elements on structural system- Analysis of non-structural elements- Prevention of non-structural damage- Isolation of non-structures.

UNIT - VIII

Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction- Ductility-definition-ductility relationships-Impact of Ductility-Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behaviour of beams and columns in RC buildings during earthquakes-Vulnerability of open ground storey and short columns during earthquakes.

TEXT BOOKS:

1. Earthquake Resistant Design of structures - S. K. Duggal, Oxford University Press
2. Earthquake Resistant Design of structures - Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS

1. Seismic Design of Reinforced Concrete and Masonry Building - T. Paulay and M.J.N. Priestly, John Wiley & Sons
2. Masonry and Timber structures including earthquake Resistant Design - Anand S.Arya, Nem chand & Bros
3. Earthquake - Resistant Design of Masonry Building - Miha Tomazevic, Imperial college Press.
4. Advanced Reinforced Concrete Design - P. C Varghese, Prentice Hall of India Pvt. Ltd.
5. Earthquake Tips - Learning Earthquake Design and Construction C.V.R. Murty

REFERENCE CODES:

1. IS: 1893 (Part-1)-2002, "Criteria for Earthquake Resistant - Design of structures." B.I.S., New Delhi.
2. IS:4326-1993, "Earthquake Resistant Design and Construction of Building". Code of Practice B.I.S., New Delhi.
3. IS:13920-1993, "Ductile detailing of concrete structures subjected to seismic force" - Guidelines, B.I.S., New Delhi.

(57004) WATERSHED MANAGEMENT (ELECTIVE-II)

UNIT-I

INTRODUCTION: Concept of watershed development, objectives of watershed development, need for watershed development in India. Integrated and multidisciplinary approach for watershed management.

UNIT-II

CHARACTERISTICS OF WATERSHED: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-III

Watershed delineation - Runoff Computations from a watershed - Flood Frequency Analysis - Gumbell, Log Pearson and Weibull Methods of Analysis.

UNIT-IV

PRINCIPLES OF EROSION: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.

MEASURES TO CONTROL EROSION: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT-V

WATER HARVESTING: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.

UNIT-VI

FOREST AND GRASS LAND MANAGEMENT: Interpretation of Satellite Imageries- Land use and Land Cover. Land capability classification, management of forest, agricultural, grassland and wild land, Reclamation of saline and alkaline soils.

UNIT-VII

ECOSYSTEM MANAGEMENT: Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture, horticulture, social forestry and afforestation.

UNIT-VIII

Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements- Reservoir Routing.

TEXT BOOKS:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awarth and WP James, - Prentice Hall Publishers.

REFERENCE:

1. Land and Water Management by VVN Murthy, - Kalyani Publications,
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

IV Year B.Tech. C.E. I-Sem

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(57005) GIS AND REMOTE SENSING**UNIT - I**

Introduction to Photogrammetry: Principle and types of aerial photographs, stereoscopy. Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

UNIT - II

Remote Sensing - I: Basic concepts and foundation of remote sensing - elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

UNIT - III

Remote Sensing - II: Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT - IV

Geographic Information Systems: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

UNIT - V

Types of data representation: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS - File management, Spatial data - Layer based GIS, Feature based GIS mapping.

UNIT - VI

GIS Spatial Analysis: Computational Analysis Methods (CAM), Visual Analysis Methods (VAM). Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

IV Year B.Tech. C.E. I – Sem

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(57006) PAVEMENT DESIGN**UNIT – I**

Factors Affecting Pavement Design: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane, Directional Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT – II

Stresses In Pavements: Vehicle-Pavement Interaction: Transient, Random & Damping Vibrations, Steady State of Vibration, Experiments on Vibration, Stress Inducing Factors in Flexible and Rigid pavements

UNIT - III

Stress In Flexible Pavements: Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two and Three Layered Systems, Fundamental Design Concepts

UNIT – IV

Stresses In Rigid Pavements: Westergaard's Theory and Assumptions, Stresses due to Curling, Stresses and Deflections due to Loading, Frictional Stresses, Stresses in Dowel Bars & Tie Bars

UNIT – V

Material Characteristics: CBR and Modulus of Subgrade Reaction of Soil, Mineral aggregates – Blending of aggregates, binders, polymer and rubber modified bitumen, Resilient, Diametral Resilient and Complex (Dynamic) Moduli of Bituminous Mixes, Permanent Deformation Parameters and other Properties, Effects and Methods of Stabilisation and Use of Geo Synthetics.

UNIT - VI

Design Of Flexible Pavements: Flexible Pavement Design Concepts, Asphalt Institute's Methods with HMA and other Base Combinations.

UNIT – VII

Water Resources Applications-I: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.

UNIT – VIII

Water Resources Applications – II: Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

1. Remote Sensing and its applications by LRA Narayana University Press 1999.
2. Principles of Geo physical Information Systems – Peter A Burrough and Rachael A. Mc Donnell. Oxford Publishers 2004.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Young, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. GIS by Kang – tsung chang, TMH Publications & Co.,
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
5. Fundamental of GIS by Mechanical designs John Wiley & Sons

UNIT - VII

Design Of Rigid Pavements: Calibrated Mechanistic Design Process, PCA, AASHTO & IRC Specifications, Introduction to Prestressed and Continuously Reinforced Cement-Concrete Pavement Design.

UNIT – VIII

Design of Pavement – Pavement design for low volume roads, Rural road designs – code of practices.

REFERENCES:

1. Design of Functional Pavements, Nai C. Yang, McGraw Hill Publications
2. Concrete Pavements, AF Stock, Elsevier, Applied Science Publishers
3. Principles of Pavement Design, Yoder J. & Wittraz Mathew, W. John Wiley & Sons Inc
4. Pavement Analysis & Design, Yang H. Huang, Prentice Hall Inc.
5. Pavement and Surfacing for Highway & Airports, Micheal Sargious, Applied Science Publishers Limited.
6. IRC Codes for Flexible and Rigid Pavements design

IV Year B.Tech. C.E. I – Sem

L	T/P/D	C
3	1/-	3

(57007) ESTIMATING AND COSTING**UNIT – I**

General items of work in Building – Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating, Earthwork for roads and canals

UNIT – II

Detailed Estimates of Buildings.

UNIT – III

Earthwork for roads and canals

UNIT - IV

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT - V

Reinforcement bar bending and bar requirement schedules.

UNIT-VI

Contracts – Types of contracts – Contract Documents – Conditions of contract.

UNIT – VII

Valuation of buildings.

UNIT - VIII

Standard specifications for different items of building construction.

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie

REFERENCES :

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
4. National Building Code

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IV Year B.Tech. C.E. I - Sem

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4	1/-/-	4

**(57008) WATER RESOURCES PLANNING AND
MANAGEMENT (ELECTIVE-III)**

UNIT - I

Introduction: concepts of systems analysis, definition, systems approach to water resources planning and management, role of optimization models, objective function and constraints, types of optimization techniques.

UNIT - II

Linear programming - I: Formulation linear programming models, graphical method, simplex method, application of linear programming in water resources.

UNIT - III

Linear programming - II: Revised simplex method, duality in linear programming, sensitivity and post optimality analysis.

UNIT - IV

Dynamic programming: Belman's principles of optimality forward and backward recursive dynamic programming, case of dimensionality, application of dynamic programming for resource allocation.

UNIT - V

Non-linear optimization techniques: Clerical of method optimization, Kuch-Tucker, gradient based research techniques for simple unconstrained optimization.

UNIT - VI

Simulation: application of simulation techniques in water resources.

UNIT - VII

Water-resources economics: Principles of Economics analysis, benefit cost analysis- Multi-purpose Projects - Cost Allocation among various Projects - Alternative Single Project- Socio economic intuition and pricing of water resources.

UNIT - VIII

Water resources management: Planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, conjunctive use of surface and sub-surface water resources.

TEXT BOOKS:

1. Water Resources System Analysis - Vedula & Mujumdar - Tata Mc. Graw Hill Company Ltd. 2005.
2. Water Resources Economics - James & Lee. Oxford Publishers 2005

REFERENCE:

1. Optimal design of water distribution networks P.R. Bhave, Narosa Publishing house 2003.

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IV Year B.Tech. C.E. I - Sem

L	T/P/D	C
4	1/-/-	4

**(57009) FINITE ELEMENT METHODS (ELECTIVE-III)
UNIT - I**

Introduction to Finite Element Method - Basic Equations in Elasticity - equation - concept of plane stress - plane strain advantages and disadvantages of FEM.

UNIT - II

Element shapes - nodes - nodal degree of freedom - strain displacement relations.

UNIT - III

Finite Element Analysis (FEA) of - one dimensional problems - Bar element - Shape functions stiffness matrix - stress - strain

UNIT - IV

FEA Beam elements - stiffness matrix - shape function - continuous beams.

UNIT - V

FEA Two dimensional problem - CST - LST element - shape function - stress - strain.

UNIT - VI

Lagrangian - Serendipity elements - Hermit polynomials - regular, irregular 2D & 3D - Element - shape functions.

UNIT - VII

Isoparametric formulation - Concepts of, isoparametric elements for 2D analysis - formulation of CST element, 4-noded and 8-noded iso-parametric quadrilateral elements.

UNIT-VIII

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOK:

1. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. Finite element method by Logan daryl

REFERENCES:

1. Finite element method by chandrupatta, belegunda
2. Finite element analysis by p. zeshu, TMH

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IV Year B.Tech. C.E. I-Sem

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**(57010) DISASTER MANAGEMENT AND MITIGATION
(ELECTIVE-III)**

Unit-I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit -II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards -

Unit -III

Endogenous Hazards - Volcanic Eruption - Earthquakes - Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India -- Human adjustment, perception & mitigation of earthquake.

Unit -IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters, Infrequent events: Cyclones - Lightning - Hailstorms, Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation), Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves
Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation), Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Planetary Hazards/ Disasters- Man induced Hazards /Disasters- Physical hazards/ Disasters- Soil Erosion
Soil Erosion:— Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion, Chemical hazards/

disasters:— Release of toxic chemicals, nuclear explosion- Sedimentation processes, Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation, Biological hazards/ disasters:- Population Explosion.

Unit -V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

Unit -VI

Natural Disaster Reduction & Management

- a) Provision of Immediate relief measures to disaster affected people
- b) Prediction of Hazards & Disasters
- c) Measures of adjustment to natural hazards

Unit -VII

Disaster Management- An integrated approach for disaster preparedness, mitigation & awareness.

Mitigation- Institutions- discuss the work of following Institution.

- a. Meteorological observatory
- b. Seismological observatory
- c. Volcanology institution
- d. Hydrology Laboratory
- e. Industrial Safety inspectorate
- f. Institution of urban & regional planners
- g. Chambers of Architects
- h. Engineering Council
- i. National Standards Committee

Integrated Planning- Contingency management Preparedness -

- a) Education on disasters
- b) Community involvement
- c) The adjustment of Human Population to Natural hazards & disasters
Role of Media

Monitoring Management- Discuss the programme of disaster research & mitigation of disaster of following organizations.

- a) International Council for Scientific Unions (ICSU)- Scientific committee on problems of the Environment (SCOPE), International Geosphere- Biosphere programme (IGBP)
- b) World federation of Engineering Organizations(WFEO)
- c) National Academy of Sciences
- d) World Meteorological organizations(WMO)
- e) Geographical Information System(GIS)
- f) International Association of Seismology & Physics of Earth's Interior (IASPEI)
- g) Various U.N agencies like UNCRD, IDNDR, WHO, UNESCO, UNICEF, UNLP.

Unit –VIII

- A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster & Disaster in Hills with particular reference to India
- Ecological planning for sustainability & sustainable development in India- Sustainable rural development: A Remedy to Disasters -Role of Panchayats in Disaster mitigations
- Environmental policies & programmes in India- Institutions & National Centres for Natural Disaster reduction, Environmental Legislations in India, Awareness, Conservation Movement, Education & training

TEXT BOOK:

Disaster Mitigation: Experiences And Reflections by Pardeep Sahu

REFERENCES

- R.B. Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990
- Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997
- Kates, R.J & White, G.F The Environment as Hazards, Oxford, New York, 1978
- R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
- H.K. Gupta (Ed) Disaster Management, Universities Press, India, 2003
- R.B. Singh, Space Technology for Disaster Mitigation in India (INCEID), University of Tokyo, 1994
- Dr. Satender , Disaster Management in Hills, Concept Publishing Co., New Delhi, 2003
- A.S. Arya Action Plan For Earthquake, Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
- R.K. Bhandari An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi
- M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001

(57011) ADVANCED FOUNDATION ENGINEERING

UNIT – I

Introduction-Bearing capacity of Footings subjected to Eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soils.

UNIT – II

Elastic settlement of Footings embedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertmann's method, Janbu method.

UNIT – III

Pile Foundations – static and dynamic methods-pile groups-negative skin friction-under reamed piles.

UNIT – IV

Settlement of Pile groups resting in sands and clays –laterally loaded piles-ultimate capacity of laterally loaded piles.

UNIT – V

Lateral Earth pressures-Rankine - Coulomb's and graphical methods – Stability of cantilever and counterfort retaining walls, Reinforced earth retaining walls.

UNIT – VI

Cantilever sheet piles and anchored bulkheads. Earth pressure diagram - Determination of Depth of embedment in sands and clays – Timbering of trenches- Earth pressure diagrams – Forces in struts.

UNIT – VII

Caissons and well foundations: Types of caissons – well foundations - Different shapes of wells – Components of wells – functions and Design – Design Criteria – Sinking of wells – lateral stability by Terzaghi's analysis.

UNIT – VIII

Foundations in Expansive soils Problems in Expansive soils – Mechanism of swelling-Swell Pressure and Swelling potential-Heave-foundation practices-Sand cushion-CNS technique – under – reamed pile Foundations – Granular pile – anchor technique. stabilization of expansive soils.

TEXT BOOKS:

1. Das, B.M., - (1999) Principles of Foundation Engineering – 4th edition PWS Publishing, Singapore
2. Bowles, J.E., (1988) Foundation Analysis and Design – 4th Edition, McGraw-Hill International.
3. Geotechnical Engineering: Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group

REFERENCE BOOKS:

1. Geotechnical Engineering by C. Venkataraman, New Age International Pvt.Ltd, Publishers (2002).
2. Analysis and Design of Substructures - Swami Saran, Oxford & IBH Publishing Company Pvt.Ltd (1998).
3. Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.Ltd. Publishers (2002).

IV Year B.Tech. C.E. I –Sem

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(57601) CONCRETE AND HIGHWAY MATERIALS LAB**I. ROAD AGGREGATES:**

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. CEMENT AND CONCRETES:**TESTS ON CEMENTS:**

1. Normal Consistency or fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration)

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IV Year B.Tech. C.E. I – Sem

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(57602) ENVIRONMENTAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides
5. Determination of iron.
6. Determination of Dissolved Oxygen.
7. Determination of Nitrates
8. Determination of Optimum dose of coagulant
9. Determination of Chlorine demand
10. Determination of total Phosphorous.
11. Determination of B.O.D
12. Determination of C.O.D
13. Determination of Optimum coagulant dose.
14. Determination of Chlorine demand.
15. Presumptive coliform test.

NOTE : At least 8 of the above experiments are to be conducted.

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IV Year B.Tech. C.E. II-Sem

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(58001) GROUND IMPROVEMENT TECHNIQUES (ELECTIVE-IV)

UNIT – I

Dewatering: methods of de-watering- sumps and interceptor ditches- single, multi stage well points - vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains – Electro-osmosis.

UNIT – II

Grouting: Objectives of grouting- grouts and their properties- grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- post grout test.

UNIT – III

In – situ densification methods in granular Soils:– Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

UNIT - IV

In – situ densification methods in Cohesive soils:– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – V

Reinforced Earth: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

UNIT – VI

Geosynthetics : Description, properties, functions and applications of geosynthetics

UNIT – VII

Geoenvironmental application of geosynthetics : Geomembranes for landfills and ponds, Geosynthetic clay liner, Designing with GCLs, Filtration, Erosion control, slope protection.

UNIT – VIII

Stabilization: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum.

Expansive soils: Problems of expansive soils – tests for identification – methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

TEXT BOOKS:

1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Purushotham Raj Ground Improvement Techniques, Laxmi Publications, New Delhi

REFERENCES:

1. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida, USA.
2. Xanthakos P.P, Abramson, L.W and Brukwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jersey, USA

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HYDERABAD**

IV Year B. Tech. C.E. II –Sem

L	T/P/D	C
3	1/-	3

**(58002) DESIGN AND DRAWING OF
IRRIGATION STRUCTURES
(ELECTIVE-IV)**

Design and drawing of the following hydraulic structures.

Group A

1. Surplus weir.
2. Syphon Well Drop
3. Trapezoidal notch fall.
4. Tank sluice with tower head

Group B

1. Sloping glacis weir.
2. Canal regulator
3. Under Tunnel.
4. Type III Syphon aqueduct

Final Examination pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks.

The duration of examination will be FOUR hours.

However, the students are supposed to practise the drawings for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Water Resources Engineering - Principles and Practice by Challa ; Satyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

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IV Year B.Tech. C.E. II-Sem

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3 1/- 3

**(58003) AIRPORT PLANNING AND DESIGN
(ELECTIVE - IV)**

UNIT - I The Air Transportation Systems

1. Introduction and history
2. Air transport and the national economy
3. Growth of air transport and future trends
4. Aviation organizations and their functions

UNIT - II Components of Air Transportation

1. Airports and airways
2. Airlines and air passengers
3. Operating environment

UNIT - III Airport Planning

1. Types of airport planning studies
2. Forecasting in aviation and airport planning

UNIT - IV Airport Configuration

1. Runway configurations
2. Taxiway configurations

UNIT - V

1. Introduction of Airport configurations
2. Analysis of wind
3. Site selection approach

UNIT - VI Planning and Design of the Terminal Area

1. The passenger terminal system
2. The terminal planning process
3. The apron-gate system

UNIT - VII Airport Space Traffic Control

1. Airways
2. Navigation aids

UNIT - VIII

1. Air Traffic Control
2. Air traffic control facilities
3. Air safety & Regulation issues

TEXT BOOK

1. Khanna S K, Arora M G and Jain S S. Airport Planning and Design, Neredchand and Brothers, Roorkee, 1994.

REFERENCES

1. Rangwala, Airport Engineering, Charotar Publishing House, 1996.
2. Air Transportation Planning & design - Virendra Kumar & Statish Chandhra - Gal Gotu Publishers (1999).

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HYDERABAD**

IV Year B.Tech. C.E. II-Sem

L T/P/D C
3 1/- 3

**(58004) PRESTRESSED CONCRETE STRUCTURES
(ELECTIVE-IV)**

UNIT - I

INTRODUCTION: Historic development - General principles of prestressing pretensioning and post tensioning - Advantages and limitations of prestressed concrete - Materials - High strength concrete and high tensile steel their characteristics.

UNIT - II

I.S.Code provisions, Methods and Systems of Prestressing: Pre-tensioning and post tensioning methods - Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Glifford - Udall System.

UNIT - III

LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

UNIT - IV

Analysis of sections for flexure; Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT - V

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: Allowable stress, Design criteria as per I.S.Code - Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses - design for shear in beams - Kern - lines, cable profile.

UNIT - VI

ANALYSIS OF END BLOCKS: by Guyon's method and Magnel method, Anchorage zone stresses - Approximate method of design - Anchorage zone reinforcement - Transfer of prestress pre-tensioned members.

UNIT - VII

Composite section: Introduction – Analysis of stress – Differential shrinkage – General design considerations

UNIT - VIII

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections factors influencing deflections short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS:

1. Prestressed Concrete by Krishnu Raju; - Tata Mc.Graw Hill Publications.
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

REFERENCE:

1. Prestressed Concrete by Ramamurtham; Dhunpatra Publications.
2. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns. John Wiley & Sons.

Codes: BIS code on prestressed concrete, IS 1343.

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IV Year B.Tech. C.E. II – Sem

L	T/P/D	C
3	1/-	3

**(58005) DATA BASE MANAGEMENT SYSTEMS
(ELECTIVE - IV)**

UNIT I :

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor

UNIT II :

History of Data base Systems, Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT III :

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT IV :

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT V :

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless Join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT VI :

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

UNIT VII :

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

UNIT VIII :

Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

TEXT BOOKS :

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATAMcGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES :

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V.Shah, SPD,
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M.T., Gillenson, Wiley Student Edition.

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IV Year B.Tech. C.E. II –Sem

L	T/P/D	C
3	1/4	3

(58006) REHABILITATION AND RETROFITTING OF STRUCTURES

UNIT – I Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention.

UNIT – II Mechanism of Damage – Types of Damage.

UNIT – III Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention.

UNIT – IV Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – V Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT – VI Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Gunning – Shot Crete – Underpinning.

UNIT – VII Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – VIII Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

TEXT BOOKS:

1. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W H Ranso, (1981)
2. Building Failures - Diagnosis and Avoidance, EF & N Spon, London, B. A. Richardson, (1991).

REFERENCE

1. Concrete Technology by A.R. Shantakumar, Oxford University press
2. Defects and Deterioration in Buildings, E F & N Spon, London
3. Non-Destructive Evaluation of Concrete Structures by Bunggy
4. Maintenance and Repair of Civil Structures. B.L. Gupta and Amit Gupta, Standard Publications.

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IV Year B.Tech. C.E. II -Sem

L T/P/D C
3 -/- 3

(58007) MANAGEMENT SCIENCE

Unit I

Introduction to Management: Entrepreneurship and organization - Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

Unit II

Designing Organisational Structures: Departmentation and Decentralisation, Types of Organisation structures - Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure and their merits, demerits and suitability.

Unit III

Operations Management: Principles and Types of Plant Layout- Methods of production (Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement- Statistical Quality Control: $\bar{X}$ chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

Unit IV

A) Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Supply Chain Management

B) Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle., Channels of distribution.

Unit V

Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

Unit VI

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given

time, Project Cost Analysis, Project Crashing. (simple problems)

Unit VII

Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

Unit VIII

Contemporary Management Practices: Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering 5S Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Benchmarking, Balanced Score Card.

TEXT BOOK:

1. Aryasri: *Management Science*, TMH, New Delhi, 2009

REFERENCE BOOKS:

1. Stoner, Management, Pearson, 2009
2. Kotler Philip & Keller Kevin Lane: *Marketing Management PHI*, 2009.
3. Koontz, Weihrich, & Aryasri: *Principles of Management*, TMH, 2009.
4. Thomas N. Duening & John M. Ivancevich *Management—Principles and Guidelines*, Cengage, 2009.
5. Kunishka Bedi: *Production and Operations Management*, Oxford University Press, 2009.
6. Memoria & S.V. Ganker, *Personnel Management*, Himalaya, 2009
7. Schermerhorn: *Management*, Wiley, 2009.
8. Parnell: *Strategic Management*, Biztantra, 2009.
9. L.S. Srinath: *PERT/CPM*, Affiliated East-West Press, 2009.
10. William J. Stevenson & Ceyhan Ozgur: *Introduction to Management Science*, TMH, 2007.

Pre-requisites: Managerial Economics

Objective : To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/Tables : Normal Distribution Function Table need to be permitted into the examination Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions.

The question paper should contain atleast 2 practical problems, one each from units -III & VI Each question should not have more than 3 bits.

Unit VIII will have only short questions, not essay questions.

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IV Year B.Tech. C.E. II -Sem

L	T/P/D	C
0	-/-	2

(58601) INDUSTRIAL TRAINING

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. C.E. II -Sem

L	T/P/D	C
0	-6/-	2

(58602) SEMINAR

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. C.E. II -Sem

L	T/P/D	C
0	-15/-	10

(58603) PROJECT

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. C.E. II -Sem

L	T/P/D	C
0	-/-	2

(58604) COMPREHENSIVE VIVA

BHARAT INSTITUTE OF ENGINEERING AND TECHNOLOGY

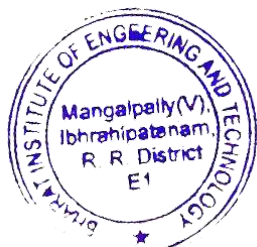
Mangalpally (Village), Ibrahimpatnam (Mandal), Ranga Reddy (District), Telangana-501510

1.3.2. Average percentage of courses that include experiential learning through project work/field work/internship during last five years

B.Tech-CIVIL ENGINEERING

2014-15

S. No.	Regulations	No. of Course	Year of Study
1.	R13	9	I Year & II Year I & II Semesters
2.	R09	16	III & IV year I & II Semesters



Vettikanti Subu
PRINCIPAL
Principal
Bharat Institute of Engg. and Tech
Mangalpally(V), Ibrahimpatnam(M)
Ranga Reddy (Dist)-Telangana-501510

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD.**B. TECH. CIVIL ENGINEERING****I YEAR**

Code	Subject	L	T/P/D	C
A10001	English	2	-	4
A10002	Mathematics – I	3	1	6
A10302	Engineering Mechanics	3	-	6
A10004	Engineering Physics	3	-	6
A10005	Engineering Chemistry	3	-	6
A10501	Computer Programming	3	-	6
A10301	Engineering Drawing	2	3	6
A10581	Computer Programming Lab.	-	3	4
A10081	Engineering Physics & Engineering Chemistry Lab.	-	3	4
A10083	English Language Communication Skills Lab.	-	3	4
A10082	IT Workshop / Engineering Workshop	-	3	4
	Total	19	16	56

II YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A30006	Mathematics – II	4	-	4
A30203	Electrical & Electronics Engineering	4	-	4
A30107	Strength of Materials –I	4	-	4
A30108	Surveying	4	-	4
A30101	Fluid Mechanics	4	-	4
A30010	Managerial Economics and Financial Analysis	4	-	4
A30185	Surveying Lab- I	-	3	2
A30183	Strength of Materials Lab	-	3	2
	Total	24	6	28

II YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A40008	Probability & Statistics	4	-	4
A40114	Strength of Materials - II	4	-	4
A40111	Hydraulics & Hydraulic Machinery	4	-	4
A40009	Environmental Studies	4	-	4
A40115	Structural Analysis -I	4	-	4
A40109	Building Materials, Construction & Planning	4	-	4
A40186	Computer Aided Drafting of Buildings	-	3	2
A40190	Surveying Lab- II	-	3	2
	Total	24	6	28

III YEAR I SEMESTER

Code	Subject	L	T/P/D	C
A50116	Concrete Technology	4	-	4
A50121	Reinforced Concrete Structures Design and Drawing	4	-	4
A50118	Engineering Geology	4	-	4
A50120	Geotechnical Engineering	4	-	4
A50122	Water Resources Engineering-I	4	-	4
	Open Elective	4	-	4
A50117	Disaster Management			
A50017	Intellectual Property Rights			
A50018	Human Values and Professional Ethics			
A50181	Fluid Mechanics & Hydraulic Machinery Lab	-	3	2
A50191	Engineering Geology Lab	-	3	2
	Total	24	6	28

III YEAR II SEMESTER

Code	Subject	L	T/P/D	C
A60130	Steel Structures Design and Drawing	3	2	4
A60119	Environmental Engineering	4		4
A60132	Transportation Engineering -I	4		4
A60126	Foundation Engineering	4		4
A60131	Structural Analysis -II	4		4
	Elective -I	4	-	4
A60123	Elements of Earthquake Engineering			
A60127	Ground Improvement Techniques			
A60128	Ground Water Hydrology			
A60124	Environmental Impact Assessment			
A60129	Principles of Entrepreneurship			
A60194	Geotechnical Engineering Lab	-	3	2
A60086	Advanced Communication Skills Lab	-	3	2
	Total	23	8	28

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****2 -/- 4****(A10001) ENGLISH****Introduction:**

In view of the growing importance of English as a tool for global communication and the consequent emphasis on training students to acquire communicative competence, the syllabus has been designed to develop linguistic and communicative competencies of Engineering students. The prescribed books and the exercises are meant to serve broadly as students' handbooks.

In the English classes, the focus should be on the skills of reading, writing, listening and speaking and for this the teachers should use the text prescribed for detailed study. For example, the students should be encouraged to read the texts/selected paragraphs silently. The teachers can ask comprehension questions to stimulate discussion and based on the discussions students can be made to write short paragraphs/essays etc.

The text for non-detailed study is for extensive reading/reading for pleasure. Hence, it is suggested that they read it on their own the topics selected for discussion in the class. The time should be utilized for working out the exercises given after each section, as also for supplementing the exercises with authentic materials of a similar kind for example, from newspaper articles, advertisements, promotional material etc.. However, the stress in this syllabus is on skill development, fostering ideas and practice of language skills.

Objectives:

- To improve the language proficiency of the students in English with emphasis on LSRW skills.
- To equip the students to study academic subjects more effectively using the theoretical and practical components of the English syllabus.
- To develop the study skills and communication skills in formal and informal situations.

SYLLABUS:**Listening Skills:****Objectives**

1. To enable students to develop their listening skill so that they may appreciate its role in the LSRW skills approach to language and improve their pronunciation.

2. To equip students with necessary training in listening so that they can comprehend the speech of people of different backgrounds and regions.

Students should be given practice in listening to the sounds of the language to be able to recognise them, to distinguish between them to mark stress and recognise and use the right intonation in sentences.

- Listening for general content
- Listening to fill up information
- Intensive listening
- Listening for specific information

Speaking Skills:

Objectives

1. To make students aware of the role of speaking in English and its contribution to their success.
 2. To enable students to express themselves fluently and appropriately in social and professional contexts.
- Oral practice
 - Describing objects/situations/people
 - Role play – Individual/Group activities (Using exercises from the five units of the prescribed text: **Skills Annexe -Functional English for Success**)
 - Just A Minute(JAM) Sessions.

Reading Skills:

Objectives

1. To develop an awareness in the students about the significance of silent reading and comprehension.
 2. To develop the ability of students to guess the meanings of words from context and grasp the overall message of the text, draw inferences etc.
- Skimming the text
 - Understanding the gist of an argument
 - Identifying the topic sentence
 - Inferring lexical and contextual meaning
 - Understanding discourse features
 - Scanning
 - Recognizing coherence/sequencing of sentences

NOTE : The students will be trained in reading skills using the prescribed text for detailed study.

They will be examined in reading and answering questions using 'unseen' passages which may be taken from authentic texts, such as magazines/newspaper articles.

Writing Skills :

Objectives

1. To develop an awareness in the students about writing as an exact and formal skill.
2. To equip them with the components of different forms of writing, beginning with the lower order ones.
 - Writing sentences
 - Use of appropriate vocabulary
 - Paragraph writing
 - Coherence and cohesiveness
 - Narration / description
 - Note Making
 - Formal and informal letter writing
 - Describing graphs using expressions of comparison

TEXTBOOKS PRESCRIBED:

In order to improve the proficiency of the student in the acquisition of the four skills mentioned above, the following texts and course content, divided into Five Units, are prescribed:

For Detailed study: First Textbook: "Skills Annexe -Functional English for Success", Published by Orient Black Swan, Hyderabad

For Non-detailed study

1. **Second text book "Epitome of Wisdom"**, Published by Maruthi Publications, Guntur
 - The course content and study material is divided into Five Units.

Unit –I:

1. Chapter entitled '**Wit and Humour**' from '**Skills Annexe**' -Functional English for Success, Published by Orient Black Swan, Hyderabad
2. Chapter entitled '**Mokshagundam Visvesvaraya**' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad.
- L- Listening For Sounds, Stress and Intonation
- S- Greeting and Taking Leave, Introducing Oneself and Others (Formal

and Informal Situations)

- R- Reading for Subject/ Theme
- W- Writing Paragraphs
- G- Types of Nouns and Pronouns
- V- Homonyms, homophones synonyms, antonyms

Unit –II

1. Chapter entitled **“Cyber Age”** from **“Skills Annexe -Functional English for Success”** Published by Orient Black Swan, Hyderabad.
 2. Chapter entitled **'Three Days To See'** from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad.
- L – Listening for themes and facts
 - S – Apologizing, interrupting, requesting and making polite conversation
 - R- for theme and gist
 - W- Describing people, places, objects, events
 - G- Verb forms
 - V- noun, verb, adjective and adverb

Unit –III

1. Chapter entitled **'Risk Management'** from **“Skills Annexe - Functional English for Success”** Published by Orient Black Swan, Hyderabad
 2. Chapter entitled **'Leela's Friend'** by R.K. Narayan from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad
- L – for main points and sub-points for note taking
 - S – giving instructions and directions; Speaking of hypothetical situations
 - R – reading for details
 - W – note-making, information transfer, punctuation
 - G – present tense
 - V – synonyms and antonyms

Unit –IV

1. Chapter entitled **'Human Values and Professional Ethics'** from **“Skills Annexe -Functional English for Success”** Published by Orient Black Swan, Hyderabad
 2. Chapter entitled **'The Last Leaf'** from **“Epitome of Wisdom”**, Published by Maruthi Publications, Hyderabad
- L - Listening for specific details and information
 - S- narrating, expressing opinions and telephone interactions

- R - Reading for specific details and information
- W- Writing formal letters and CVs
- G- Past and future tenses
- V- Vocabulary - idioms and Phrasal verbs

Unit –V

1. Chapter entitled '**Sports and Health**' from "**Skills Annexe - Functional English for Success**" Published by Orient Black Swan, Hyderabad
2. Chapter entitled '**The Convocation Speech**' by N.R. Narayanmurthy' from "**Epitome of Wisdom**", Published by Maruthi Publications, Hyderabad
- L- Critical Listening and Listening for speaker's tone/ attitude
- S- Group discussion and Making presentations
- R- Critical reading, reading for reference
- W- Project proposals; Technical reports, Project Reports and Research Papers
- G- Adjectives, prepositions and concord
- V- Collocations and Technical vocabulary

Using words appropriately

- * Exercises from the texts not prescribed shall also be used for classroom tasks.

REFERENCES :

1. Contemporary English Grammar Structures and Composition by David Green, MacMillan Publishers, New Delhi. 2010.
2. Innovate with English: A Course in English for Engineering Students, edited by T Samson, Foundation Books.
3. English Grammar Practice, Raj N Bakshi, Orient Longman.
4. Technical Communication by Daniel Riordan. 2011. Cengage Publications. New Delhi.
5. Effective English, edited by E Suresh Kumar, A RamaKrishna Rao, P Sreehari, Published by Pearson
6. Handbook of English Grammar & Usage, Mark Lester and Larry Beason, Tata Mc Graw –Hill.
7. Spoken English, R.K. Bansal & JB Harrison, Orient Longman.
8. Technical Communication, Meenakshi Raman, Oxford University Press

9. Objective English Edgar Thorpe & Showick Thorpe, Pearson Education
10. Grammar Games, Renuvolcuri Mario, Cambridge University Press.
11. Murphy's English Grammar with CD, Murphy, Cambridge University Press.
12. Everyday Dialogues in English, Robert J. Dixon, Prentice Hall India Pvt Ltd.,
13. ABC of Common Errors Nigel D Turton, Mac Millan Publishers.
14. Basic Vocabulary Edgar Thorpe & Showick Thorpe, Pearson Education
15. Effective Technical Communication, M Ashraf Rizvi, Tata Mc Graw – Hill.
16. An Interactive Grammar of Modern English, Shivendra K. Verma and Hemlatha Nagarajan , Frank Bros & CO
17. A Communicative Grammar of English, Geoffrey Leech, Jan Svartvik, Pearson Education
18. Enrich your English, Thakur K B P Sinha, Vijay Nicole Imprints Pvt Ltd.,
19. A Grammar Book for You And I, C. Edward Good, MacMillan Publishers

Outcomes:

- Usage of English Language, written and spoken.
- Enrichment of comprehension and fluency
- Gaining confidence in using language in verbal situations.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****3 1/-/- 6****(A10002) MATHEMATICS -I****Objectives:** To learn

- The types of Matrices and their properties.
- Concept of rank of a matrix and applying the concept of rank to know the consistency of linear equations and to find all possible solutions, if exist.
- The concept of eigenvalues and eigenvectors of a matrix is to reduce a quadratic form into a canonical form through a linear transformation.
- The mean value theorems and to understand the concepts geometrically.
- The functions of several variables and optimization of these functions.
- The evaluation of improper integrals, Beta and Gamma functions.
- Multiple integration and its applications.
- Methods of solving the differential equations of 1st and higher order
- The applications of the differential equations to Newton's law of cooling, Natural growth and decay, Bending of beams etc.
- The definition of integral transforms and Laplace Transform.
- Properties of Laplace transform.
- Inverse Laplace Transform.
- Convolution theorem.
- Solution of Differential equations using Laplace transform.

UNIT-I

Theory of Matrices: Real matrices – Symmetric, skew – symmetric, orthogonal. Complex matrices: Hermitian, Skew-Hermitian and Unitary Matrices. Idempotent matrix, Elementary row and column transformations-Elementary matrix, Finding rank of a matrix by reducing to Echelon and normal forms. Finding the inverse of a non-singular square matrix using row/ column transformations (Gauss- Jordan method). Consistency of system of linear equations (homogeneous and non- homogeneous) using the rank of a matrix. Solving $m \times n$ and $n \times n$ linear system of equations by Gauss elimination.

Cayley-Hamilton Theorem (without proof) – Verification. Finding inverse of a matrix and powers of a matrix by Cayley-Hamilton theorem, Linear dependence and Independence of Vectors. Linear Transformation –

Orthogonal Transformation. Eigen values and eigen vectors of a matrix. Properties of eigen values and eigen vectors of real and complex matrices. Finding linearly independent eigen vectors of a matrix when the eigen values of the matrix are repeated.

Diagonalization of matrix – Quadratic forms up to three variables. Rank – Positive definite, negative definite, semi definite, index, signature of quadratic forms. Reduction of a quadratic form to canonical form.

UNIT – II

Differential calculus methods: Rolle's Mean value Theorem – Lagrange's Mean Value Theorem – Cauchy's mean value Theorem – (all theorems without proof but with geometrical interpretations), verification of the Theorems and testing the applicability of these theorem to the given function.

Functions of several variables: Functional dependence- Jacobian- Maxima and Minima of functions of two variables without constraints and with constraints-Method of Lagrange multipliers.

UNIT – III

Improper integration, Multiple integration & applications: Gamma and Beta Functions –Relation between them, their properties – evaluation of improper integrals using Gamma / Beta functions.

Multiple integrals – double and triple integrals – change of order of integration-change of variables (polar, cylindrical and spherical) Finding the area of a region using double integration and volume of a region using triple integration.

UNIT – IV

Differential equations and applications : Overview of differential equations-exact, linear and Bernoulli (NOT TO BE EXAMINED). Applications of first order differential equations – Newton's Law of cooling, Law of natural growth and decay, orthogonal trajectories.

Linear differential equations of second and higher order with constant coefficients, Non-homogeneous term of the type $f(X) = e^{ax}$, $\sin ax$, $\cos ax$, and x^n , $e^{ax} V(x)$, $x^n V(x)$, method of variation of parameters. Applications to bending of beams, Electrical circuits and simple harmonic motion.

UNIT – V

Laplace transform and its applications to Ordinary differential equations
Definition of Integral transform, Domain of the function and Kernel for the Laplace transforms. Existence of Laplace transform. Laplace transform of standard functions, first shifting Theorem, Laplace transform of functions when they are multiplied or divided by "t". Laplace transforms of derivatives and integrals of functions. – Unit step function – second shifting theorem – Dirac's delta function, Periodic function – Inverse Laplace transform by

Partial fractions(Heaviside method) Inverse Laplace transforms of functions when they are multiplied or divided by "s", Inverse Laplace Transforms of derivatives and integrals of functions, Convolution theorem --- Solving ordinary differential equations by Laplace transforms.

TEXT BOOKS:

1. Advanced engineering Mathematics by Kreyszig, John Wiley & Sons Publishers.
2. Higher Engineering Mathematics by B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Advanced Engineering Mathematics by R.K. Jain & S.R.K. Iyengar, 3rd edition, Narosa Publishing House, Delhi.
2. Engineering Mathematics – I by T.K. V. Iyengar, B. Krishna Gandhi & Others, S. Chand.
3. Engineering Mathematics – I by D. S. Chandrasekhar, Prison Books Pvt. Ltd.
4. Engineering Mathematics – I by G. Shanker Rao & Others I.K. International Publications.
5. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, CRC Press Taylor & Francis Group.
6. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
7. Advanced Engineering Mathematics, Michael Greenberg, Second Edition, Pearson Education.

Outcome:

- After learning the contents of this Unit the student is able to write the matrix representation of a set of linear equations and to analyze solutions of system of equations.
- The student will be able to understand the methods of differential calculus to optimize single and multivariable functions.
- The student is able to evaluate the multiple integrals and can apply the concepts to find the Areas, Volumes, Moment of Inertia etc., of regions on a plane or in space.
- The student is able to identify the type of differential equation and uses the right method to solve the differential equation. Also able to apply the theory of differential equations to the real world problems.
- The student is able to solve certain differential equations using Laplace Transform. Also able to transform functions on time domain to frequency domain using Laplace transforms.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE**

L	T/P/D	C
3	-/-	6

(A10302) ENGINEERING MECHANICS**UNIT – I**

Introduction to Engineering Mechanics – Basic Concepts. **Resultants of Force System:** Parallelogram law – Forces and components- Resultant of coplanar Concurrent Forces – Components of forces in Space – Moment of Force - principle of moments – Coplanar Applications – Couples - Resultant of any Force System.

Equilibrium of Force Systems : Free Body Diagrams, Equations of Equilibrium - Equilibrium of planar Systems - Equilibrium of Spatial Systems.

UNIT – II

FRICTION: Introduction – Theory of Friction – Angle of friction - Laws of Friction – Static and Dynamic Frictions – Motion of Bodies: Wedge, Screw, Screw-jack, and Differential Screw-jack.

Transmission of Power: Flat Belt Drives - Types of Flat Belt Drives – Length of Belt, tensions, Tight side, Slack Side, Initial and Centrifugal – Power Transmitted and Condition for Max. Power.

UNIT – III

Centroids and Centers of Gravity: Introduction – Centroids and Centre of gravity of simple figures (from basic principles) – Centroids of Composite Figures - Theorem of Pappus – Center of gravity of bodies and centroids of volumes.

Moments of Inertia : Definition – Polar Moment of Inertia – Radius of gyration - Transfer formula for moment of inertia - Moments of Inertia for Composite areas - Products of Inertia, Transfer Formula for Product of Inertia.

Mass Moment of Inertia : Moment of Inertia of Masses- Transfer Formula for Mass Moments of Inertia - mass moment of inertia of composite bodies.

UNIT – IV

Kinematics of a Particle: Motion of a particle – Rectilinear motion – motion curves – Rectangular components of curvilinear motion– Kinematics of Rigid Body - Types of rigid body motion -Angular motion - Fixed Axis Rotation

Kinetics of particles: Translation -Analysis as a Particle and Analysis as a Rigid Body in Translation – Equations of plane motion - Angular motion - Fixed Axis Rotation – Rolling Bodies.

UNIT – V

Work - Energy Method : Work energy Equations for Translation - Work-Energy Applications to Particle Motion – Work energy applied to Connected Systems - Work energy applied to Fixed Axis Rotation and Plane Motion. Impulse and momentum.

Mechanical Vibrations : Definitions and Concepts – Simple Harmonic Motion – Free vibrations, simple and Compound Pendulums – Torsion Pendulum – Free vibrations without damping: General cases.

TEXT BOOKS:

1. Engineering Mechanics - Statics and Dynamics by Ferdinand.L. Singer / Harper International Edition.
2. Engineering Mechanics/ S. Timoshenko and D.H. Young, Mc Graw Hill Book Compan.

REFERENCES:

1. Engineering Mechanics / Irving Shames / Prentice Hall.
2. A text of Engineering Mechanics /YVD Rao/ K. Govinda Rajulu/ M. Manzoor Hussain, Academic Publishing Company.
3. Engg. Mechanics / M.V. Seshagiri Rao & D Rama Durgaiah/ Universities Press.
4. Engineering Mechanics, Umesh Regl / Tayal.
5. Engg. Mechanics / KL Kumar / Tata McGraw Hill.
6. Engg. Mechanics / S.S. Bhavikati & K.G. Rajasekharappa.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****3 -/- 6****(A10004) ENGINEERING PHYSICS****Objectives:**

It gives

- to the students basic understanding of bonding in solids, crystal structures and techniques to characterize crystals.
- to understand the behavior of electron in a solid and thereby one can determine the conductivity and specific heat values of the solids.
- to study applications in Engineering like memory devices, transformer core and Electromagnetic machinery.
- to help the student to design powerful light sources for various Engineering Applications and also enable them to develop communication systems using Fiber Technology.
- to understand the working of Electronic devices, how to design acoustic proof halls and understand the behavior of the materials at Nano scale.

UNIT-I

Crystallography: Ionic Bond, Covalent Bond, Metallic Bond, Hydrogen Bond, Vander-Waal's Bond, Calculation of Cohesive Energy of diatomic molecule-Space Lattice, Unit Cell, Lattice Parameters, Crystal Systems, Bravais Lattices, Atomic Radius, Co-ordination Number and Packing Factor of SC, BCC, FCC, Miller Indices, Crystal Planes and Directions, Inter Planar Spacing of Orthogonal Crystal Systems, Structure of Diamond and NaCl.

X-ray Diffraction & Defects in Crystals: Bragg's Law, X-Ray diffraction methods: Laue Method, Powder Method: Point Defects: Vacancies, Substitutional, Interstitial, Frenkel and Schottky Defects, line defects (Qualitative) & Burger's Vector.

UNIT-II

Principles of Quantum Mechanics: Waves and Particles, de Broglie Hypothesis, Matter Waves, Davisson and Germer's Experiment, Heisenberg's Uncertainty Principle, Schrödinger's Time Independent Wave Equation - Physical Significance of the Wave Function – Infinite square well potential, extension to three dimensions

Elements of Statistical Mechanics & Electron theory of Solids: Phase space, Ensembles, Micro Canonical, Canonical and Grand Canonical Ensembles - Maxwell-Boltzmann, Bose-Einstein and Fermi-Dirac Statistics (Qualitative Treatment), Concept of Electron Gas, Density of States, Fermi

Energy- Electron in a periodic Potential, Bloch Theorem, Kronig-Penny Model (Qualitative Treatment), E-K curve, Origin of Energy Band Formation in Solids, Concept of Effective Mass of an Electron, Classification of Materials into Conductors, Semi Conductors & Insulators.

UNIT-III

Dielectric Properties: Electric Dipole, Dipole Moment, Dielectric Constant, Polarizability, Electric Susceptibility, Displacement Vector, Electronic, Ionic and Orientation Polarizations and Calculation of Polarizabilities: Ionic and Electronic - Internal Fields in Solids, Clausius - Mossotti Equation, Piezo - electricity and Ferro- electricity.

Magnetic Properties & Superconducting Properties: Permeability, Field Intensity, Magnetic Field Induction, Magnetization, Magnetic Susceptibility, Origin of Magnetic Moment, Bohr Magneton, Classification of Dia, Para and Ferro Magnetic Materials on the basis of Magnetic Moment, Domain Theory of Ferro Magnetism on the basis of Hysteresis Curve, Soft and Hard Magnetic Materials, Properties of Anti-Ferro and Ferri Magnetic Materials and their Applications, Superconductivity, Meissner Effect, Effect of Magnetic field, Type-I & Type-II Superconductors, Applications of Superconductors.

UNIT-IV

Optics: Interference-Interference in thin films (Reflected light), Newton rings experiment- Fraunhofer diffraction due to single slit, N-slits, Diffraction grating experiment , Double refraction-construction and working of Nicol's Prism

Lasers & Fiber Optics: Characteristics of Lasers, Spontaneous and Stimulated Emission of Radiation, Einstein's Coefficients and Relation between them, Population Inversion, Lasing Action, Ruby Laser, Helium-Neon Laser, Semiconductor Diode Laser, Applications of Lasers- Principle of Optical Fiber, Construction of fiber, Acceptance Angle and Acceptance Cone, Numerical Aperture, Types of Optical Fibers: Step Index and Graded Index Fibers, Attenuation in Optical Fibers, Application of Optical Fiber in communication systems.

UNIT-V:

Semiconductor Physics: Fermi Level in Intrinsic and Extrinsic Semiconductors, Calculation of carrier concentration in Intrinsic &, Extrinsic Semiconductors, Direct and Indirect Band gap semiconductors, Hall Effect-Formation of PN Junction, Open Circuit PN Junction, Energy Diagram of PN Diode, Diode Equation, I-V Characteristics of PN Junction diode, Solar cell, LED & Photo Diodes. **Acoustics of Buildings & Acoustic Quieting** Reverberation and Time of Reverberation, Sabine's Formula for Reverberation Time, Measurement of Absorption Coefficient of a Material, factors affecting the Architectural Acoustics and their Remedies

Nanotechnology: Origin of Nanotechnology, Nano Scale, Surface to Volume

Ratio, Quantum Confinement, Bottom-up Fabrication: Sol-gel, Top-down Fabrication: Chemical Vapour Deposition, Characterization by TEM.

TEXT BOOKS:

1. Engineering Physics, K. Malik, A. K. Singh, Tata Mc Graw Hill Book Publishers.
2. Engineering Physics, V. Rajendran, Tata Mc Graw Hill Book Publishers.

REFERENCES:

1. Fundamentals of Physics, David Halliday, Robert Resnick, Jearl Walker by John Wiley & Sons.
2. Sears and Zemansky's University Physics (10th Edition) by Hugh D. Young Roger A. Freedman, T. R. Sandin, A. Lewis Ford Addison-Wesley Publishers.
3. Applied Physics for Engineers – P. Madhusudana Rao (Academic Publishing company, 2013).
4. Solid State Physics – M. Arumugam (Anuradha Publications).
5. Modern Physics – R. Murugesan & K. Siva Prasath – S. Chand & Co. (for Statistical Mechanics).
6. A Text Book of Engg Physics – M. N. Avadhanulu & P. G. Khsirsagar – S. Chand & Co. (for acoustics).
7. Modern Physics by K. Vijaya Kumar, S. Chandralingam: S. Chand & Co. Ltd.
8. Nanotechnology – M. Ratner & D. Ratner (Pearson Ed.).
9. Introduction to Solid State Physics – C. Kittel (Wiley Eastern).
10. Solid State Physics – A.J. Dekker (Macmillan).
11. Applied Physics – Mani Naidu Pearson Education.

Outcomes:

- The student would be able to learn the fundamental concepts on behavior of crystalline solids.
- The knowledge on Fundamentals of Quantum Mechanics, Statistical Mechanics enables the student to apply to various systems like Communications Solar Cells, Photo Cells and so on.
- Design, Characterization and study of properties of materials help the student to prepare new materials for various Engineering applications.
- This course also helps the student exposed to non-destructive testing methods.
- Finally, Engineering Physics Course helps the student to develop problem solving skills and analytical skills.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****3 -/- 6****(A10005) ENGINEERING CHEMISTRY****Objective:**

An engineer is as someone who uses scientific, natural and physical principles to design something of use for people or other living creatures. Much of what any engineer does involves chemistry because everything in our environment has a molecular make up. Engineering requires the concepts of applied chemistry and the more chemistry an engineer understands, the more beneficial it is. In the future, global problems and issues will require an in-depth understanding of chemistry to have a global solution. This syllabus aims at bridging the concepts and theory of chemistry with examples from fields of practical application, thus reinforcing the connection between science and engineering. It deals with the basic principles of various branches of chemistry which are fundamental tools necessary for an accomplished engineer.

UNIT I:

Electrochemistry & Corrosion: Electro Chemistry – Conductance - Specific, Equivalent and Molar conductance and their Units; Applications of Conductance (Conductometric titrations). **EMF:** Galvanic Cells, types of Electrodes – (Calomel, Quinhydrone and glass electrodes); Nernst equation and its applications ; concept of concentration cells, electro chemical series, Potentiometric titrations, determination of P^H using glass electrode-Numerical problems.

Batteries: Primary cells (dry cells) and secondary cells (lead-Acid cell, Ni-Cd cell, Lithium cells). Applications of batteries. **Fuel cells** – Hydrogen – Oxygen fuel cell; methanol – oxygen fuel cell ; Advantages and Applications.

Corrosion and its control: Causes and effects of corrosion; Theories of corrosion – Chemical & Electrochemical corrosion; Types of corrosion (Galvanic, Water line, Pitting and Intergranular); Factors affecting rate of corrosion – Nature of metal and Nature of Environment – Corrosion control methods – Cathodic protection (sacrificial anodic and impressed current). Surface coatings: Metallic coatings & methods of application of metallic coatings - hot dipping (galvanization & tinning), Cementation, cladding, electroplating (copper plating) Electroless plating (Ni plating) - Organic coatings – Paints - constituents and their functions.

UNIT II:

Engineering Materials: Polymers: Types of Polymerization (Chain & Step growth). **Plastics:** Thermoplastic & Thermo setting resins; Compounding &

fabrication of plastics (Compression and injection moulding). Preparation, properties, engineering applications of PVC, Teflon and Bakelite.

Fibers- Characteristics of fibers – preparation, properties and uses of Nylon – 6,6 and Dacron – Fiber Reinforced Plastics (FRP) – applications. **Rubbers** – Natural rubber and its vulcanization. Elastomers – Buna-s, Butyl rubber and Thiokol rubber.

Conducting polymers: Polyacetylene, Polyaniline, Mechanism of Conduction, doping; applications of Conducting polymers. **Bio-degradable Polymers**- preparation and Applications of Poly vinyl acetate and Poly lactic acid - **Cement**: composition of Portland cement, setting & hardening of cement (reactions), **Lubricants**: Classification with examples- Characteristics of a good lubricant & mechanism of lubrication (thick film, thin film and extreme pressure) – properties of lubricants: viscosity, Cloud point, flash and fire points. **Refractories**: Classification, characteristics of a good refractory and applications.

Nanomaterials: Introduction, preparation by sol-gel & chemical vapour deposition methods. Applications of nanomaterials.

UNIT III:

Water and its Treatment: Hardness of Water: Causes of hardness, expression of hardness – units – types of hardness, estimation of temporary & permanent hardness of water by EDTA method - numerical problems. Boiler troubles – Scale & sludges, Priming and foaming, caustic embrittlement and boiler corrosion; Treatment of boiler feed water – Internal treatment (Phosphate, Colloidal and calgon conditioning) – External treatment – Lime Soda process, Zeolite process and ion exchange process. Numerical Problems. **Potable Water**- Its Specifications – Steps involved in treatment of potable water – Disinfection of water by chlorination and ozonisation. Reverse osmosis & its significance.

Unit – IV :

Fuels & Combustion: Fuels – Classification – solid fuels : coal – analysis of coal - proximate and ultimate analysis and their significance. Liquid fuels – petroleum and its refining – cracking – types – fixed bed catalytic cracking. Knocking – octane and cetane rating, synthetic petrol, Bergius and Fischer-Tropsch's process: Gaseous fuels - constituents, characteristics and applications of natural gas, LPG and CNG. Analysis of flue gas by Orsat's apparatus – Numerical Problems.

Combustion – Definition, Calorific value of fuel – HCV , LCV; Determination of calorific value by Junker's gas calorimeter – theoretical calculation of Calorific value by Dulong's formula – Numerical problems on combustion.

UNIT V:

Phase Rule & Surface Chemistry : Phase Rule: Definition of terms: Phase,

component, degree of freedom, phase rule equation. Phase diagrams – one component system- water system. Two component system Lead- Silver, cooling curves, heat treatment based on iron-carbon phase diagram - hardening, annealing and normalization.

Surface Chemistry: Adsorption – Types of Adsorption, Isotherms – Freundlich and Langmuir adsorption isotherm, applications of adsorption; **Colloids**: Classification of Colloids; Electrical & optical properties, micelles, applications of colloids in industry.

TEXT BOOKS:

1. Engineering Chemistry by R.P. Mani, K.N. Mishra, B. Rama Devi / CENGAGE learning.
2. Engineering Chemistry by P.C Jain & Monica Jain, Dhanpatrai Publishing Company (2008).

REFERENCE BOOKS

1. Engineering Chemistry by B. Siva Shankar Mc.Graw Hill Publishing Company Limited, New Delhi (2006).
2. Engineering Chemistry J.C. Kuriacase & J. Rajaram, Tata McGraw Hills Publishing Company Limited, New Delhi (2004).
3. Text Book of Engineering Chemistry by S.S. Dara & Mukkati S. Chand & Co Publishers, New Delhi (2006).
4. Chemistry of Engineering Materials by CV Agarwal, C.P Murthy, A.Naidu, BS Publications.

Outcome:

- Students will demonstrate a depth of knowledge and apply the methods of inquiry in a discipline of their choosing, and they will demonstrate a breadth of knowledge across their choice of varied disciplines.
- Students will demonstrate the ability to access and interpret information, respond and adapt to changing situations, make complex decisions, solve problems, and evaluate actions.
- Students will demonstrate awareness and understanding of the skills necessary to live and work in a diverse engineering world.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****3 -/- 6****(A10501) COMPUTER PROGRAMMING****Objectives:**

- To understand the various steps in Program development.
- To understand the basic concepts in C Programming Language.
- To learn how to write modular and readable C Programs.
- To learn to write programs (using structured programming approach) in C to solve problems.
- To introduce the students to basic data structures such as lists, stacks and queues.
- To make the student understand simple sorting and searching methods.

UNIT - I

Introduction to Computers – Computer Systems, Computing Environments, Computer Languages, Creating and running programs, Program Development.

Introduction to the C Language – Background, C Programs, Identifiers, Types, Variables, Constants, Input / Output, Operators (Arithmetic, relational, logical, bitwise etc.), Expressions, Precedence and Associativity, Expression Evaluation, Type conversions, Statements- Selection Statements (making decisions) – if and switch statements, Repetition statements (loops)-while, for, do-while statements, Loop examples, other statements related to looping – break, continue, goto, Simple C Program examples.

UNIT - II

Functions-Designing Structured Programs, Functions, user defined functions, inter function communication, Standard functions, Scope, Storage classes-auto, register, static, extern, scope rules, type qualifiers, recursion- recursive functions, Limitations of recursion, example C programs, Preprocessor commands.

Arrays – Concepts, using arrays in C, inter function communication, array applications, two – dimensional arrays, multidimensional arrays, C program examples.

UNIT - III

Pointers – Introduction (Basic Concepts), Pointers for inter function communication, pointers to pointers, compatibility, Pointer Applications-Arrays and Pointers, Pointer Arithmetic and arrays, Passing an array to a function,

memory allocation functions, array of pointers, programming applications, pointers to void, pointers to functions.

Strings – Concepts, C Strings, String Input / Output functions, arrays of strings, string manipulation functions, string / data conversion, C program examples.

UNIT - IV

Enumerated, Structure, and Union Types– The Type Definition (typedef), Enumerated types, Structures –Declaration, initialization, accessing structures, operations on structures, Complex structures, structures and functions, Passing structures through pointers, self referential structures, unions, bit fields, C programming examples, command –line arguments.

Input and Output – Concept of a file, streams, text files and binary files, Differences between text and binary files, State of a file, Opening and Closing files, file input / output functions (standard library input / output functions for files), file status functions (error handling), Positioning functions, C program examples.

UNIT – V

Searching and Sorting – Sorting- selection sort, bubble sort, Searching-linear and binary search methods.

Lists- Linear list – singly linked list implementation, insertion, deletion and searching operations on linear list, Stacks-Push and Pop Operations, Queues- Enqueue and Dequeue operations.

TEXT BOOKS:

1. Computer Science: A Structured Programming Approach Using C, B.A.Forouzan and R.F. Gilberg, Third Edition, Cengage Learning.
2. Programming in C. P. Dey and M Ghosh , Oxford University Press.

REFERENCE BOOKS:

1. C& Data structures – P. Padmanabham, Third Edition, B.S. Publications.
2. C for All, S. Thamarai Selvi, R.Murugesan, Anuradha Publications.
3. Problem Solving and Program Design in C, J.R. Hanly and E.B. Koffman, 7th Edition, Pearson education.
4. Programming in C, Ajay Mittal, Pearson.
5. Programming with C, B.Gottfried, 3rd edition, Schaum's outlines, TMH.
6. Problem solving with C, M.T.Somasekhara, PHI
7. Programming with C, R.S.Bickar, Universities Press.
8. Computer Programming & Data Structures, E.Balagurusamy, 4th edition, TMH.
9. Programming in C – Stephen G. Kochan, III Edition, Pearson

Education.

10. The C Programming Language, B.W. Kernighan and Dennis M.Ritchie, PHI.
11. C Programming with problem solving, J.A. Jones & K. Harrow, Dreamtech Press.

Outcomes:

- Demonstrate the basic knowledge of computer hardware and software.
- Ability to apply solving and logical skills to programming in C language and also in other languages.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****2 -/3 6****(A10301) ENGINEERING DRAWING****UNIT – I**

Introduction to Engineering Drawing: Principles of Engineering Drawing/ Graphics – Various Drawing Instruments – Conventions in Drawing – **Lettering practice** – BIS Conventions.

Curves: Constructions of Curves used in Engineering Practice:

- Conic Sections including the Rectangular Hyperbola – General method only.
- Cycloid, Epicycloid and Hypocycloid
- Involute.

Scales: Construction of different types of Scales, Plain, Diagonal, Vernier scale.

UNIT – II**Orthographic Projections in First Angle**

Projection: Principles of Orthographic Projections – Conventions – First and Third Angle projections.

Projections of Points : including Points in all four quadrants.

Projections of Lines : Parallel, perpendicular, inclined to one plane and inclined to both planes. True length and true angle of a line. Traces of a line.

Projections of Planes: Plane parallel, perpendicular and inclined to one reference plane. Plane inclined to both the reference planes.

UNIT – III

Projections of Solids: Projections of regular solids, cube, prisms, pyramids, tetrahedron, cylinder and cone, axis inclined to both planes.

Sections and Sectional Views: Right Regular Solids – Prism, Cylinder, Pyramid, Cone – use of Auxiliary views.

UNIT – IV

Development of Surfaces: Development of Surfaces of Right, Regular Solids – Prisms, Cylinder, Pyramids, Cone and their parts. frustum of solids.

Intersection of Solids:- Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – V

Isometric Projections : Principles of Isometric Projection – Isometric Scale – Isometric Views– Conventions – Plane Figures, Simple and Compound

Solids – Isometric Projection of objects having non- isometric lines. Isometric Projection of parts with Spherical surface.

Transformation of Projections : Conversion of Isometric Views to Orthographic Views. Conversion of orthographic views to isometric views – simple objects.

Perspective Projections : Perspective View : Points, Lines and Plane Figures, Vanishing Point Methods (General Method only).

TEXT BOOKS

1. Engineering Drawing – Basant, Agrawal, TMH
2. Engineering Drawing, N.D. Bhatt

REFERENCES :

1. Engineering Graphics. P I Varghese Tata McGraw Hill Education Pvt. Ltd.
2. Engineering drawing – P.J. Shah .S.Chand Publishers.
3. Engineering Drawing- Johle/Tata Macgraw Hill Book Publishers.
4. Engineering Drawing – M.B. Shah and B.C. Rana, Pearson.
5. Engineering Drawing by K.Venu Gopal & V.Prabu Raja New Age Publications.
6. Engineering Drawing by John. PHI Learning Publisher.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE**

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(A10581) COMPUTER PROGRAMMING LAB**Objectives:**

- To write programs in C to solve the problems.
- To implement linear data structures such as lists, stacks, queues.
- To implement simple searching and sorting methods.

Recommended Systems/Software Requirements:

- Intel based desktop PC
- ANSI C Compiler with Supporting Editors

Week 1

- a) Write a C program to find the sum of individual digits of a positive integer.
- b) A Fibonacci sequence is defined as follows: the first and second terms in the sequence are 0 and 1. Subsequent terms are found by adding the preceding two terms in the sequence. Write a C program to generate the first n terms of the sequence.
- c) Write a C program to generate all the prime numbers between 1 and n, where n is a value supplied by the user.

Week 2

- a) Write a C program to calculate the following Sum:

$$\text{Sum} = 1 - x^2/2! + x^4/4! - x^6/6! + x^8/8! - x^{10}/10!$$
- b) Write a C program to find the roots of a quadratic equation.

Week 3

- a) The total distance travelled by vehicle in 't' seconds is given by distance $s = ut + 1/2at^2$ where 'u' and 'a' are the initial velocity (m/sec.) and acceleration (m/sec²). Write C program to find the distance travelled at regular intervals of time given the values of 'u' and 'a'. The program should provide the flexibility to the user to select his own time intervals and repeat the calculations for different values of 'u' and 'a'.
- b) Write a C program, which takes two integer operands and one operator from the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)

Week 4

- a) Write C programs that use both recursive and non-recursive functions
- To find the factorial of a given integer.

- ii) To find the GCD (greatest common divisor) of two given integers.

Week 5

- a) Write a C program to find the largest integer in a list of integers.
- b) Write a C program that uses functions to perform the following:
 - i) Addition of Two Matrices
 - ii) Multiplication of Two Matrices

Week 6

- a) Write a C program that uses functions to perform the following operations:
 - i) To insert a sub-string in to a given main string from a given position.
 - ii) To delete n Characters from a given position in a given string.
- b) Write a C program to determine if the given string is a palindrome or not

Week 7

- a) Write a C program that displays the position or index in the string S where the string T begins, or – 1 if S doesn't contain T.
- b) Write a C program to count the lines, words and characters in a given text.

Week 8

- a) Write a C program to generate Pascal's triangle.
- b) Write a C program to construct a pyramid of numbers.

Week 9

Write a C program to read in two numbers, x and n, and then compute the sum of this geometric progression:

$$1+x+x^2+x^3+\dots+x^n$$

For example: if n is 3 and x is 5, then the program computes $1+5+25+125$.

Print x, n, the sum

Perform error checking. For example, the formula does not make sense for negative exponents – if n is less than 0. Have your program print an error message if $n < 0$, then go back and read in the next pair of numbers of without computing the sum. Are any values of x also illegal? If so, test for them too.

Week 10

- a) 2's complement of a number is obtained by scanning it from right to left and complementing all the bits after the first appearance of a 1. Thus 2's complement of 11100 is 00100. Write a C program to find the 2's complement of a binary number.
- b) Write a C program to convert a Roman numeral to its decimal equivalent.

Week 11

Write a C program that uses functions to perform the following operations:

- i) Reading a complex number
- ii) Writing a complex number
- iii) Addition of two complex numbers
- iv) Multiplication of two complex numbers

(Note: represent complex number using a structure.)

Week 12

a) Write a C program which copies one file to another.

b) Write a C program to reverse the first n characters in a file.

(Note: The file name and n are specified on the command line.)

Week 13

a) Write a C program to display the contents of a file.

b) Write a C program to merge two files into a third file (i.e., the contents of the first file followed by those of the second are put in the third file)

Week 14

a) Write a C program that uses non recursive function to search for a Key value in a given list of integers using Linear search.

b) Write a C program that uses non recursive function to search for a Key value in a given sorted list of integers using Binary search.

Week 15

a) Write a C program that implements the Selection sort method to sort a given array of integers in ascending order.

b) Write a C program that implements the Bubble sort method to sort a given list of names in ascending order.

Week 16

Write a C program that uses functions to perform the following operations:

- i) Create a singly linked list of integer elements.
- ii) Traverse the above list and display the elements.

Week 17

Write a C program that implements stack (its operations) using a singly linked list to display a given list of integers in reverse order. Ex. input: 10 23 4 6 output: 6 4 23 10

Week 18

Write a C program that implements Queue (its operations) using a singly linked list to display a given list of integers in the same order. Ex. input: 10

23 4 6 output: 10 23 4 6

Week 19

Write a C program to implement the linear regression algorithm.

Week 20

Write a C program to implement the polynomial regression algorithm.

Week 21

Write a C program to implement the Lagrange interpolation.

Week 22

Write C program to implement the Newton- Gregory forward interpolation.

Week 23

Write a C program to implement Trapezoidal method.

Week 24

Write a C program to implement Simpson method.

TEXT BOOKS:

1. C programming and Data Structures, P. Padmanabham, Third Edition, BS Publications.
2. Computer Programming in C, V. Rajaraman, PHI Publishers.
3. C Programming, E.Balagurusamy, 3rd edition, TMH Publishers.
4. C Programming, M.V.S.S.N.Prasad, ACME Learning Pvt. Ltd.
5. C and Data Structures, N.B.Venkateswarlu and E.V.Prasad, S.Chand Publishers.
6. Mastering C, K.R. Venugopal and S.R. Prasad, TMH Publishers.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****- -/3/- 4****(A10081) ENGINEERING PHYSICS / ENGINEERING CHEMISTRY LAB****ENGINEERING PHYSICS LAB****(Any TEN experiments compulsory)****Objectives**

This course on Physics lab is designed with 13 experiments in an academic year. It is common to all branches of Engineering in B.Tech 1st year.

The objective of the course is that the student will have exposure to various experimental skills which is very essential for an Engineering student.

The experiments are selected from various areas of Physics like Physical Optics, Lasers, Fiber Optics, Sound, Mechanics, Electricity & Magnetism and Basic Electronics.

Also the student is exposed to various tools like Screw gauge, Vernier Callipers, Physics Balance, Spectrometer and Microscope.

1. Dispersive power of the material of a prism – Spectrometer
2. Determination of wavelength of a source – Diffraction Grating.
3. Newton's Rings - Radius of curvature of plano convex lens.
4. Melde's experiment – Transverse and longitudinal modes.
5. Time constant of an R-C circuit.
6. L-C-R circuit.
7. Magnetic field along the axis of current carrying coil – Stewart and Gees method.
8. Study the characteristics of LED and LASER sources.
9. Bending losses of fibres & Evaluation of numerical aperture of a given fibre.
10. Energy gap of a material of p-n junction.
11. Torsional pendulum.
12. Wavelength of light –diffraction grating - using laser.
13. Characteristics of a solar cell

LABORATORY MANUAL:

1. Laboratory Manual of Engineering Physics by Dr.Y.Aparna & Dr.K.Venkateswara Rao (V.G.S Publishers)

Outcomes

The student is expected to learn from this laboratory course the concept of error and its analysis. It also allows the student to develop experimental skills to design new experiments in Engineering.

With the exposure to these experiments the student can compare the theory and correlate with experiment.

ENGINEERING CHEMISTRY LAB

List of Experiments (Any 12 of the following)

Titrimetry:

1. Estimation of ferrous iron by dichrometry.
2. Estimation of hardness of water by EDTA method.

Mineral analysis:

3. Determination of percentage of copper in brass.
4. Estimation of manganese dioxide in pyrolusite.

Instrumental Methods:**Colorimetry:**

5. Determination of ferrous iron in cement by colorimetric method
6. Estimation of copper by colorimetric method.

Conductometry:

7. Conductometric titration of strong acid vs strong base.
8. Conductometric titration of mixture of acids vs strong base.

Potentiometry:

9. Titration of strong acid vs strong base by potentiometry.
10. Titration of weak acid vs strong base by potentiometry.

Physical properties:

11. Determination of viscosity of sample oil by redwood / oswald's viscometer.
12. Determination of Surface tension of lubricants.

Preparations:

13. Preparation of Aspirin
14. Preparation of Thiokol rubber

Adsorption:

15. Adsorption of acetic acid on charcoal.

TEXT BOOKS:

1. Practical Engineering Chemistry by K. Mukkanti, etal, B.S. Publications, Hyderabad.
2. Inorganic quantitative analysis, Vogel.

REFERENCE BOOKS:

1. Text Book of engineering chemistry by R. N. Goyal and Harmendra Goel, Ane Books Private Ltd.,
2. A text book on experiments and calculation Engg. S.S. Dara.
3. Instrumental methods of chemical analysis, Chatwal, Anand, Himalaya Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****- -/3/- 4****(A10083) ENGLISH LANGUAGE COMMUNICATION SKILLS LAB**

The **Language Lab** focuses on the production and practice of sounds of language and familiarises the students with the use of English in everyday situations and contexts.

Objectives

- ✎ To facilitate computer-aided multi-media instruction enabling individualized and independent language learning
- ✎ To sensitise the students to the nuances of English speech sounds, word accent, intonation and rhythm
- ✎ To bring about a consistent accent and intelligibility in their pronunciation of English by providing an opportunity for practice in speaking
- ✎ To improve the fluency in spoken English and neutralize mother tongue influence
- ✎ To train students to use language appropriately for interviews, group discussion and public speaking

Syllabus: English Language Communication Skills Lab shall have two parts:

- a. Computer Assisted Language Learning (CALL) Lab**
- b. Interactive Communication Skills (ICS) Lab**

The following course content is prescribed for the **English Language Communication Skills Lab**

Exercise – I

CALL Lab: Introduction to Phonetics – Speech Sounds – Vowels and Consonants

ICS Lab: Ice-Breaking activity and JAM session

Articles, Prepositions, Word formation- Prefixes & Suffixes, Synonyms & Antonyms

Exercise – II

CALL Lab: Structure of Syllables - Past Tense Marker and Plural Marker – Weak Forms and Strong Forms - Consonant Clusters.

ICS Lab: Situational Dialogues – Role-Play- Expressions in Various Situations – Self-introduction and Introducing Others – Greetings – Apologies – Requests – Social and Professional Etiquette - Telephone Etiquette.

Concord (Subject in agreement with verb) and Words often misspelt-confused/misused

Exercise - III

CALL Lab: Minimal Pairs- Word accent and Stress Shifts- Listening Comprehension.

ICS Lab: Descriptions- Narrations- Giving Directions and guidelines.

Sequence of Tenses, Question Tags and One word substitutes.

Exercise – IV

CALL Lab: Intonation and Common errors in Pronunciation.

ICS Lab: Extempore- Public Speaking

Active and Passive Voice, –Common Errors in English, Idioms and Phrases

Exercise – V

CALL Lab: Neutralization of Mother Tongue Influence and Conversation Practice

ICS Lab: Information Transfer- Oral Presentation Skills

Reading Comprehension and Job Application with Resume preparation.

Minimum Requirement of infra structural facilities for ELCS Lab:

1. Computer Assisted Language Learning (CALL) Lab:

The Computer aided Language Lab for 40 students with 40 systems, one master console, LAN facility and English language software for self- study by learners.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- i) P – IV Processor
 - a) Speed – 2.8 GHZ
 - b) RAM – 512 MB Minimum
 - c) Hard Disk – 80 GB
- ii) Headphones of High quality

2. **Interactive Communication Skills (ICS) Lab :**

The Interactive Communication Skills Lab: A Spacious room with movable chairs and audio-visual aids with a Public Address System, a T. V., a digital stereo –audio & video system and camcorder etc.

Books Suggested for English Language Lab Library (to be located within the lab in addition to the CDs of the text book which are loaded on the systems):

1. Suresh Kumar, E. & Sreehari, P. 2009. *A Handbook for English Language Laboratories*. New Delhi: Foundation.
2. *Speaking English Effectively* 2nd Edition by Krishna Mohan and N. P. Singh, 2011. Macmillan Publishers India Ltd. Delhi.
3. Sasi Kumar, V & Dhamija, P.V. *How to Prepare for Group Discussion and Interviews*. Tata McGraw Hill.
4. Hancock, M. 2009. *English Pronunciation in Use. Intermediate*. Cambridge: CUP.
5. Spoken English: A Manual of Speech and Phonetics by R. K. Bansal & J. B. Harrison. 2013. Orient Blackswan. Hyderabad.
6. Hewings, M. 2009. *English Pronunciation in Use. Advanced*. Cambridge: CUP.
7. Marks, J. 2009. *English Pronunciation in Use. Elementary*. Cambridge: CUP.
8. Nambiar, K.C. 2011. *Speaking Accurately. A Course in International Communication*. New Delhi : Foundation.
9. Soundararaj, Francis. 2012. *Basics of Communication in English*. New Delhi: Macmillan.
10. **Spoken English** (CIEFL) in 3 volumes with 6 cassettes, OUP.
11. **English Pronouncing Dictionary** Daniel Jones Current Edition with CD.
12. **A textbook of English Phonetics for Indian Students** by T. Balasubramanian (Macmillan).
13. **Prescribed Lab Manual:** A Manual entitled “*English Language Communication Skills (ELCS) Lab Manual- cum- Work Book*”, published by Cengage Learning India Pvt. Ltd, New Delhi. 2013.

DISTRIBUTION AND WEIGHTAGE OF MARKS***English Language Laboratory Practical Examination:***

1. The practical examinations for the English Language Laboratory shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 year-end Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The year- end Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

Outcomes:

- Better Understanding of nuances of language through audio- visual experience and group activities.
- Neutralization of accent for intelligibility.
- Speaking with clarity and confidence thereby enhancing employability skills of the students.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**I Year B.Tech. CE****L T/P/D C****- -/3/- 4****(A10082) IT WORKSHOP / ENGINEERING WORKSHOP****Objectives:**

The IT Workshop for engineers is a training lab course spread over 54 hours. The modules include training on PC Hardware, Internet & World Wide Web and Productivity tools including Word, Excel and Power Point.

PC Hardware introduces the students to a personal computer and its basic peripherals, the process of assembling a personal computer, installation of system software like MS Windows, Linux and the required device drivers. In addition hardware and software level troubleshooting process, tips and tricks would be covered. **The students should work on working PC to disassemble and assemble to working condition and install Windows and Linux on the same PC. Students are suggested to work similar tasks in the Laptop scenario wherever possible.**

Internet & World Wide Web module introduces the different ways of hooking the PC on to the internet from home and workplace and effectively usage of the internet. Usage of web browsers, email, newsgroups and discussion forums would be covered. In addition, awareness of cyber hygiene, i.e., protecting the personal computer from getting infected with the viruses, worms and other cyber attacks would be introduced.

Productivity tools module would enable the students in crafting professional word documents, excel spread sheets and power point presentations using the Microsoft suite of office tools and LaTeX. **(Recommended to use Microsoft office 2007 in place of MS Office 2003)**

PC Hardware

Week 1 – Task 1 : Identify the peripherals of a computer, components in a CPU and its functions. Draw the block diagram of the CPU along with the configuration of each peripheral and submit to your instructor.

Week 2 – Task 2 : Every student should disassemble and assemble the PC back to working condition. Lab instructors should verify the work and follow it up with a Viva. Also students need to go through the video which shows the process of assembling a PC. A video would be given as part of the course content.

Week 3 – Task 3 : Every student should individually install MS windows on the personal computer. Lab instructor should verify the installation and follow it up with a Viva.

Week 4 – Task 4 : Every student should install Linux on the computer. This computer should have windows installed. The system should be configured as dual boot with both windows and Linux. Lab instructors should verify the installation and follow it up with a Viva

Week 5 – Task 5: Hardware Troubleshooting: Students have to be given a PC which does not boot due to improper assembly or defective peripherals. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva

Week 6 – Task 6 : Software Troubleshooting : Students have to be given a malfunctioning CPU due to system software problems. They should identify the problem and fix it to get the computer back to working condition. The work done should be verified by the instructor and followed up with a Viva.

Internet & World Wide Web

Week 7 - Task 1 : Orientation & Connectivity Boot Camp : Students should get connected to their Local Area Network and access the Internet. In the process they configure the TCP/IP setting. Finally students should demonstrate, to the instructor, how to access the websites and email. If there is no internet connectivity preparations need to be made by the instructors to simulate the WWW on the LAN.

Week 8 - Task 2 : Web Browsers, Surfing the Web : Students customize their web browsers with the LAN proxy settings, bookmarks, search toolbars and pop up blockers. Also, plug-ins like Macromedia Flash and JRE for applets should be configured.

Week 9 - Task 3 : Search Engines & Netiquette : Students should know what search engines are and how to use the search engines. A few topics would be given to the students for which they need to search on Google. This should be demonstrated to the instructors by the student.

Week 10 - Task 4: Cyber Hygiene: Students would be exposed to the various threats on the internet and would be asked to configure their computer to be safe on the internet. They need to first install antivirus software, configure their personal firewall and windows update on their computer. Then they need to customize their browsers to block pop ups, block active x downloads to avoid viruses and/or worms.

Week 11- Task 5: Develop your home page using HTML Consisting of your photo, name, address and education details as a table and your skill set as a list.

Productivity tools**LaTeX and Word**

Week 12 – Word Orientation: The mentor needs to give an overview of LaTeX and Microsoft (MS) office 2007/ equivalent (FOSS) tool word: Importance of LaTeX and MS office 2007/ equivalent (FOSS) tool Word as word Processors, Details of the three tasks and features that would be covered in each, using LaTeX and word – Accessing, overview of toolbars, saving files, Using help and resources, rulers, format painter.

Task 1 : Using LaTeX and Word to create project certificate. Features to be covered:-Formatting Fonts in word, Drop Cap in word, Applying Text effects, Using Character Spacing, Borders and Colors, Inserting Header and Footer, Using Date and Time option in both LaTeX and Word.

Week 13 - Task 2: Creating project abstract Features to be covered:- Formatting Styles, Inserting table, Bullets and Numbering, Changing Text Direction, Cell alignment, Footnote, Hyperlink, Symbols, Spell Check, Track Changes.

Week 14 - Task 3 : Creating a Newsletter : Features to be covered:- Table of Content, Newspaper columns, Images from files and clipart, Drawing toolbar and Word Art, Formatting Images, Textboxes, Paragraphs and Mail Merge in word.

Excel

Week 15 - Excel Orientation: The mentor needs to tell the importance of MS office 2007/ equivalent (FOSS) tool Excel as a Spreadsheet tool, give the details of the two tasks and features that would be covered in each. Using Excel – Accessing, overview of toolbars, saving excel files, Using help and resources.

Task 1: Creating a Scheduler - Features to be covered:- Gridlines, Format Cells, Summation, auto fill, Formatting Text

Week 16 - Task 2 : Calculating GPA - .Features to be covered:- Cell Referencing, Formulae in excel – average, std. deviation, Charts, Renaming and Inserting worksheets, Hyper linking, Count function, LOOKUP/VLOOKUP, Sorting, Conditional formatting

LaTeX and MS/equivalent (FOSS) tool Power Point

Week 17 - Task1: Students will be working on basic power point utilities and tools which help them create basic power point presentation. Topic covered during this week includes :- PPT Orientation, Slide Layouts, Inserting Text, Word Art, Formatting Text, Bullets and Numbering, Auto Shapes, Lines and

Arrows in both LaTeX and Power point. Students will be given model power point presentation which needs to be replicated (exactly how it's asked).

Week 18- Task 2: Second week helps students in making their presentations interactive. Topic covered during this week includes: Hyperlinks, Inserting – Images, Clip Art, Audio, Video, Objects, Tables and Charts

Week 19 - Task 3: Concentrating on the in and out of Microsoft power point and presentations in LaTeX. Helps them learn best practices in designing and preparing power point presentation. Topic covered during this week includes: - Master Layouts (slide, template, and notes), Types of views (basic, presentation, slide slotter, notes etc), Inserting – Background, textures, Design Templates, Hidden slides.

REFERENCE BOOKS:

1. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
2. LaTeX Companion – Leslie Lamport, PHI/Pearson.
3. Introduction to Computers, Peter Norton, 6/e Mc Graw Hill Publishers.
4. Upgrading and Repairing, PC's 18th e, Scott Muller QUE, Pearson Education
5. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech
6. IT Essentials PC Hardware and Software Companion Guide Third Edition by David Anfinson and Ken Quamme. – CISCO Press, Pearson Education.
7. PC Hardware and A+Handbook – Kate J. Chase PHI (Microsoft)

Outcomes:

- Apply knowledge for computer assembling and software installation.
- Ability how to solve the trouble shooting problems.
- Apply the tools for preparation of PPT, Documentation and budget sheet etc.

ENGINEERING WORKSHOP

1. TRADES FOR EXERCISES:

At least two exercises from each trade:

1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.

4. Black Smithy
5. House-wiring
6. Foundry
7. Welding
8. Power tools in construction, wood working, electrical engineering and mechanical Engineering.

2. TRADES FOR DEMONSTRATION & EXPOSURE:

1. Plumbing
2. Machine Shop
3. Metal Cutting (Water Plasma)

TEXT BOOK:

1. Work shop Manual - P.Kannaiah/ K.L.Narayana/ Scitech Publishers.
2. Workshop Manual / Venkat Reddy/ BS Publications/Sixth Edition.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

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(A30006) MATHEMATICS - II**Objectives:**

- The objective is to find the relation between the variables x and y out of the given data (x,y).
- This unit also aims to find such relationships which exactly pass through data or approximately satisfy the data under the condition of least sum of squares of errors.
- The aim of numerical methods is to provide systematic methods for solving problems in a numerical form using the given initial data.
- This topic deals with methods to find roots of an equation and solving a differential equation.
- The numerical methods are important because finding an analytical procedure to solve an equation may not be always available.
- In the diverse fields like electrical circuits, electronic communication, mechanical vibration and structural engineering, periodic functions naturally occur and hence their properties are very much required.
- Indeed, any periodic and non-periodic function can be best analyzed in one way by Fourier series and transforms methods.
- The unit aims at forming a partial differential equation (PDE) for a function with many variables and their solution methods. Two important methods for first order PDE's are learnt. While separation of variables technique is learnt for typical second order PDE's such as Wave, Heat and Laplace equations.
- In many Engineering fields the physical quantities involved are vector-valued functions.
- Hence the unit aims at the basic properties of vector-valued functions and their applications to line integrals, surface integrals and volume integrals.

UNIT – I

Vector Calculus: Vector Calculus: Scalar point function and vector point function, Gradient- Divergence- Curl and their related properties. Solenoidal and irrotational vectors – finding the Potential function. Laplacian operator. Line integral – work done – Surface integrals -Volume integral. Green's

Theorem, Stoke's theorem and Gauss's Divergence Theorems (Statement & their Verification).

UNIT – II:

Fourier series and Fourier Transforms: Definition of periodic function. Fourier expansion of periodic functions in a given interval of length 2π . Determination of Fourier coefficients – Fourier series of even and odd functions – Fourier series in an arbitrary interval – even and odd periodic continuation – Half-range Fourier sine and cosine expansions.

Fourier integral theorem - Fourier sine and cosine integrals. Fourier transforms – Fourier sine and cosine transforms – properties – inverse transforms – Finite Fourier transforms.

UNIT – III:

Interpolation and Curve fitting

Interpolation: Introduction- Errors in Polynomial Interpolation – Finite differences- Forward Differences- Backward differences –Central differences – Symbolic relations of symbols. Difference expressions – Differences of a polynomial-Newton's formulae for interpolation - Gauss Central Difference Formulae –Interpolation with unevenly spaced points-Lagrange's Interpolation formula.

Curve fitting: Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares.

UNIT – IV : Numerical techniques

Solution of Algebraic and Transcendental Equations and Linear system of equations: Introduction – Graphical interpretation of solution of equations .The Bisection Method – The Method of False Position – The Iteration Method – Newton-Raphson Method .

Solving system of non-homogeneous equations by L-U Decomposition method (Crout's Method). Jacobi's and Gauss-Seidel iteration methods.

UNIT – V

Numerical Integration and Numerical solutions of differential equations:

Numerical integration - Trapezoidal rule, Simpson's $1/3^{\text{rd}}$ and $3/8$ Rule , Gauss-Legendre one point, two point and three point formulas.

Numerical solution of Ordinary Differential equations: Picard's Method of successive approximations. Solution by Taylor's series method – Single step methods-Euler's Method-Euler's modified method, Runge-Kutta (second and classical fourth order) Methods.

Boundary values & Eigen value problems: Shooting method, Finite difference method and solving eigen values problems, power method

TEXT BOOKS:

1. Advanced Engineering Mathematics by Kreyszig, John Wiley & Sons.
2. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna Publishers.

REFERENCES:

1. Mathematical Methods by T.K.V. Iyengar, B.Krishna Gandhi & Others, S. Chand.
2. Introductory Methods by Numerical Analysis by S.S. Sastry, PHI Learning Pvt. Ltd.
3. Mathematical Methods by G.Shankar Rao, I.K. International Publications, N.Delhi.
4. Advanced Engineering Mathematics with MATLAB, Dean G. Duffy, 3rd Edi, 2013, CRC Press Taylor & Francis Group.
5. Mathematics for Engineers and Scientists, Alan Jeffrey, 6th Edi, 2013, Chapman & Hall/ CRC.
6. Advanced Engineering Mathematics, Michael Greenberg, Second Edition. Person Education.
7. Mathematics For Engineers By K.B.Datta And M.A S.Srinivas, Cengage Publications.

Outcomes: From a given discrete data, one will be able to predict the value of the data at an intermediate point and by curve fitting, can find the most appropriate formula for a guessed relation of the data variables. This method of analysis data helps engineers to understand the system for better interpretation and decision making

- After studying this unit one will be able to find a root of a given equation and will be able to find a numerical solution for a given differential equation.
- Helps in describing the system by an ODE, if possible. Also, suggests to find the solution as a first approximation.
- One will be able to find the expansion of a given function by Fourier series and Fourier Transform of the function.
- Helps in phase transformation, Phase change and attenuation of coefficients in acoustics.
- After studying this unit, one will be able to find a corresponding Partial

Differential Equation for an unknown function with many independent variables and to find their solution.

- Most of the problems in physical and engineering applications, problems are highly non-linear and hence expressing them as PDEs'. Hence understanding the nature of the equation and finding a suitable solution is very much essential.
- After studying this unit, one will be able to evaluate multiple integrals (line, surface, volume integrals) and convert line integrals to area integrals and surface integrals to volume integrals.
- It is an essential requirement for an engineer to understand the behavior of the physical system.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30203) ELECTRICAL AND ELECTRONICS ENGINEERING****OBJECTIVE:**

This course introduces the concepts of electrical DC and AC circuits, basic law's of electricity, instruments to measure the electrical quantities, different methods to solve the electrical networks, construction operational features of energy conversion devices i.e. DC and AC machines, transformers. It also emphasis on basics of electronics, semiconductor devices and their characteristics and operational features.

UNIT-I:

Electrical Circuits: Basic definitions, Types of elements, Ohm's Law, Resistive networks, Kirchhoff's Laws, Inductive networks, capacitive networks, Series, Parallel circuits and Star-delta and delta-star transformations.

Instruments: Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

UNIT-II:

DC Machines: Principle of operation of DC Generator – EMF equation - types – DC motor types –torque equation – applications – three point starter.

UNIT-III:

Transformers: Principle of operation of single phase transformers –EMF equation – losses – efficiency and regulation.

AC Machines: Principle of operation of alternators – regulation by synchronous impedance method –Principle of operation of induction motor – slip – torque characteristics – applications.

UNIT-IV:

Diodes: P-n junction diode, symbol, V-I Characteristics, Diode Applications, and Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems).

Transistors: PNP and NPN Junction transistor, Transistor as an amplifier, SCR characteristics and applications.

UNIT-V:

Cathode Ray Oscillos Scope: Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

EEE: TEXT BOOKS:

1. Basic concepts of Electrical Engineering, PS Subramanyam, BS

Publications.

2. Basic Electrical Engineering, S.N. Singh, PHI.

EEE: REFERENCE BOOKS:

1. Basic Electrical Engineering, Abhijit Chakrabarthi, Sudipta nath, Chandrakumar Chanda, Tata-McGraw-Hill.
2. Principles of Electrical Engineering, V.K Mehta, Rohit Mehta, S.Chand Publications.
3. Basic Electrical Engineering, T.K.Nagasarkar and M.S. Sukhija, Oxford University Press.
4. Fundamentals of Electrical Engineering, RajendraPrasad, PHI.
5. Basic Electrical Engineering by D.P.Kothari , I.J. Nagrath, McGraw-Hill.

ECE: TEXT BOOKS:

1. Electronic Devices and Circuits, S.Salivahanan, N.Suresh Kumar, A.Vallavaraj,Tata McGraw-Hill companies..
2. Electronic Devices and Circuits, K. Lal Kishore,BS Publications.

ECE: REFERENCE BOOKS:

1. Millman's Electronic Devices and Circuits,J. Millman, C.C.Halkias, and Satyabrata Jit, Tata McGraw-Hill companies.
2. Electronic Devices and Circuits, R.L. Boylestad and Louis Nashelsky,PEI/PHI.
3. Introduction to Electronic Devices and Circuits, Rober T. Paynter,PE.
4. Integrated Electronics, J. Millman and Christos C. Halkias, Tata McGraw-Hill companies.
5. Electronic Devices and Circuits, Anil K. Maini, Varsha Agarwal,Wiley India Pvt. Ltd.

Outcomes:

After going through this course the student gets a thorough knowledge on basic electrical circuits, parameters, and operation of the transformers in the energy conversion process, electromechanical energy conversion, construction operation characteristics of DC and AC machines and the constructional features and operation of measuring instruments like voltmeter, ammeter, wattmeter etc...and different semiconductor devices, their voltage-current characteristics, operation of diodes, transistors, realization of various electronic circuits with the various semiconductor devices, and cathode ray oscilloscope, With which he/she can able to apply the above conceptual things to real-world electrical and electronics problems and applications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

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(A30107) STRENGTH OF MATERIALS – I**UNIT – I**

Simple Stresses and Strains : Elasticity and plasticity – Types of stresses and strains – Hooke's law – stress – strain diagram for mild steel – Working stress – Factor of safety – Lateral strain, Poisson's ratio and volumetric strain – Elastic moduli and the relationship between them – Bars of varying section – composite bars – Temperature stresses. Elastic constants.

Strain Energy – Resilience – Gradual, sudden, impact and shock loadings – simple applications.

UNIT – II

Shear Force and Bending Moment : Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, uniformly distributed load, uniformly varying loads and combination of these loads – Point of contraflexure – Relation between S.F., B.M and rate of loading at a section of a beam.

UNIT – III

Flexural Stresses: Theory of simple bending – Assumptions – Derivation of bending equation: $M/I = f/y = E/R$ - Neutral axis – Determination of bending stresses – Section modulus of rectangular and circular sections (Solid and Hollow), I,T, Angle and Channel sections – Design of simple beam sections.

SHEAR STRESSES : Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections.

UNIT – IV

Principal Stresses and Strains : Introduction – Stresses on an inclined section of a bar under axial loading – compound stresses – Normal and tangential stresses on an inclined plane for biaxial stresses – Two perpendicular normal stresses accompanied by a state of simple shear – Mohr's circle of stresses – Principal stresses and strains – Analytical and graphical solutions.

Theories of Failure: Introduction – Various theories of failure - Maximum Principal Stress Theory, Maximum Principal Strain Theory, Strain Energy and Shear Strain Energy Theory (Von Mises Theory).

UNIT – V

Deflection of Beams : Bending into a circular arc – slope, deflection and radius of curvature – Differential equation for the elastic line of a beam –

Double integration and Macaulay's methods – Determination of slope and deflection for cantilever and simply supported beams subjected to point loads, U.D.L, Uniformly varying load-Mohr's theorems – Moment area method – application to simple cases including overhanging beams.

Conjugate Beam Method: Introduction – Concept of conjugate beam method. Difference between a real beam and a conjugate beam. Deflections of determinate beams with constant and different moments of inertia.

TEXT BOOKS:

- 1) Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.
- 2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.
- 3) Mechanics of Materials by Pytel, Cengage Learning Pvt. Ltd.

REFERENCES:

- 1) Strength of Materials by S.S.Bhavikatti, Vikas Publishing House Pvt. Ltd.
- 2) Mechanics of Structures Vol –I by H.J.Shah and S.B.Junnarkar, Charotar Publishing House Pvt. Ltd.
- 3) Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.
- 4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.
- 5) Fundamentals of Solid Mechancis by M.L.Gambhir, PHI Learning Pvt. Ltd
- 6) Strength of Materials and Structures by John Case *et al.*, Butterworth-Heinemann.
- 7) Strength of Materials by R.Subramanian, Oxford University Press.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30108) SURVEYING****UNIT – I**

Introduction: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications, Scales, Conventional Symbols, Signals

Distances and Direction: Distance measurement methods; use of chain, tape and Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

UNIT – II

Leveling and Contouring: Concept and Terminology, Temporary adjustments- method of leveling.

Characteristics and Uses of contours- methods of conducting contour surveys and their plotting.

UNIT – III

Computation of Areas and Volumes: Area from field notes, computation of areas along irregular boundaries and area consisting of regular boundaries. Embankments and cutting for a level section and two level sections with and without transverse slopes, determination of the capacity of reservoir, volume of barrow pits.

UNIT -IV

Theodolite: Theodolite, description, uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite. Trigonometrical leveling, Traversing.

UNIT – V

Tacheometric Surveying: Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position. **Curves:** Types of curves, design and setting out – simple and compound curves.

Introduction to Advanced Surveying : Total Station and Global positioning system, Introduction to Geographic information system (GIS).

TEXT BOOKS:

1. Chandra A M, "Plane Surveying" and "Higher Surveying" New age International Pvt. Ltd., Publishers, New Delhi, 2002
2. Duggal S K, "Surveying (Vol – 1 & 2), Tata Mc.Graw Hill Publishing Co. Ltd. New Delhi, 2004.

3. Text book of surveying by C.Venkataramaiah, Unversitiies Press

REFERENCES:

1. Surveying and Leveling by R. Subramanian, Second Edition Oxford University Press - 2012
2. Surveying Theory and Practice Seventh edition by James M. and Anderson Edward M. Mikhail TATA McGraw Hill
3. Arthur R Benton and Philip J Taety, Elements of Plane Surying, McGraw Hill – 2000
4. "Advanced Surveying Total Station GIS and Remote Sensing by Satheesh Gopi, R. Sathi Kumar and N. Madhu.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30101) FLUID MECHANICS****UNIT I**

Introduction : Dimensions and units – Physical properties of fluids specific gravity, viscosity, surface tension, vapor pressure and their influences on fluid motion pressure at a point, Pascal's law, Hydrostatic law - atmospheric, gauge and vacuum pressure- measurement of pressure. Pressure gauges, Manometers: differential and Micro Manometers.

Hydrostatic Forces : Hydrostatic forces on submerged plane, Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT – II

Fluid Kinematics : Description of fluid flow, Stream line, path line and streak lines and stream tube. Classification of flows : Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two , three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT –III

Fluid Dynamics: Surface and body forces – Euler's and Bernoulli's equations for flow along a stream line for 3-D flow, (Navier – stokes equations (Explanatory) Momentum equation and its application – forces on pipe bend.

Pitot tube, Venturi meter and orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches - –Broad crested weirs.

UNIT – IV

Boundary Layer Theory : Approximate Solutions of Navier Stoke's Equations – Boundary layer – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarmen momentum integral equation, laminar and turbulent Boundary layers (no deviation), BL in transition, separation of BL, control of BL, flow around submerged objects- Drag and Lift- Magnus effect.

UNIT –V

Closed Conduit Flow : Reynold's experiment – Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes. Laws of Fluid friction – Darcy's equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic

gradient line. Pipe network problems, variation of friction factor with Reynold's number – Moody's Chart.

TEXT BOOKS:

1. Fluid Mechanics by Modi and Seth, Standard book house.
2. Introduction to Fluid Machines by S.K.Som & G.Biswas (Tata Mc.Grawhill publishers Pvt. Ltd.)
3. Mechanics of Fluids by Potter, Cengage Learning Pvt. Ltd.

REFERENCES:

1. Fluid Mechanics Basic Concepts & Principles, Shiv Kumar, Ane Books Pvt Ltd.
2. Fluid Mechanics and Machinery, CSP Ojha, Oxford Higher Education
3. Fluid Mechanics by Frank.M. White (Tata Mc.Grawhill Pvt. Ltd.)
4. Fluid Mechanics by A.K. Mohanty, Prentice Hall of India Pvt. Ltd., New Delhi
5. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) Ltd., New Delhi.
6. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem****L T/P/D C****4 -/- 4****(A30010) MANAGERIAL ECONOMICS AND FINANCIAL ANALYSIS****Objectives:**

To enable the student to understand and appreciate, with a practical insight, the importance of certain basic issues governing the business operations namely: demand and supply, production function, cost analysis, markets, forms of business organisations, capital budgeting and financial accounting and financial analysis.

Unit I

Introduction & Demand Analysis: Definition, Nature and Scope of Managerial Economics. Demand Analysis: Demand Determinants, Law of Demand and its exceptions. *Elasticity of Demand*: Definition, Types, Measurement and Significance of Elasticity of Demand. *Demand Forecasting*, Factors governing demand forecasting, methods of demand forecasting.

Unit II

Production & Cost Analysis: *Production Function* – Isoquants and Isocosts, MRTS, Least Cost Combination of Inputs, Cobb-Douglas Production function, Laws of Returns, Internal and External Economies of Scale. *Cost Analysis*: Cost concepts. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems) - Managerial Significance.

Unit III

Markets & New Economic Environment: Types of competition and Markets, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly. *Pricing*: Objectives and Policies of Pricing. Methods of Pricing. *Business*: Features and evaluation of different forms of Business Organisation: Sole Proprietorship, Partnership, Joint Stock Company, Public Enterprises and their types, *New Economic Environment*: Changing Business Environment in Post-liberalization scenario.

Unit IV

Capital Budgeting: Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising capital - Trading Forecast, Capital Budget, Cash Budget. Capital Budgeting: features of capital budgeting proposals, Methods of Capital Budgeting: Payback Method, Accounting Rate of Return (ARR) and Net Present Value Method (simple problems).

Unit V

Introduction to Financial Accounting & Financial Analysis: Accounting concepts and Conventions - Introduction IFRS - Double-Entry Book Keeping, Journal, Ledger, Trial Balance- Final Accounts (Trading Account, Profit and Loss Account and Balance Sheet with simple adjustments). *Financial Analysis:* Analysis and Interpretation of Liquidity Ratios, Activity Ratios, and Capital structure Ratios and Profitability ratios. Du Pont Chart.

TEXT BOOKS:

1. Varshney & Maheswari: Managerial Economics, Sultan Chand, 2009.
2. S.A. Siddiqui & A.S. Siddiqui, Managerial Economics and Financial Analysis, New Age international Publishers, Hyderabad 2013.
3. M. Kasi Reddy & Saraswathi, Managerial Economics and Financial Analysis, PHI New Delhi, 2012.

REFERENCES:

1. Ambrish Gupta, Financial Accounting for Management, Pearson Education, New Delhi.2012.
2. H. Craig Peterson & W. Cris Lewis, Managerial Economics, Pearson, 2012.
3. Lipsey & Chrystel, Economics, Oxford University Press, 2012
4. Domnick Salvatore: Managerial Economics in a Global Economy, Thomson, 2012.
5. Narayanaswamy: Financial Accounting—A Managerial Perspective, Pearson, 2012.
6. S.N.Maheswari & S.K. Maheswari, Financial Accounting, Vikas, 2012.
7. Truet and Truet: Managerial Economics: Analysis, Problems and Cases, Wiley, 2012.
8. Dwivedi: Managerial Economics, Vikas, 2012.
9. Shailaja & Usha : MEFA, University Press, 2012.
10. Aryasri: Managerial Economics and Financial Analysis, TMH, 2012.
11. Vijay Kumar & Appa Rao, Managerial Economics & Financial Analysis, Cengage 2011.
12. J. V. Prabhakar Rao & P.V. Rao, Managerial Economics & Financial Analysis, Maruthi Publishers, 2011.

Outcomes:

At the end of the course, the student will

- Understand the market dynamics namely, demand and supply, demand forecasting , elasticity of demand and supply, pricing methods

and pricing in different market structures.

- Gain an insight into how production function is carried out to achieve least cost combination of inputs and cost analysis
- Develop an understanding of
- Analyse how capital budgeting decisions are carried out
- Understand the framework for both manual and computerised accounting process
- Know how to analyse and interpret the financial statements through ratio analysis.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	L	T/P/D	C
	-	-/3/-	2

(A30185) SURVEYING LAB – I**LIST OF EXERCISES:**

1. Survey of an area by chain survey (closed traverse) & Plotting
2. Chaining across obstacles
3. Determination of distance between two inaccessible points with compass.
4. Surveying of a given area by prismatic compass (closed traverse) and plotting after adjustment.
5. Radiation method, intersection methods by plane Table survey
6. Two point and three point problems in plane table survey
7. Traversing by plane table survey
8. Fly leveling (differential leveling)
9. An exercise of L.S and C.S and plotting
10. Two exercises on contouring.

List of Major Equipment:

1. Chains, tapes, Ranging rods, cross staff, arrows
2. Compasses and Tripods, Optical square.
3. Plane tables, Alidade, Plumbing fork, trough compasses
4. Leveling instruments and leveling staves
5. Box sextants, planimeter.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

L	T/P/D	C
-	-/3/-	2

(A30183) STRENGTH OF MATERIALS LAB

1. Tension test
2. Bending test on (Steel / Wood) Cantilever beam.
3. Bending test on simple support beam.
4. Torsion test
5. Hardness test
6. Spring test
7. Compression test on wood or concrete
8. Impact test
9. Shear test
10. Verification of Maxwell's Reciprocal theorem on beams.
11. Use of electrical resistance strain gauges
12. Continuous beam – deflection test.

List of Major Equipment:

1. UTM for conducting tension test on rods
2. Steel beam for flexure test
3. Wooden beam for flexure test
4. Torsion testing machine
5. Brinnell's / Rock well's hardness testing machine
6. Spring testing machine
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell's theorem verification.
11. Continuous beam setup
12. Electrical Resistance gauges.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem**

L	T/P/D	C
4	-/-/-	4

(A40008) PROBABILITY AND STATISTICS**Objectives: To learn**

- Understand a random variable that describes randomness or an uncertainty in certain realistic situation. It can be of either discrete or continuous type.
- In the discrete case, study of the binomial and the Poisson random variables and the Normal random variable for the continuous case predominantly describe important probability distributions. Important statistical properties for these random variables provide very good insight and are essential for industrial applications.
- Most of the random situations are described as functions of many single random variables. In this unit, the objective is to learn functions of many random variables through joint distributions.
- The types of sampling, Sampling distribution of means, Sampling distribution of variance, Estimations of statistical parameters, Testing of hypothesis of few unknown statistical parameters.
- The mechanism of queuing system, The characteristics of queue, The mean arrival and service rates
- The expected queue length, The waiting line
- The random processes, The classification of random processes, Markov chain, Classification of states
- Stochastic matrix (transition probability matrix), Limiting probabilities, Applications of Markov chains

UNIT-I:

Single Random variables and probability distributions: Random variables – Discrete and continuous. Probability distributions, mass function/ density function of a probability distribution. Mathematical Expectation, Moment about origin, Central moments Moment generating function of probability distribution. Binomial, Poisson & normal distributions and their properties. Moment generating functions of the above three distributions. and hence finding the mean and variance.

UNIT-II

Multiple Random variables, Correlation & Regression: Joint probability distributions- Joint probability mass / density function, Marginal probability mass / density functions, Covariance of two random variables, Correlation - Coefficient of correlation, The rank correlation. Regression- Regression

Coefficient, The lines of regression and multiple correlation & regression.

UNIT-III:

Sampling Distributions and Testing of Hypothesis : Sampling: Definitions of population, sampling, statistic, parameter. Types of sampling, Expected values of Sample mean and variance, sampling distribution, Standard error, Sampling distribution of means and sampling distribution of variance.

Parameter estimations – likelihood estimate, interval estimations .

Testing of hypothesis: Null hypothesis, Alternate hypothesis, type I, & type II errors – critical region, confidence interval, Level of significance. One sided test, Two sided test,

Large sample tests:

- (i) Test of Equality of means of two samples equality of sample mean and population mean (cases of known variance & unknown variance, equal and unequal variances)
- (ii) Tests of significance of difference between sample S.D and population S.D.
- (iii) Tests of significance difference between sample proportion and population proportion & difference between two sample proportions.

Small sample tests: Student t-distribution, its properties; Test of significance difference between sample mean and population mean; difference between means of two small samples

Snedecor's F- distribution and its properties. Test of equality of two population variances

Chi-square distribution , its properties, Chi-square test of goodness of fit

UNIT-IV

Queuing Theory: Structure of a queuing system, Operating Characteristics of queuing system, Transient and steady states, Terminology of Queuing systems, Arrival and service processes- Pure Birth-Death process Deterministic queuing models- M/M/1 Model of infinite queue, M/M/1 model of finite queue .

UNIT-V

Stochastic processes: Introduction to Stochastic Processes –Classification of Random processes, Methods of description of random processes, Stationary and non-stationary random process, Average values of single random process and two or more random processes. Markov process, Markov chain, classification of states – Examples of Markov Chains, Stochastic Matrix.

TEXT BOOKS:

1. Higher Engineering Mathematics by Dr. B.S. Grewal, Khanna

Publishers

2. Probability and Statistics for Engineers and Scientists by Sheldon M. Ross, Academic Press
3. Operations Research by S.D. Sarma,

REFERENCE BOOKS:

1. Mathematics for Engineers by K.B. Datta and M.A. S. Srinivas, Cengage Publications
2. Probability and Statistics by T.K.V. Iyengar & B. Krishna Gandhi Et
3. Fundamentals of Mathematical Statistics by S. C. Gupta and V.K. Kapoor
4. Probability and Statistics for Engineers and Scientists by Jay I. Devore.
5. Probability Theory & Stochastic Processes by P. Sri Hari, Hi-Tech Publishers.
6. Probability & Statistics by Ahmed Waheedullah, M. Ahmed Mohiuddin, Sultan Ali, HI-TECH Publishers

Outcomes:

- Students would be able to identify distribution in certain realistic situation. It is mainly useful for circuit as well as non-circuit branches of engineering. Also able to differentiate among many random variables involved in the probability models. It is quite useful for all branches of engineering.
- The student would be able to calculate mean and proportions (small and large sample) and to make important decisions from few samples which are taken out of unmanageably huge populations. It is mainly useful for non-circuit branches of engineering.
- The students would be able to find the expected queue length, the ideal time, the traffic intensity and the waiting time. These are very useful tools in many engineering and data management problems in the industry. It is useful for all branches of engineering.
- The student would be able to understand about the random process, Markov process and Markov chains which are essentially models of many time dependent processes such as signals in communications, time series analysis, queuing systems. The student would be able to find the limiting probabilities and the probabilities in n^{th} state. It is quite useful for all branches of engineering.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40114) STRENGTH OF MATERIALS – II****UNIT – I**

Torsion of Circular Shafts : Theory of pure torsion – Derivation of Torsion equations : $T/J = q/r = N\theta/L$ – Assumptions made in the theory of pure torsion – Torsional moment of resistance – Polar section modulus – Power transmitted by shafts – Combined bending and torsion and end thrust – Design of shafts according to theories of failure.

Springs: Introduction – Types of springs – deflection of close and open coiled helical springs under axial pull and axial couple – springs in series and parallel – Carriage or leaf springs.

UNIT – II

Columns and Struts : Introduction – Types of columns – Short, medium and long columns – Axially loaded compression members – Crushing load – Euler's theorem for long columns- assumptions- derivation of Euler's critical load formulae for various end conditions – Equivalent length of a column – slenderness ratio – Euler's critical stress – Limitations of Euler's theory – Rankine – Gordon formula – Long columns subjected to eccentric loading – Secant formula – Empirical formulae – Straight line formula – Prof. Perry's formula.

Beams Curved in Plan: Introduction – circular beams loaded uniformly and supported on symmetrically placed Columns – Semi-circular beam simply-supported on three equally spaced supports.

UNIT - III

Beam Columns: Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

Direct and Bending Stresses: Stresses under the combined action of direct loading and bending moment, core of a section – determination of stresses in the case of chimneys, retaining walls and dams – conditions for stability – stresses due to direct loading and bending moment about both axis.

UNIT – IV

Unsymmetrical Bending: Introduction – Centroidal principal axes of section – Graphical method for locating principal axes – Moments of inertia referred to any set of rectangular axes – Stresses in beams subjected to unsymmetrical bending – Principal axes – Resolution of bending moment into two rectangular axes through the centroid – Location of neutral axis -

Deflection of beams under unsymmetrical bending.

Shear Centre: Introduction - Shear centre for symmetrical and unsymmetrical (channel, I, T and L) sections

UNIT – V

Thin Cylinders: Thin seamless cylindrical shells – Derivation of formula for longitudinal and circumferential stresses – hoop, longitudinal and Volumetric strains – changes in dia, and volume of thin cylinders – Thin spherical shells.

Thick Cylinders: Introduction Lamé's theory for thick cylinders – Derivation of Lamé's formulae – distribution of hoop and radial stresses across thickness – design of thick cylinders – compound cylinders – Necessary difference of radii for shrinkage – Thick spherical shells.

TEXT BOOKS:

- 1) Strength of Materials by R.K.Bansal, Lakshmi Publications House Pvt. Ltd.
- 2) Strength of Materials by R.K Rajput, S.Chand & Company Ltd.
- 3) Mechanics of Materials by Gere, Cengage Learning Pvt. Ltd.

REFERENCES:

- 1) Fundamentals of Solid Mechanics by M.L.Gambhir, PHI Learning Pvt. Ltd
- 2) Introduction to Strength of Materials by U.C.Jindal, Galgotia Publications Pvt. Ltd.
- 3) Strength of Materials by Bhattacharya, Cengage Learning
- 3) Strength of Materials by D.S Prakash Rao, Universities Press Pvt. Ltd.
- 4) Strength of Materials by S.S.Rattan, Tata McGraw Hill Education Pvt. Ltd.
- 5) Strength of Materials by R.Subramanian, Oxford University Press.
- 6) Mechanics of Materials by Ferdinand P. Beer *et al.*, Tata McGraw Hill Education Pvt. Ltd.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem**

L	T/P/D	C
4	-/-/-	4

(A40111) HYDRAULICS AND HYRAULIC MACHINERY**UNIT – I**

Open Channel Flow: Types of flows - Type of channels – Velocity distribution – Energy and momentum correction factors – Chezy's, Manning's; and Bazin formulae for uniform flow – Most Economical sections. Critical flow: Specific energy-critical depth – computation of critical depth – critical sub-critical and super critical flows.

Non uniform flow-Dynamic equation for G.V.F., Mild, Critical, Steep, horizontal and adverse slopes-surface profiles-direct step method- Rapidly varied flow, hydraulic jump, energy dissipation.

UNIT - II

Dimensional Analysis and Similitude: Dimensional analysis-Rayleigh's method and Buckingham's pi theorem-study of Hydraulic models – Geometric, kinematic and dynamic similarities-dimensionless numbers – model and prototype relations.

UNIT-III

Hydrodynamic Force on Jets : Hydrodynamic force of jets on stationary and moving flat, inclined and curved vanes, jet striking centrally and at tip, velocity triangles at inlet and outlet, expressions for work done and efficiency-Angular momentum principle, Applications to radial flow turbines. Layout of a typical Hydropower installation – Heads and efficiencies.

UNIT-IV

Hydraualic Turbines: Classification of turbines-pelton wheel-Francis turbine-Kaplan turbine-working, working proportions, velocity diagram, work done and efficiency, hydraulic design, draft tube – theory and function efficiency. Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

UNIT – V

Centrifugal-Pumps: Pump installation details-classification-work done-Manometric head-minimum starting speed-losses and efficiencies-specific speed, multistage pumps-pumps in parallel- performance of pumps-characteristic curves- NPSH-cavitation.

Classification of Hydropower plants – Definition of terms – load factor, utilization factor, capacity factor, estimation of hydropower potential.

TEXT BOOKS:

1. Open Channel flow by K,Subramanya . Tata Mc.Grawhill Publishers.
2. Fluid Mechanics, Hydraulic and Hydraulic Machines by Modi & Seth, Standard book house.
3. Fluid Mechanics & Fluid machines by Narayana pillai, Universities press.

REFERENCES :

1. Fluid Mechanics and Machinery, CSP OJHA, Oxford University Press
2. Elements of Open channel flow by Ranga Raju, Tata Mc.Graw Hill, Publications.
3. Fluid mechanics and fluid machines by Rajput, S.Chand &Co.
4. Open Channel flow by V.T.Chow, Mc.Graw Hill book company.
5. Fluid Mechanics and Machinery by D. Ramdurgaia New Age Publications.
6. Mechanics of Fluids by Merle C. Potter, David C. Wiggert,Bassem H. Ramadan, Cengage Learning.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40009) ENVIRONMENTAL STUDIES****Objectives:**

1. Understanding the importance of ecological balance for sustainable development.
2. Understanding the impacts of developmental activities and mitigation measures.
3. Understanding the environmental policies and regulations

UNIT-I :

Ecosystems: Definition, Scope and Importance of ecosystem. Classification, structure and function of an ecosystem, Food chains, food webs and ecological pyramids. Flow of energy, Biogeochemical cycles, Bioaccumulation, Biomagnification, ecosystem value, services and carrying capacity, Field visits.

UNIT-II:

Natural Resources: Classification of Resources: Living and Non-Living resources, **water resources:** use and over utilization of surface and ground water, floods and droughts, Dams: benefits and problems. **Mineral resources:** use and exploitation, environmental effects of extracting and using mineral resources, **Land resources:** Forest resources, **Energy resources:** growing energy needs, renewable and non renewable energy sources, use of alternate energy source, case studies.

UNIT-III:

Biodiversity and Biotic Resources: Introduction, Definition, genetic, species and ecosystem diversity. Value of biodiversity; consumptive use, productive use, social, ethical, aesthetic and optional values. India as a mega diversity nation, Hot spots of biodiversity. Field visit. Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts; conservation of biodiversity: In-Situ and Ex-situ conservation. National Biodiversity act.

UNIT-IV:

Environmental Pollution and Control Technologies: Environmental Pollution: Classification of pollution, **Air Pollution:** Primary and secondary pollutants, Automobile and Industrial pollution, Ambient air quality standards. **Water pollution:** Sources and types of pollution, drinking water quality standards. **Soil Pollution:** Sources and types, Impacts of modern agriculture, degradation of soil. **Noise Pollution:** Sources and Health hazards, standards, **Solid waste:** Municipal Solid Waste management, composition and

characteristics of e-Waste and its management. **Pollution control technologies:** Wastewater Treatment methods: Primary, secondary and Tertiary.

Overview of air pollution control technologies, Concepts of bioremediation. **Global Environmental Problems and Global Efforts:** Climate change and impacts on human environment. Ozone depletion and Ozone depleting substances (ODS). Deforestation and desertification. International conventions / Protocols: Earth summit, Kyoto protocol and Montréal Protocol.

UNIT-V:

Environmental Policy, Legislation & EIA: Environmental Protection act, Legal aspects Air Act- 1981, Water Act, Forest Act, Wild life Act, Municipal solid waste management and handling rules, biomedical waste management and handling rules, hazardous waste management and handling rules. **EIA:** EIA structure, methods of baseline data acquisition. Overview on Impacts of air, water, biological and Socio-economical aspects. Strategies for risk assessment, Concepts of Environmental Management Plan (EMP). **Towards Sustainable Future:** Concept of Sustainable Development, Population and its explosion, Crazy Consumerism, Environmental Education, Urban Sprawl, Human health, Environmental Ethics, Concept of Green Building, Ecological Foot Print, Life Cycle assessment (LCA), Low carbon life style.

SUGGESTED TEXT BOOKS:

- 1 Textbook of Environmental Studies for Undergraduate Courses by Erach Bharucha for University Grants Commission.
- 2 Environmental Studies by R. Rajagopalan, Oxford University Press.

REFERENCE BOOKS:

1. Environmental Science: towards a sustainable future by Richard T.Wright. 2008 PHL Learning Private Ltd. New Delhi.
2. Environmental Engineering and science by Gilbert M.Masters and Wendell P. Ela .2008 PHI Learning Pvt. Ltd.
3. Environmental Science by Daniel B.Botkin & Edward A.Keller, Wiley INDIA edition.
4. Environmental Studies by Anubha Kaushik, 4th Edition, New age international publishers.
5. Text book of Environmental Science and Technology - Dr. M. Anji Reddy 2007, BS Publications.

Outcomes:

Based on this course, the Engineering graduate will understand /evaluate / develop technologies on the basis of ecological principles and environmental regulations which inturn helps in sustainable development

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40115) STRUCTURAL ANALYSIS – I****UNIT – I**

Analysis Of Perfect Frames: Types of frames- Perfect, Imperfect and Redundant pin jointed frames. - Analysis of determinate pin jointed frames using method of joints, method of sections and tension coefficient method for vertical loads, horizontal loads and inclined loads.

UNIT – II

Energy Theorems: Introduction-Strain energy in linear elastic system, expression of strain energy due to axial load, bending moment and shear forces - Castigliano's first theorem-Unit Load Method. Deflections of simple beams and pin- jointed plane trusses. Deflections of statically determinate bent frames.

Three Hinged Arches – Introduction – Types of Arches – Comparison between Three hinged and Two hinged Arches. Linear Arch. Eddy's theorem. Analysis of Three hinged arches. Normal Thrust and radial shear in an arch. Geometrical properties of parabolic and circular arch. Three hinged circular arch at different levels. Absolute maximum bending moment diagram for a three hinged arch.

UNIT-III

Propped Cantilever and Fixed Beams: Analysis of Propped cantilever and fixed beams, including the beams with varying moments of inertia, subjected to uniformly distributed load, central point load, eccentric point load, number of point loads, uniformly varying load, couple and combination of loads - Shear force and Bending moment diagrams for Propped Cantilever and Fixed Beams-Deflection of Propped cantilever and fixed beams; effect of sinking of support, effect of rotation of a support.

UNIT – IV

Slope-Deflection Method and Moment Distribution Method: Introduction-Continuous beams. Clapeyron's theorem of three moments- Analysis of continuous beams with constant and variable moments of inertia with one or both ends fixed-continuous beams with overhang. Effects of sinking of supports. Derivation of slope-deflection equation, application to continuous beams with and without settlement of supports. Analysis of continuous beams with and without settlement of supports using Moment Distribution Method. Shear force and Bending moment diagrams, Elastic curve.

UNIT – V

Moving Loads and Influence Lines: Introduction maximum SF and BM at a given section and absolute maximum S.F. and B.M due to single concentrated load U.D load longer than the span, U.D load shorter than the span, two point loads with fixed distance between them and several point loads-Equivalent uniformly distributed load-Focal length. Definition of influence line for SF, Influence line for BM- load position for maximum SF at a section-Load position for maximum BM at a section - Point loads, UDL longer than the span, UDL shorter than the span- Influence lines for forces in members of Pratt and Warren trusses.

TEXT BOOKS:

- 1) Structural Analysis Vol –I & II by Vazarani and Ratwani, Khanna Publishers.
- 2) Structural Analysis Vol I & II by Pundit and Gupta., Tata McGraw Hill Publishers.

REFERENCES:

- 1) Basic Structural Analysis by K.U.Muthu *et al.*, I.K.International Publishing House Pvt.Ltd.
- 2) Structural Analysis by Hibbeler, pearson Education Ltd
- 3) Basic Structural Analysis by C.S.Reddy., Tata McGraw Hill Publishers.
- 4) Fundamentals of structural Analysis by M.L.Gamhir, PHI.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-II Sem****L T/P/D C****4 -/- 4****(A40109) BUILDING MATERIALS, CONSTRUCTION AND PLANNING****UNIT – I**

Stones and Bricks, Tiles: Building stones – classifications and quarrying – properties – structural requirements – dressing Bricks – Composition of Brick earth – manufacture and structural requirements.

Wood, Aluminum, Glass and Paints: Wood - structure – types and properties – seasoning – defects; alternate materials for wood – GI / fibre – reinforced glass bricks, steel & aluminum.

UNIT-II

Cement & Admixtures : Ingredients of cement – manufacture – Chemical composition – Hydration - field & lab tests Admixtures – mineral & chemical admixtures – uses.

UNIT-III

Building Components : Lintels, Arches, walls, vaults – stair cases – types of floors, types of roofs – flat, curved, trussed ; foundations – types ; Damp Proof Course ; Joinery – doors – windows – materials – types.

Building Services : Plumbing Services : Water Distribution, Sanitary – Lines & Fittings ; Ventilations : Functional requirements systems of ventilations. Air-conditioning - Essentials and Types ; Acoustics – characteristic – absorption – Acoustic design ; Fire protection – Fire Hazards – Classification of fire resistant materials and constructions

UNIT -IV

Masonry and Finishing's : Brick masonry – types – bonds ; Stone masonry – types ; Composite masonry – Brick-stone composite ; Concrete, Reinforced brick.

Finishers : Plastering, Pointing, Painting, Claddings – Types – Tiles - ACP

Form work : Requirements – Standards – Scaffolding – Design ; Shoring, Underpinning.

UNIT –V

Building Planning : Principles of Building Planning, Classification of buildings and Building by laws.

TEXT BOOKS:

1. Building Materials and Construction – Arora & Bindra, Dhanpat Roy Publications.

2. Building Construction by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi

REFERENCES:

1. Building Materials by Duggal, New Age Internations.
2. Building Construction by PC Verghese PHI.
3. Construction Technology – Vol – I & II by R. Chuddy, Longman UK.
4. Basics of Civil Engg by Subhash Chander; Jain Brothers.
5. Alternate Building materials and Technology, K.S.Jagadish, Venkatarama Reddyand others; New Age Publications.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

II Year B.Tech. CE-I Sem	L	T/P/D	C
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(A40186) COMPUTER AIDED DRAFTING OF BUILDINGS

1. Introduction to computer aided drafting
2. Software for CAD – Introduction to different softwares
3. Practice exercises on CAD software
4. Drawing of plans of buildings using software
 - a) single storeyed buildings
 - b) multi storyed buildings
5. Developing sections and elevations for
 - a) single storeyed buildings
 - b) multi storyed buildings
6. Detailing of building components like Doors, Windows, Roof Trusses etc. using CAD softwares
7. Exercises on development of working of buildings

TEXT BOOKS :

1. Computer Aided Design Laboratory by M. N. Sesha Praksh & Dr. G. S. Servesh – Laxmi Publications.
2. Engineering Graphics by P. J. Sha – S. Chand & Co.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD**II Year B.Tech. CE-I Sem**

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(A40190) SURVEYING LAB – II**LIST OF EXERCISES :**

1. Study of theodolite in detail - practice for measurement of horizontal and vertical angles.
2. Measurement of horizontal angles by method of repetition and reiteration.
3. Trigonometric Leveling - Heights and distance problem (Two Exercises)
4. Heights and distance using Principles of tacheometric surveying (Two Exercises)
5. Curve setting – different methods. (Two Exercises)
6. Setting out works for buildings & pipe lines.
7. Determine of area using total station
8. Traversing using total station
9. contouring using total station
10. Determination of remote height using total station
11. State-out using total station
12. Distance, gradient, Diff, height between tow inaccessible points using total stations

LIST OF EQUIPMENT:

1. Theodolites and leveling staffs.
2. Tachometers.
3. Total station.

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY HYDERABAD

III Year B. Tech. C.E. I - Sem

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(35001) CONCRETE TECHNOLOGY

UNIT I

CEMENT : Portland cement - chemical composition - Hydration, Setting of cement - Structure of hydrate cement - Test on physical properties - Different grades of cement.

UNIT - II

ADMIXTURES : Types of admixtures - mineral and chemical admixtures - properties - dosages - effects - usage.

UNIT - III

AGGREGATES : Classification of aggregate - Particle shape & texture - Bond, strength & other mechanical properties of aggregate - Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate - Bulking of sand - Deleterious substance in aggregate - Soundness of aggregate - Alkali aggregate reaction - Thermal properties - Sieve analysis - Fineness modulus - Grading curves - Grading of fine & coarse Aggregates - Gap graded aggregate - Maximum aggregate size.

UNIT - IV

FRESH CONCRETE : Workability - Factors affecting workability - Measurement of workability by different tests - Setting times of concrete - Effect of time and temperature on workability - Segregation & bleeding - Mixing and vibration of concrete - Steps in manufacture of concrete - Quality of mixing water.

UNIT - V

HARDENED CONCRETE : Water / Cement ratio - Abram's Law - Gelspave ratio - Nature of strength of concrete - Maturity concept - Strength in tension & compression - Factors affecting strength - Relation between compression & tensile strength - Curing.

UNIT - VI

TESTING OF HARDENED CONCRETE : Compression tests - Tension tests - Factors affecting strength - Flexure tests - Splitting tests - Pull-out test, Non-destructive testing methods - code provisions for NDT.

ELASTICITY, CREEP & SHRINKAGE – Modulus of elasticity – Dynamic modulus of elasticity – Poisson's ratio – Creep of concrete – Factors influencing creep – Relation between creep & time – Nature of creep – Effects of creep – Shrinkage – types of shrinkage.

UNIT – VII

MIX DESIGN : Factors in the choice of mix proportions – Durability of concrete – Quality Control of concrete – Statistical methods – Acceptance criteria – Proportioning of concrete mixes by various methods – BIS method of mix design.

UNIT – VIII

SPECIAL CONCRETES: Light weight aggregates – Light weight aggregate concrete – Cellular concrete – No-fines concrete – High density concrete – Fibre reinforced concrete – Polymer concrete – Types of Polymer concrete – High performance concrete – Self compacting concrete.

TEXT BOOKS:

1. Properties of Concrete by A.M.Neville – Low priced Edition – 4th edition
2. Concrete Technology by M.S.Shetty. – S.Chand & Co. : 2004

REFERENCES:

1. Concrete Technology by M.L. Gambhir. – Tata Mc. Graw Hill Publishers, New Delhi
2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi
3. Concrete: Micro structure, Properties and Materials – P.K.Mehra and J.M.Monteiro, Mc-Graw Hill Publishers

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III Year B.Tech. C.E. I – Sem

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(55002) DESIGN OF REINFORCED CONCRETE STRUCTURES

UNIT – I

Concepts of RC. Design – Limit State method – Material Stress- Strain Curves – Safety factors – Characteristic values. Stress Block parameters – IS – 456 – 2000 – Working Stress Method.

UNIT – II

Beams : Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – III

Shear, Torsion and Bond : Limit state analysis and design of section for shear and torsion – concept of bond, anchorage and development length, I.S. code provisions. Design examples in simply supported and continuous beams, detailing.

UNIT – IV

Design of Two-way slabs, one way slab, continuous slab Using I S Coefficients

UNIT – V

Footings : Different types of footings – Design of isolated, square, rectangular, circular footings and Combined footings.

UNIT – VI

Short and Long columns – under axial loads, uniaxial bending and biaxial bending – I S Code provisions.

UNIT – VII

Limit state design for serviceability for deflection, cracking and codal provision.

UNIT – VIII**Miscellaneous design stair case design – Design of Canopy (Portico)****TEXT BOOKS:**

1. Limit state design of reinforced concrete -- P.C.Varghese, Prentice Hall of India, New Delhi.
2. Reinforced concrete design by N. Krishna Raju and R.N. Praneeth, New age International Publishers, New Delhi
3. Reinforced concrete design by S.Unnikrishna Pillai & Devdas Menon, Tata Mc.Graw Hill, New Delhi.
4. Fundamentals of reinforced concrete by N.C. Sinha and S.K.Roy, S. Chand publishers

REFERENCES :

1. Fundamentals of Reinforced concrete design by M.L. Gambhir, Prentice Hall of India Private Ltd., New Delhi,
2. Reinforced concrete structural elements – behaviour, Analysis and design by P.Parushotham, Tata Mc.Graw Hill, 1994,
3. Design of concrete structures - Arthur H.Nelson, David Darwin, and Charles W.Dolan, Tata Mc.Graw-Hill, 3rd Edition, 2005.
4. Design of Reinforced Concrete Foundations - P.C. Varghese Prentice Hall of India, New Delhi
5. Reinforced concrete structures, Vol. I, by B.C.Purania, Ashok Kumar Jain and Arun Kumar Jain, Luxmi, publications Pvt. Ltd., New Delhi
6. Reinforced concrete structures – I.C. Syal & A.K.Goel, S.Chand Publishers
7. Limit State Design by B.C.Purania, Ashok Kumar Jain and Arun Kumar Jain, Luxmi, publications Pvt. Ltd., New Delhi

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III Year B.Tech. C.E. I – Sem
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(55003) ENGINEERING GEOLOGY

UNIT – I INTRODUCTION: Importance of geology from Civil Engineering point of view. Brief study of case histories of failure of some Civil Engineering constructions due to geological drawbacks. Importance of Physical geology. Petrology and Structural geology.

WEATHERING OF ROCKS: Its effect over the properties of rocks importance of weathering with REFERENCE to dams, reservoirs and tunnels weathering of common rock like "Granite"

UNIT – II MINERALOGY: Definition of mineral, Importance of study of minerals, Different methods of study of minerals. Advantages of study of minerals by physical properties. Role of study of physical properties of minerals in the identification of minerals. Study of physical properties of following common rock forming minerals: Feldspar, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Taic, Calcite. Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chlorite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

UNIT – III PETROLOGY: Definition of rock: Geological classification of rocks into igneous, Sedimentary and metamorphic rocks. Dykes and sills, common structures and textures of igneous. Sedimentary and metamorphic rocks. Their distinguishing features, Megascopic and microscopic study of Granite, Dolerite, Basalt, Pegmatite, Laterite, Conglomerate, Sand Stone, Shale, Limestone, Gneiss, Schist, Quartzite, Marble and Slate. Rock excavation, stone aggregates.

UNIT – IV STRUCTURAL GEOLOGY: Indian stratigraphy, and geological time scale, Out crop, strike and dip study of common geological structures associating with the rocks such as folds, faults unconformities, and joints - their important types.

UNIT – V Geophysical studies: Importance of Geophysical studies Principles of geophysical study by Gravity methods, Magnetic methods, Electrical methods, Seismic methods, Radio metric methods and Geothermal

(55004) GEOTECHNICAL ENGINEERING - I

UNIT - I

INTRODUCTION: Soil formation - soil structure and clay mineralogy - Adsorbed water - Mass- volume relationship - Relative density.

UNIT - II

INDEX PROPERTIES OF SOILS: Grain size analysis - Sieve and Hydrometer methods - consistency limits and indices - I.S. Classification of soils.

UNIT - III

PERMEABILITY: Soil water - capillary rise - flow of water through soils - Darcy's law- permeability - Factors affecting permeability - laboratory determination of coefficient of permeability - Permeability of layered soils - In situ permeability tests (Pneumatics & Pumping out test).

UNIT - IV

EFFECTIVE STRESS & SEEPAGE THROUGH SOILS: Total, neutral and effective stress - principle of effective stress - quick sand condition - Seepage through soils - Flownets: Characteristics and Uses.

UNIT - V

STRESS DISTRIBUTION IN SOILS: Boussinesq's and Westergaard's theories for point load, uniformly loaded circular and rectangular areas, pressure bulb, variation of vertical stress under point load along the vertical and horizontal plane, and Newmark's influence chart for irregular areas.

UNIT - VI

COMPACTION: Mechanism of compaction - factors affecting compaction - effects of compaction on soil properties - Field compaction Equipment - compaction quality control.

UNIT - VII

CONSOLIDATION: Types of compressibility - Immediate Settlement, primary consolidation and secondary consolidation - stress history of clay; e-p and e-log p curves - normally consolidated soil, over consolidated soil

method. Special importance of Electrical resistivity methods, and seismic refraction methods. Improvement of competence of sites by grouting etc. Fundamental aspects of Rock mechanics and Environmental Geology.

UNIT - VI GEOLAXY OF DAMS AND RESERVOIRS: Types of dams and bearing of Geology of site in their selection, Geological Considerations in the selection of a dam site. Analysis of dam failures of the past. Factors Contributing to the success of a reservoir. Geological factors influencing water tightness and life of reservoirs, Geo hazards, ground subsidence.

UNIT - VII Ground water: Water table, common types of ground water, springs, cone of depression, geological controls of ground water movement, ground water exploration. Earth quakes, their causes and effects, shield areas and seismic belts. Seismic waves, Richter scale, precautions to be taken for building construction in seismic areas. Land slides, land slides hazards, water in land slides their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, Earthquake and landslides.

UNIT - VIII TUNNELS: Purposes of tunneling, Effects of Tunneling on the ground Role of Geological Considerations (lithological, structural and ground water) in tunneling over break and lining in tunnels; Tunnels in rock, subsidence over old mines , mining substances

TEXT BOOKS:

- 1) Principals of Engineering Geology by K.V.G.K. Gokhale - B.S publications
- 2) Engineering Geology by N.Chennakesavulu, Mac-Millan, Publishers 2nd Edition India Ltd. 2010.
- 3) Engineering Geology by D. Venkat Reddy, Vikas Publications

REFERENCES:

1. F.G Bell, Fundamental of Engineering Geology Butterworths, Publications, New Delhi, 1992.
2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution.
3. Foundations of Engineering Geology - Tony Waltham - Spon press/ Cry press Taylor & Francis.

and under consolidated soil - preconsolidation pressure and its determination - Terzaghi's 1-D consolidation theory - coefficient of consolidation, square root time and logarithm of time fitting methods.

UNIT - VIII

SHEAR STRENGTH OF SOILS: Importance of shear strength - Mohr's - Coulomb Failure theories - Types of laboratory strength tests - strength tests based on drainage conditions - Shear strength of sands - dilatancy - Critical Void Ratio - Liquefaction; shear strength of clays.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New age International Pvt. Ltd, New Delhi
2. Principles of Geotechnical Engineering by Braja M. Das, Cengage Learning Publishers.
3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group.

REFERENCES:

1. Geotechnical Engineering by C. Venkatarumiah, New age International Pvt. Ltd, (2002)
2. Soil Mechanics - T.W. Lambe and Whitman, Mc-Graw Hill Publishing Company, New York.
3. Geotechnical Engineering by Manoj Dutta & Gulati S.K - Tata Mc.Grawhill Publishers New Delhi.
4. Soil Mechanics and Foundation Engg. By K.R. Arora, Standard Publishers and Distributors, Delhi.
5. Soil Mechanics and Foundation by B C Punmia, Ashok Kumar Jain and Arun Kumar Jain, Laxmi, publications Pvt. Ltd., New Delhi

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III Year B.Tech. C.E. I-Sem

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(55005) WATER RESOURCES ENGINEERING-I

UNIT I

Introduction to engineering hydrology and its applications, Hydrologic cycle, types and forms of precipitation, rainfall measurement, types of rain gauges, computation of average rainfall over a basin, processing of rainfall data - Adjustment of record - Rainfall Double Mass Curve. Runoff- Factors affecting Runoff - Runoff over a Catchment- Empirical and Rational Formulae.

UNIT-II

Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation- Evapotranspiration- Penman and Blaney & Criddle Methods -Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices..

UNIT-III

Distribution of Runoff - Hydrograph Analysis Flood Hydrograph - Effective Rainfall - Base Flow- Base Flow Separation - Direct Runoff Hydrograph - Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph from Direct Runoff Hydrograph and vice versa - S-hydrograph, Synthetic Unit Hydrograph.

UNIT-IV

Ground water Occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, Darcy's law, radial flow to wells in confined and unconfined aquifers. Types of wells,- Well Construction - Well Development.

UNIT-V

Necessity and Importance of Irrigation, advantages and ill-effects of Irrigation, types of Irrigation, methods of application of Irrigation water, Indian agricultural soils, methods of improving soil fertility -Crop Rotation, preparation of land for Irrigation, standards of quality for Irrigation water.

UNIT-VI

Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, Duty and delta, factors affecting duty- Design discharge for a water course. Depth and frequency of Irrigation, irrigation efficiencies- Water Logging.

UNIT-VII

Classification of canals, Design of Irrigation canals by Kennedy's and Lacey's theories, balancing depth of cutting, IS standards for a canal design canal lining.

UNIT - VIII

Design Discharge over a catchment, Computation of design discharge- rational formula, SCS curve number method, flood frequency analysis- Introductory Part only. Stream Gauging - measurement and estimation of stream flow.

TEXT BOOKS:

1. Engineering Hydrology by Jayaram Reddy, Laxmi publications Pvt. Ltd., New Delhi
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications Pvt. Ltd., New Delhi

REFERENCES:

1. Elementary hydrology by V.P.Singh, PHI publications.
2. Irrigation and Water Resources & Water Power by P.N.Modi, Standard Book House.
3. Irrigation Water Management by D.K. Majumdar, Printice Hall of India.
4. Irrigation and Hydraulic structures by S.K.Grag.
5. Applied hydrology by Ven Te Chow, David R. Maidment Larry W. Mays Tata MC, Graw Hill.
6. Introduction to hydrology by Warren Viessvant, Jr. Caryl. Lewis, PHI

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III Year B.Tech. C.E. I - Sem

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(55006) WASTE MANAGEMENT (ELECTIVE-I)

UNIT - I

Quality requirements of boiler and cooling waters - Quality requirements of process water for Textiles - Food processing and Brewery Industries - Boiler and Cooling water treatment methods.

UNIT - II

Basic Theories of Industrial Waste water Management - Volume reduction - Strength reduction - Neutralization - Equalization and proportioning. Joint treatment of industrial wastes and domestic sewage - consequent problems.

UNIT - III

Industrial waste water discharges into streams, Lakes and oceans and problems.

UNIT - IV

Recirculation of Industrial Wastes - Use of Municipal Waste Water in Industries.

UNIT - V

Manufacturing Process and design origin of liquid waste from Textiles, Paper and Pulp industries, Thermal Power Plants and Tanneries, Special Characteristics, Effects and treatment methods.

UNIT - VI

Manufacturing Process and design origin of liquid waste from Fertilizers, Distillers, and Dairy. Special Characteristics, Effects and treatment methods.

UNIT - VII

Manufacturing Process and design origin of liquid waste from Sugar Mills, Steel Plants, Oil Refineries, and Pharmaceutical Plants, Special Characteristics, Effects and treatment methods.

UNIT - VIII

Common Effluent Treatment Plants - Advantages and Suitability, Limitations, Effluent Disposal Methods.

TEXT BOOK:

1. Waste Water Treatment by M.N. Rao and Dura, Oxford & IBH, New Delhi

REFERENCES:

1. Liquid waste of Industry by Newsham.
2. Water and Waste Water technology by Mark J. Hammer and Mark J. Hammer (Jr).

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III Year B.Tech. C.E. I -Sem

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**(55007) ENVIRONMENTAL IMPACT ASSESSMENT AND
MANAGEMENT
(ELECTIVE-I)**

UNIT - I

Basic concept of EIA : Initial environmental Examination, Elements of EIA, - factors affecting E-I-A Impact evaluation and analysis, preparation of Environmental Base map, Classification of environmental parameters.

UNIT - II

E I A Methodologies: Introduction, Criteria for the selection of EIA Methodology, E I A methods, Ad-hoc methods, matrix methods, Network method Environmental Media Quality Index method, overlay methods, cost/benefit Analysis.

UNIT - III

Impact of Developmental Activities and Land use: Introduction and Methodology for the assessment of soil and ground water, Delineation of study area, Identification of actives:

UNIT-IV

Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT-V

Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures.

UNIT - VI

EIA of surface water, Air and Biological environment: Methodology for the assessment of Impacts on surface water environment, Air pollution sources, Generalized approach for assessment of Air pollution Impact.

UNIT - VII

Environmental Audit & Environmental legislation objectives of Environmental Audit. Types of environmental Audit, Audit protocol, stages

of Environmental Audit, onsite activities, evaluation of Audit data and preparation of Audit report. Post Audit activities.

UNIT - VIII

The Environmental Protection Act, The water Act, The Air (Prevention & Control of pollution Act.), Motor Act, Wild life Act.
Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:

1. Environmental Impact Assessment & Management . Publisher: Daya Author: B B Hosetti, A Kumar
2. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu. B.S. Publication, Sultan Bazar, Hyderabad.
3. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCES:

1. Environmental Science and Engineering, by Suresh K. Dhameja - S.K.,Kataria & Sons Publication., New Delhi.
2. Environmental Pollution and Control, by Dr H.S. Bhatia - Galgotia Publication (P) Ltd, Delhi

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III Year B.Tech. C.E. I-Sem

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**(55008) ADVANCED STRUCTURAL ANALYSIS
(ELECTIVE-I)**

UNIT - I

Moment distribution method - Application to the analysis of portal frames with inclined legs and gable frames.

UNIT - II

Kani's method - application to continuous beam - portal frames (upto single bay two storages)

UNIT - III

Plastic analysis - I - Ductility - ultimate load - plastic hinge - shape factor - moment curvature relations - upper and lower bound the...

UNIT - IV

Plastic Analysis - II - Plastic Analysis beam - portal frames - mechanism - portal sway mechanics.

UNIT - V

Analysis of building frames by substitute frame - upto five bays method.

UNIT - VI

Analysis of frames for lateral force - portal and cantilever method.

UNIT - VII

Introduction to Finite Element method - Application to one dimensional elements - shape function - lagrangian serendipity elements.

UNIT - VIII

Introduction to Structural dynamics disclaimer's principle - Free vibration - single degree of freedom - Eagleville - Lign vector.

TEXT BOOKS

1. Theory of Structures by B.C. Ponniah, Jain, Ashok Kumar Jain Arun Kumar Jain.
2. Finite Element Analysis - S. S. Bhavikuthi, New age International Publication. 2010

REFERENCES

1. Analysis of Structures - T. S. Thandavamoorthy, Oxford University Press - 2009.
2. Basic of Structural dynamics and Seismic design/ S.R. Damodara swamy and S. Kavitha. - PHI, 2010

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III Year B.Tech. C.E. I-Sem

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**(55600) FLUID MECHANICS & HYDRAULIC
MACHINERY LAB**

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice / mouthpiece by constant head method.
3. Calibration of contracted Rectangular Notch and / Triangular Notch
4. Determination of friction factor of a pipe.
5. Determination of Coefficient for minor losses.
6. Verification of Bernoulli's equation.
7. Impact of jet on vanes
8. Study of Hydraulic jump.
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Performance characteristics of a single stage/ multi-stage centrifugal pump.
12. Performance characteristics of a reciprocating pump.

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III Year B.Tech. C.E. I –Sem

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(55601) ENGINEERING GEOLOGY LAB

1. Study of physical properties and identification of minerals referred under theory.
2. Megascopic and microscopic description and identification of rocks referred under theory.
3. Megascopic and microscopic identification of rocks & minerals.
4. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.
5. Simple Structural Geology problems.

LAB EXAMINATION PATTERN:

1. Description and Identification of SIX minerals
2. Description and identification of Six (including igneous, sedimentary and metamorphic rocks)
3. Interpretation of a Geological map along with a geological section.
4. Simple strike and Dip problems.

III Year-B.Tech. C.E. II-Sem

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(56001) DESIGN OF STEEL STRUCTURES

UNIT – I

Materials – Making of iron and steel – types of structural steel – mechanical properties of steel – Concepts of plasticity – yield strength. Loads – and combinations local buckling behavior of steel. Concept of limit State Design – Limit States – Design Strengths- deflection limits – serviceability – stability check.

UNIT – II

Bolted connections – Riveted connections – IS – 800 – 2007 - specifications – Design strength – efficiency of joint – prying action, Welded connections – Types of welded joints – specifications - design requirements.

UNIT – III

Design of tension members– Design strength – Design procedure splice - lug angle.

UNIT – IV

Design of compress in members – Buckling class – slenderness ratio / strength design – laced – built-up columns – splice – column base – slab /

UNIT – V

Design of Beams – Plastic moment – Bending and shear strength / buckling – Builtup sections – laterally / supported beams.

UNIT – VI

Design of eccentric connections – Framed – stiffened / seat connection.

UNIT – VII

Design of plate girders – elements – economical depth – design of main section – connections between web and flange – design of stiffener bearing – intermediate stiffeners – Design of Websplca & Flange splca.

UNIT – VIII

Design of roof trusses – Types of roof trusses, loads on trusses – purlin design – truss design, Design of joints and end bearings.

TEXT BOOKS :

1. Design of steel structures – N. Subramanian, Oxford University Press – 2009.
2. Limit State Design of steel structures, S.K. Duggal, Tata McGraw-Hill, 2010

REFERENCE BOOKS :

1. Design of Steel structures by K.S. Sai Ram, Person Education.
2. Design of Steel Structures Edwin H. Gaylord, Jr. Charles N. Gaylord and James Stallmeyer Tata McGraw-Hill Education pvt. Ltd.
3. Design of Steel Structures Vol. 1 & 2 – Ramchandra, Standard Publications.
4. Design of steel structures, Structures, S.S. Bhavikatti, IK int Publication House, New Delhi, 2010.

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III Year B.Tech. C.E. II-Sem

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(56002) ENVIRONMENTAL ENGINEERING

UNIT – I

Introduction: Waterborne diseases – protected water supply – Population forecasts, design period – water demand – Types of demand – factors affecting – fluctuations – fire demand – storage capacity – water quality and testing – drinking water standards.

UNIT – II

SOURCES OF WATER : Comparison from quality and quantity and other considerations – intakes – infiltration galleries, confined and unconfined aquifers distribution systems. – requirements – methods and layouts.

UNIT III.

Layout and general outline of water treatment units – sedimentation, uniform settling velocity – principles – design factors – surface loading – Jar test – optimum dosage of coagulant – coagulation-flocculation clarifier design – coagulants – feeding arrangements.

UNIT – IV

Filtration – theory – working of slow and rapid gravity filters – multimedia filters – design of filters – troubles in operation comparison of filters – disinfection – types of disinfection – theory of chlorination – chlorine demand – other disinfection treatment methods.

UNIT- V

Distribution systems – types of layouts of Distribution systems – design of distribution systems – Hardy Cross and equivalent pipe methods service reservoirs – joints, valves such as sluice valves, air valves, scour valves and check valves water meters – laying and testing of pipe lines – pump house.

UNIT - VI

Conservancy and water carriage systems – sewage and storm water estimation – time of concentration – storm water overflows combined flow – characteristics of sewage – cycles of decay – decomposition of sewage.

examination of sewage - B.O.D. - C.O.D. equations, Design of sewers - shapes and materials - sewer appurtenances-manholes - inverted siphon - catch basins - flushing tanks - ejectors, pumps and pumphouses - house drainage - components requirements - sanitary fittings-traps - one pipe and two pipe systems of plumbing - ultimate disposal of sewage - sewage farming - dilution.

UNIT - VI

Layout and general out line of various units in a waste water treatment plant - primary treatment design of screens - grit chambers - skimming tanks - sedimentation tanks - principles and design of biological treatment - trickling filters - standard and high rate.

UNIT - VIII

Construction and design of oxidation ponds - Sludge digestion tanks factors effecting - design of Digestion tank - Sludge disposal by drying - septic tanks working principles and design - soak pits.

TEXT BOOKS:

1. Water supply and sanitary Engineering by G.S. Birdi, Dhanpat Rai & Sons Publishers.
2. Water Supply Engineering, Vol. I, waste water Engineering, Vol. II, B.C.Punmia, Ashok Jain & Arun Jain, Laxmi Publications Pvt.Ltd, New Delhi
3. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers

REFERENCES :

1. Water and Waste Water Technology by Mark J Hammer and Mark J. Hammer Jr.
2. Water and Waste Water Technology by Steel
3. Water and Waste Water Engineering by Fair Geyer and Okun
4. Waste water treatment- concepts and design approach by G.L. Racia and R.A. Christian, PHI
5. Waste water Engineering by Metcalf and Eddy.
6. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age International.

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III Year B.Tech. C.E. II -Sem

L	T/P/D	C
3	11/4	3

(56003) WATER RESOURCES ENGINEERING-II

UNIT-I

Storage Works-Reservoirs -Types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve- Reservoir Sedimentation - Life of Reservoir.. Types of dams, factors affecting selection of type of dam, factors governing selection of site for a dam.

UNIT-II

Gravity dams: Forces acting on a gravity dam, causes of failure of a gravity dam, elementary profile and practical profile of a gravity dam, limiting height of a low gravity dam, Factors of Safety - Stability Analysis, Foundation for a Gravity Dam, drainage and inspection galleries.

UNIT-III

Earth dams: types of Earth dams, causes of failure of earth dam, criteria for safe design of earth dam, seepage through earth dam-graphical method, measures for control of seepage.

UNIT-IV

Spillways: types of spill ways, Design principles of Ogee spillways - Spillway gates, Energy Dissipaters and Stilling Basins Significance of Jump Height Curve and Tail Water Rating Curve - USBR and Indian types of Stilling Basins.

UNIT-V

Diversion Head works: Types of Diversion head works- weirs and barrages, layout of diversion head work - components, Causes and failure of Weirs and Barrages on permeable foundations, -Silt Ejectors and Silt Excluders

UNIT-VI

Weirs on Permeable Foundations - Creep Theories - Bligh's, Lane's and Khosla's theories, Determination of uplift pressure- Various Correction Factors Design principles of weirs on permeable foundations using Creep theories - exit gradient, U/s and D/s Sheet Piles - Launching Apron.

UNIT-VII

Canal Falls - types of falls and their location, Design principles of Notch Fall and Sarada type Fall.

Canal regulation works, principles of design of distributory and head regulators, Canal Cross Regulators -canal outlets, types of canal modules, proportionality, sensitivity and flexibility,

UNIT-VIII

Cross Drainage works: types, selection of site, Design principles of aqueduct, siphon aqueduct and super passage. Design of Type II Aqueduct (Under Tunnel)

TEXT BOOKS:

1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation and water power engineering by Punmia & Lal, Laxmi publications pvt. Ltd., New Delhi

REFERENCES:

1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
3. Irrigation engineering by K.R.Aroca
4. Irrigation Engineering by R.K. Sharma and T.K. Sharma, S. Chand Publishers
5. Introduction to hydrology by Warren Viessvann, Jr, Garyl. Lewis, PHI
6. Engineering Hydrology by CS Pajha, R. Berndtsson and P. Bhunya, Oxford University Press.

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III Year B.Tech. C.E. II-Sem

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3	1/-	3

(56004) GEOTECHNICAL ENGINEERING-II

UNIT - I

SOIL EXPLORATION: Need – Methods of soil exploration - Boring and Sampling methods – Penetration Tests – Plate load test – Pressure meter – planning of Programme and preparation of soil investigation report.

UNIT - II

SLOPE STABILITY: Infinite and finite earth slopes – types of failures – factor of safety of infinite slopes – stability analysis by Swedish arc method, standard method of slices, Bishop's Simplified method – Taylor's Stability Number- Stability of slopes of earth dams under different conditions.

UNIT - III

EARTH PRESSURE THEORIES: Rankine's theory of earth pressure – earth pressures in layered soils – Coulomb's earth pressure theory - Culmann's graphical method.

UNIT - IV

RETAINING WALLS. Types of retaining walls – stability of retaining walls against overturning, sliding, bearing capacity and drainage from backfill

UNIT - V

SHALLOW FOUNDATIONS - BEARING CAPACITY CRITERIA - Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

UNIT - VI

SHALLOW FOUNDATIONS - SETTLEMENT CRITERIA - Safe bearing pressure based on N- value - allowable bearing pressure; safe bearing capacity - plate load test – allowable settlements of structures.

UNIT -VII

PILE FOUNDATION: Types of piles – Load carrying capacity of piles based on static pile formulae – Dynamic pile formulae – Pile load tests – Load carrying capacity of pile groups in sands and clays – Settlement of pile groups.

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III Year B.Tech. C.E. II - Sem

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4	1/-	4

(56005) TRANSPORTATION ENGINEERING

UNIT I

HIGHWAY DEVELOPMENT AND PLANNING: Highway development in India - Necessity for Highway Planning - Different Road Development Plans.

UNIT - II

HIGHWAY PLANNING: Classification of Roads - Road Network Patterns - Highway Alignment - Factors affecting Alignment - Engineering Surveys - Drawings and Reports, Road Project Initiation need based planning.

UNIT - III

HIGHWAY GEOMETRIC DESIGN: Importance of Geometric Design - Design controls and Criteria - Highway Cross Section Elements - Sight Distance Elements - Stopping sight Distance, Overtaking Sight Distance and intermediate Sight Distance - Design of Horizontal Alignment - Design of Super elevation and Extra widening - Design of Transition Curves - Design of Vertical alignment - Gradients - Vertical curves. Typical cross sections for different types of roads.

UNIT - IV

TRAFFIC ENGINEERING: Basic Parameters of Traffic - Volume, Speed and Density - Traffic Volume Studies - Data Collection and Presentation - speed studies - Data Collection and Presentation - Parking Studies and Parking characteristics - Road Accidents - Causes and Preventive measures - Accident Data Recording - Condition Diagram and Collision Diagrams. Traffic, infrastructural and safety audits.

UNIT - V

TRAFFIC REGULATION AND MANAGEMENT: Road Traffic Signs - Types and Specifications - Road markings - Need for Road Markings - Types of Road Markings - Design of Traffic Signals - Webster Method - IRC Method, intelligent transportation systems typical architectures.

UNIT - VIII

WELL FOUNDATIONS: Types - Different shapes of wells - Components of wells - functions and Design Criteria - Sinking of wells - Tilts and shifts.

TEXT BOOKS:

1. Basic and Applied Soil Mechanics by Gopul Rangan & ASR Rao, New Age International Pvt. Ltd. (2004).
2. Das, B.M., - (1999) Principles of Foundation Engineering - 6th edition (Indian edition) Thomson Engineering
3. Geotechnical Engineering : Principles and practices of soil mechanics and foundation Engineering by VNS Murthy. Taylor & Francis Group

REFERENCES:

1. Analysis and Design of Substructures - Swami Suran, Oxford and IBH Publishing company Pvt Ltd 1998
2. Geotechnical Engineering by S. K. Gulbati & Manoj Datta - Tata Mc.Graw Hill Publishing company New Delhi, 2005.
3. Teng, W.C - Foundation Design, Prentice Hall, New Jersey
4. Bowles, J.E., (1988) Foundation Analysis and Design - 4th Edition, McGraw-Hill Publishing company, New York.

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III Year B.Tech. C.S. II - Sem

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4	-/-	4

(56006) CONSTRUCTION TECHNOLOGY AND PROJECT MANAGEMENT (OPEN ELECTIVE)

UNIT - I : Fundamentals of Construction Technology - Construction Activities - Process - Construction Schedule - Construction Records - Documents - Quality - Safety - Codes and Regulations.

UNIT - II : Construction Method - Earthwork - Piling - Concrete and Concreting - Form work - Fabrication and Erection.

UNIT - III : Mechanised Construction - Construction Equipment - Equipment Economics - Excavators - Rollers - Dozers - Scrapers - Hauling Equipment - Concrete Equipment - Handling Equipment - Cranes Draglines and Clamshells.

UNIT - IV : Quality Control, Assurance and Safety - ISO - 9000 Quality Systems - Principles on Safety - Personnel, Fire and Electrical Safety - Environment Protection - Concept of Green Building.

UNIT - V : Contract Management - Project Estimation - Types of Estimation - Contract Document - Classification - Bidding - Procurement Process.

UNIT - VI : Construction Planning - Project Planning Techniques - Planning of manpower, Material, Equipment and Finance.

UNIT - VII
Project scheduling - PERT - CPM, Resource leveling.

UNIT - VIII : Construction Claims, Dispute and Project Closure - Source of Claim - Claim Management - Dispute Resolution - Arbitration - Construction Closure - Contract Closure - Documentation.

TEXT BOOK

1. Construction Technology by Subir K. Sarkar, Subhjit Saraswati / Oxford University Press, 2009.
2. Construction Project Management - Theory and Practice, Nirajjha, Pearson Education, 2010.

REFERENCES :

1. Construction Planning Equipment and Methods by Peurifay, Schexnayder, Shapira TMH, 2010.
2. Project Planning and Control with PERT and CPM - B.C. Punmia, K.K. Khandelwala - Laxmi Publication.

UNIT - VI

INTERSECTION DESIGN: Types of Intersections - Conflicts at Intersections - Types of At-Grade Intersections - Channelization - Objectives - Traffic Islands and Design criteria - Types of Grade Separated Intersections - Rotary Intersection - Concept of Rotary and Design Criteria - Impacts of Geometrics on intersection with reference safety, Operational capacity.

UNIT - VII

INTRODUCTION TO RAILWAY ENGINEERING: Permanent way components - Cross Section of Permanent Way - Functions of various Components like Rails, Sleepers and Ballast - Rail Fastenings - Creep of Rails - Theories related to creep - Ageing of Sleepers - Sleeper density

GEOMETRIC DESIGN OF RAILWAY TRACK: Gradients - Grade Compensation - Cant and Negative Super elevation - Cant Deficiency - Degree of Curve - Crossings and Turn outs .

UNIT - VII

AIRPORT ENGINEERING: Factors affecting Selection of site for Airport - Aircraft Characteristics - Geometric Design of Runway - Computation of Runway length - Correction for runway length - Orientation of Runway - Wind Rose Diagram - Runway Lighting system.

TEXT BOOKS:

1. Highway Engineering, S.K.Khanna & C.F.G.Justo, Nemichand & Bros., 7th edition (2000).
2. Railway Engineering, A text book of Transportation Engineering - S.P.Chadula - S.Chand & Co. Ltd. 2001
3. Highway Engineering Design - L.R. Kadiyali and Lal - Khanna Publications.
4. Airport Planning and Design - S.K.Khanna and Atora, Nemchand Bros.

REFERENCES:

1. Highway Engineering - S.P.Bindra, Dhruv Rai & Sons. - 4th Edition (1981)
2. Traffic Engineering & Transportation Planning - Dr.L.R.Kadiyali. Khanna publications - 6th Edition 1997.
3. Railway Engineering - August - Prabhu & Co., 15th Edition - 1994.
4. Air Transportation Planning & design - Virendra Kumar & Statish Chandhva - Gal Gotia Publishers 1999
5. Principles of Traffic Engineering - Garber & Hoel, Cengage Learning.

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III Year B.Tech. C.E. II-Sem

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4 -/- 4

**(56007) URBAN DISASTER - INTELLIGENT
CONTROLS SYSTEMS
(OPEN ELECTIVE)**

UNIT - I

Disasters : Types of disaster, Significant aspects of disasters, economic impact of disasters, Risk aspects, Hazards and disasters.

UNIT - II

Urban Disaster and their environmental impacts : Impact of earthquakes, floods, fires, droughts, land slides, Congestion pollution, accident risk on urban environment policies for remedial measures, Technology to forecast their impact.

UNIT - III

Technology to Track Urban Disasters : Monitoring profile - cameras, sensors and communication systems Engineering profiles - total station, terrestrial scanners, and other survey equipment.

UNIT - IV

Planning Profile - Impact on Urban Disasters: Planning profile - GPS, satellite technology and photographic technique.

UNIT - V

Information systems : Geography information systems - different packages and over view, MIS - Architecture, web enabled communication systems - over view.

UNIT - VI

Intelligent control system : Technology enabled online monitoring system, post evaluation multi criteria systems, force casting approaches through decision supporting systems.

UNIT - VII

Disasters : Disaster studies on disaster mitigation measures.

SUGGESTED & TEXT BOOKS:

1. Disasters - Global challenges and local solutions by Rajib Shaw, R.R. Krishna Murthy, University Press
2. Sensor Technologies & Data requirement of ITS by Lawrence A. Klein,
3. Disaster mitigation - Experiences and reflections - Pradeep Sahni, Alka Dhumeja, Uma Medhuri, PHI

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III Year B.Tech. C.E. II-Sem

L T/P/D C
4 -/- 4

**(56008) INTELLECTUAL PROPERTY RIGHTS
(OPEN ELECTIVE)**

UNIT - I

Introduction to Intellectual property: Introduction, types of intellectual property, international organizations, agencies and treaties, importance of intellectual property rights.

UNIT - II

Trade Marks : Purpose and function of trade marks, acquisition of trade mark rights, protectable matter, selecting and evaluating trade mark, trade mark registration processes.

UNIT - III

Law of copy rights : Fundamental of copy right law, originality of material, rights of reproduction, rights to perform the work publicly, copy right ownership issues, copy right registration, notice of copy right, international copy right law.

UNIT - IV

Law of patents : Foundation of patent law, patent searching process, ownership rights and transfer

UNIT - V

Trade Secrets : Trade secrets law, determination of trade secrets status, liability for misappropriations of trade secrets, protection for submission, trade secrets litigation.

UNIT - VI

Unfair competition : Misappropriation right of publicity, False advertising.

UNIT - VII

New development of intellectual property: new developments in trade mark law, copy right law, patent law, intellectual property audits.

UNIT - VIII

International overview on intellectual property, international - trade mark

law, copy right law, international patent law, international development in trade secrets law.

References & Text Books :

1. Intellectual property right, Deborah. E. Bouchoux, cengage learning.
2. Intellectual property right – neashmy the knowledge economy, prabuddha ganguli, Tate Mc Graw Hill Publishing company ltd.,

III Year B.Tech. C.E. II –Sem

L	T/P/D	C'
0	-3/-	2

(56600) GEOTECHNICAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Atterberg's Limits (LI & PL)
2. Field density-core cutter and sand replacement method
3. Grain size analysis (Sieve and Hydrometer analysis)
4. Permeability of soil, constant and variable head test
5. Compaction test
6. CBR Test
7. Consolidation test
8. Unconfined compression test
9. Tri-axial Compression test
10. Direct shear test.
11. Vane shear test

Note: Any eight experiments may be completed.

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III Year B.Tech. C.E. II – Sem

L	T/P/D	C
0	-3/-	2

(56601) ADVANCED ENGLISH COMMUNICATION SKILLS LAB

1. Introduction

The introduction of the English Language Lab is considered essential at 3rd year level. At this stage the students need to prepare themselves for their careers which may require them to listen to, read, speak and write in English both for their professional and interpersonal communication in the globalised context.

The proposed course should be an integrated theory and lab course to enable students to use 'good' English and perform the following:

- Gather ideas and information, to organise ideas relevantly and coherently.
- Engage in debates.
- Participate in group discussions.
- Face interviews.
- Write project/research reports/technical reports.
- Make oral presentations.
- Write formal letters.
- Transfer information from non-verbal to verbal texts and vice versa.
- To take part in social and professional communication.

2. Objectives:

This Lab focuses on using computer-aided multimedia instruction for language development to meet the following targets:

- To improve the students' fluency in English, through a well-developed vocabulary and enable them to listen to English spoken at normal conversational speed by educated English speakers and respond appropriately in different socio-cultural and professional contexts.
- Further, they would be required to communicate their ideas relevantly and coherently in writing.

3. Syllabus:

The following course content is prescribed for the Advanced Communication Skills Lab:

- Functional English - starting a conversation - responding appropriately and relevantly - using the right body language - role play in different situations.

- Vocabulary Building - synonyms and antonyms, word roots, one-word substitutes, prefixes and suffixes, study of word origin, analogy, idioms and phrases.
- Reading Comprehension - reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, Critical reading.
- Writing Skills - structure and presentation of different types of writing - Resume writing / e-correspondence/Technical report writing/Portfolio writing - planning for writing - research abilities/data collection/organizing data/tools/analysis - improving one's writing.
- Group Discussion - dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Presentation Skills - Oral presentations (individual and group) through IAM sessions/seminars and written presentations through posters/projects/reports/PPTs/e-mails/assignments etc.
- Interview Skills - concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.

4. Minimum Requirement:

The English Language Lab shall have two parts:

- The Computer aided Language Lab for 60 students with 60 systems, one master console, LAN facility and English language software for self-study by learners.
- The Communication Skills Lab with movable chairs and audio-visual aids with a P.A System, a T. V., a digital stereo -audio & video system and camcorder etc.

System Requirement (Hardware component):

Computer network with Lan with minimum 60 multimedia systems with the following specifications:

- P - IV Processor
- a) Speed - 2.8 GHZ
- b) RAM - 512 MB Minimum
- c) Hard Disk - 80 GB
- d) Headphones of High quality

5. Suggested Software:

The software consisting of the prescribed topics elaborated above should be procured and used.

Suggested Software:

- Clarity Pronunciation Power - part II
- Oxford Advanced Learner's Compass, 7th Edition
- DELTA's key to the Next Generation TOEFL Test: Advanced Skill Practice.
- Lingua TOEFL CBT Insider, by Dreamtech
- TOEFL & GRE (KAPLAN, AARCO & BARRONS, USA. Cracking GRE by CIJFES)
- The following software from 'train2success.com'
- Preparing for being Interviewed,
- Positive Thinking,
- Interviewing Skills,
- Telephone Skills,
- Time Management
- Team Building,
- Decision making
- English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

6. Books Recommended:

1. Technical Communication by Meenakshi Raman & Sangeta Sharma, Oxford University Press 2009.
2. Advanced Communication Skills Laboratory Manual by Sudha Rani, D. Pearson Education 2011.
3. English Language Communication : A Reader cum Lab Manual Dr A. Ramakrishna Rao, Dr G. Nataraj & Prof SA Sankaranarayanan, Anuradha Publications, Chennai 2008.
4. English Vocabulary in Use series, Cambridge University Press 2008.
5. Management Shapers Series by Universities Press(India) Pvt Ltd., Himaynagar, Hyderabad 2008.
6. Communication Skills by Leena Sen, PHI Learning Pvt Ltd., New Delhi, 2009.
7. Handbook for Technical Writing by David A McMurrey & Joanne Buckley CENGAGE Learning 2008.
8. Job Hunting by Colin Downes, Cambridge University Press 2008.
9. Master Public Speaking by Anne Nicholls, JAICO Publishing House, 2006.
10. English for Technical Communication for Engineering Students, Aysla Vishwanathan, Tata Mc Graw-Hill 2009.

11. Books on TOEFL/GRE/GMAT/CAT/IELTS by Barron's/DELTA/ Cambridge University Press.

12. International English for Call Centres by Barry Tomalin and Suhashini Thirous, Macmillan Publishers, 2009.

DISTRIBUTION AND WEIGHTAGE OF MARKS:

Advanced Communication Skills Lab Practicals.

1. The practical examinations for the English Language Laboratory practice shall be conducted as per the University norms prescribed for the core engineering practical sessions.
2. For the English Language lab sessions, there shall be a continuous evaluation during the year for 25 sessional marks and 50 End Examination marks. Of the 25 marks, 15 marks shall be awarded for day-to-day work and 10 marks to be awarded by conducting Internal Lab Test(s). The End Examination shall be conducted by the teacher concerned with the help of another member of the staff of the same department of the same institution.

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HYDERABAD**

IV Year B.Tech. C.E. I-Sem

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4	-/-/-	4

**(57001) GROUND WATER DEVELOPMENT AND
MANAGEMENT
(ELECTIVE-II)**

UNIT – I

Ground Water Occurrence: Ground water hydrologic cycle, origin of ground water, rock properties effecting ground water, vertical distribution of ground water, zone of aeration and zone of saturation, geologic formation as Aquifers, types of aquifers, porosity, Specific yield and Specific retention.

UNIT – II

Ground Water Movement: Permeability, Darcy's law, storage coefficient, Transmissivity, differential equation governing ground water flow in three dimensions derivation, ground water flow equation in polar coordinate system, Ground water flow contours their applications.

UNIT – III

Steady groundwater flow towards a well in confined and unconfined aquifers – Dupuit's and Theim's equations, Assumptions, Formation constants, yield of an open well Well interface and well tests – Recuperation Test.

UNIT – IV

Unsteady flow towards a well – Non equilibrium equations – Theis' solution – Jacob and Chow's simplifications, Leaky aquifers – Well Interference.

UNIT – V

Surface and Subsurface Investigation: Surface methods of exploration – Electrical resistivity and Seismic refraction methods, Subsurface methods – Geophysical logging and resistivity logging, Aerial Photogrammetry applications along with Case Studies in Subsurface Investigation.

UNIT – VI

Artificial Recharge of Ground Water: Concept of artificial recharge—recharge methods, relative merits, Applications of GIS and Remote Sensing in Artificial Recharge of Ground water along with Case studies.

UNIT – VII

Well Construction – Drilling Equipment used for Well Construction – Bore log – Interpretation of Log Data.

UNIT – VIII

Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben-Herzberg relation, Shape of interface, control of seawater intrusion. Groundwater Basin Management: Concepts of conjunction use, Case studies.

TEXT BOOKS:

1. Ground water Hydrology by David Keith Todd, John Wiley & Son, New York.
2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.

REFERENCES :

1. Groundwater Hydrology by BOWER, John Wiley & sons.
2. Groundwater System Planning & Management – R.Willes & W.W.G.Yeh, Prentice Hall.
3. Applied Hydrogeology by C.W.Fetta, CBS Publishers & Distributors.

(57002) ADVANCED STRUCTURAL DESIGN (ELECTIVE-II)

UNIT - I

Design and Detailing of Cantilever Types Retaining Walls - Principles of Counterfort Retaining Walls

UNIT - II

Design of Circular Rectangular Water Tanks,

UNIT - III

Design of Bunkers and Silos.

UNIT - IV

Design of RCC Chimneys

UNIT - V

Design of Concrete Bridges - TRC Loading - Design of Slab Bridge.

UNIT - VI

Design of T-Beam Girder Bridge.

UNIT - VII

Design of Steel Bridges - Loadings Design of Plate Girder Bridges.

UNIT - VIII

Design of Steel Gantry Girders.

TEXTBOOKS:

1. Advanced Reinforced Concrete Structures by Varghese, Pradies Hall of India Pvt. Ltd.
2. Reinforced Concrete Structures Vol. 2 by B.C. Punmia, Ashok Kumar Jain and Arun Kumar Jain, Taxmi, Publications Pvt. Ltd., New Delhi.

REFERENCES :

1. Essentials of Bridge Engineering by D. John Son Victor, Oxford and IBM Publication Co., Pvt. Ltd.
 2. Reinforced Concrete Design by S. U. Pillai and D. Menon, Tata Mc. Grawhill Publishing Company.
- Codes : Relevant IS : Codes

(57003) ELEMENTS OF EARTHQUAKE ENGINEERING (ELECTIVE-II)

UNIT-I

Engineering Seismology: Earthquake phenomenon cause of earthquakes-Faults- Plate tectonics- Seismic waves- Terms associated with earthquakes- Magnitude/Intensity of an earthquake-scales-Energy released-Earthquake measuring instruments-Seismoscope, Seismograph, accelerograph-strong ground motions- Seismic zones of India.

UNIT - II

Theory of Vibrations: Elements of a vibratory system- Degrees of Freedom- Continuous system- Lumped mass idealization- Oscillatory motion- Simple Harmonic Motion- Free vibration of single degree of freedom (SDOF) system- undamped and damped-critical damping- Logarithmic decrement- Forced vibrations.

UNIT - III

Conceptual design: Introduction-Functional planning-Continuous load path- Overall form-simplicity and symmetry-elongated shapes-stiffness and strength-Horizontal and Vertical members-Twisting of buildings- flexible buildings-framing systems-choice of construction materials-unconfined concrete-confined concrete-masonry-reinforcing steel - Lateral load resisting systems.

UNIT - IV

Introduction to earthquake resistant design: Seismic design requirements-regular and irregular configurations-basic assumptions-design earthquake loads-basic load combinations-permissible stresses-seismic methods of analysis-factors in seismic analysis-equivalent lateral force method.

UNIT - V

Reinforced Concrete Buildings: Principles of earthquake resistant design of RC members- Structural models for frame buildings- IS code (IS 1893) based methods for seismic design- retrofitting Vertical irregularities- Plan configuration problems- Determination of design lateral forces- Equivalent lateral force procedure- Lateral distribution of base shear.

UNIT - VI

Masonry Buildings: Introduction- Elastic properties of masonry assemblage- Categories of masonry buildings- Behaviour of unreinforced and reinforced masonry walls- Behaviour of walls- Box action and bands- Behaviour of

infill walls- Improving seismic behaviour of masonry buildings- Load combinations and permissible stresses- Seismic design requirements- Lateral load analysis of masonry buildings.

UNIT - VII

Structural Walls and Non-Structural Elements: Strategies in the location of structural walls- sectional shapes- variations in elevation- cantilever walls without openings - Failure mechanism of non-structures- Effects of non-structural elements on structural system- Analysis of non-structural elements- Prevention of non-structural damage- Isolation of non-structures.

UNIT - VIII

Ductility Considerations in Earthquake Resistant Design of RC Buildings: Introduction- Ductility-definition-ductility relationships-Impact of Ductility-Requirements for Ductility- Assessment of Ductility- Factors affecting Ductility- Ductile detailing considerations as per IS 13920. Behaviour of beams and columns in RC buildings during earthquakes-Vulnerability of open ground storey and short columns during earthquakes.

TEXT BOOKS:

1. Earthquake Resistant Design of structures - S. K. Duggal, Oxford University Press
2. Earthquake Resistant Design of structures - Pankaj Agarwal and Manish Shrikhande, Prentice Hall of India Pvt. Ltd.

REFERENCE BOOKS

1. Seismic Design of Reinforced Concrete and Masonry Building - T. Paulay and M.J.N. Priestly, John Wiley & Sons
2. Masonry and Timber structures including earthquake Resistant Design - Anand S.Arya, Nemchand & Bros
3. Earthquake - Resistant Design of Masonry Building - Miha Tomazevic, Imperial college Press.
4. Advanced Reinforced Concrete Design - P. C Varghese, Prentice Hall of India Pvt. Ltd.
5. Earthquake Tips - Learning Earthquake Design and Construction C.V.R. Murty

REFERENCE CODES:

1. IS: 1893 (Part-1)-2002, "Criteria for Earthquake Resistant - Design of structures." B.I.S., New Delhi.
2. IS:4326-1993, "Earthquake Resistant Design and Construction of Building". Code of Practice B.I.S., New Delhi.
3. IS:13920-1993, "Ductile detailing of concrete structures subjected to seismic force" - Guidelines, B.I.S., New Delhi.

(57004) WATERSHED MANAGEMENT (ELECTIVE-II)

UNIT-I

INTRODUCTION: Concept of watershed development, objectives of watershed development, need for watershed development in India. Integrated and multidisciplinary approach for watershed management.

UNIT-II

CHARACTERISTICS OF WATERSHED: size, shape, physiography, slope, climate, drainage, land use, vegetation, geology and soils, hydrology and hydrogeology, socio-economic characteristics, basic data on watersheds.

UNIT-III

Watershed delineation - Runoff Computations from a watershed - Flood Frequency Analysis - Gumbell, Log Pearson and Weibull Methods of Analysis.

UNIT-IV

PRINCIPLES OF EROSION: Types of erosion, factors affecting erosion, effects of erosion on land fertility and land capability, estimation of soil loss due to erosion, Universal soil loss equation.

MEASURES TO CONTROL EROSION: Contour techniques, ploughing, furrowing, trenching, bunding, terracing, gully control, rockfill dams, brushwood dam, Gabion.

UNIT-V

WATER HARVESTING: Rainwater Harvesting, catchment harvesting, harvesting structures, soil moisture conservation, check dams, artificial recharge, farm ponds, percolation tanks.

UNIT-VI

FOREST AND GRASS LAND MANAGEMENT: Interpretation of Satellite Imageries- Land use and Land Cover. Land capability classification, management of forest, agricultural, grassland and wild land, Reclamation of saline and alkaline soils.

UNIT-VII

ECOSYSTEM MANAGEMENT: Role of Ecosystem, crop husbandry, soil enrichment, inter, mixed and strip cropping, cropping pattern, sustainable agriculture, bio-mass management, dry land agriculture, Silvi pasture, horticulture, social forestry and afforestation.

UNIT-VIII

Planning of watershed management activities, peoples participation, preparation of action plan, administrative requirements- Reservoir Routing.

TEXT BOOKS:

1. Watershed Management by JVS Murthy, - New Age International Publishers.
2. Water Resource Engineering by R.Awarth and WP James, - Prentice Hall Publishers.

REFERENCE:

1. Land and Water Management by VVN Murthy, - Kalyani Publications,
2. Irrigation and Water Management by D.K.Majumdar, Printice Hall of India.

IV Year B.Tech. C.E. I-Sem

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(57005) GIS AND REMOTE SENSING**UNIT - I**

Introduction to Photogrammetry: Principle and types of aerial photographs, stereoscopy. Map Vs Mosaic, ground control, Parallax measurements for height, determinations.

UNIT - II

Remote Sensing - I: Basic concepts and foundation of remote sensing - elements involved in remote sensing, electromagnetic spectrum, remote sensing terminology and units.

UNIT - III

Remote Sensing - II: Energy resources, energy interactions with earth surface features and atmosphere, resolution, sensors and satellite visual interpretation techniques, basic elements, converging evidence, interpretation for terrain evaluation, spectral properties of water bodies, introduction to digital data analysis.

UNIT - IV

Geographic Information Systems: Introduction, GIS definition and terminology, GIS categories, components of GIS, fundamental operations of GIS, A theoretical framework for GIS.

UNIT - V

Types of data representation: Data collection and input overview, data input and output. Keyboard entry and coordinate geometry procedure, manual digitizing and scanning, Raster GIS, Vector GIS - File management, Spatial data - Layer based GIS, Feature based GIS mapping.

UNIT - VI

GIS Spatial Analysis: Computational Analysis Methods (CAM), Visual Analysis Methods (VAM). Data storage-vector data storage, attribute data storage, overview of the data manipulation and analysis. Integrated analysis of the spatial and attribute data.

(57006) PAVEMENT DESIGN**UNIT – I**

Factors Affecting Pavement Design: Variables Considered in Pavement Design, Types of Pavements, Functions of Individual Layers, Classification of Axle Types of Rigid Chassis and Articulated Commercial Vehicles, Legal Axle and Gross Weights on Single and Multiple Units, Tire Pressure, Contact Pressure, EAL and ESWL Concepts, Traffic Analysis: ADT, AADT, Truck Factor, Growth Factor, Lane, Directional Distributions & Vehicle Damage Factors, Effect of Transient & Moving Loads.

UNIT – II

Stresses In Pavements: Vehicle-Pavement Interaction: Transient, Random & Damping Vibrations, Steady State of Vibration, Experiments on Vibration, Stress Inducing Factors in Flexible and Rigid pavements

UNIT - III

Stress In Flexible Pavements: Visco-Elastic Theory and Assumptions, Layered Systems Concepts, Stress Solutions for One, Two and Three Layered Systems, Fundamental Design Concepts

UNIT – IV

Stresses In Rigid Pavements: Westergaard's Theory and Assumptions, Stresses due to Curling, Stresses and Deflections due to Loading, Frictional Stresses, Stresses in Dowel Bars & Tie Bars

UNIT – V

Material Characteristics: CBR and Modulus of Subgrade Reaction of Soil, Mineral aggregates – Blending of aggregates, binders, polymer and rubber modified bitumen, Resilient, Diametral Resilient and Complex (Dynamic) Moduli of Bituminous Mixes, Permanent Deformation Parameters and other Properties, Effects and Methods of Stabilisation and Use of Geo Synthetics.

UNIT - VI

Design Of Flexible Pavements: Flexible Pavement Design Concepts, Asphalt Institute's Methods with HMA and other Base Combinations.

UNIT – VII

Water Resources Applications-I: Land use/Land cover in water resources, Surface water mapping and inventory, Rainfall – Runoff relations and runoff potential indices of watersheds, Flood and Drought impact assessment and monitoring, Watershed management for sustainable development and Watershed characteristics.

UNIT – VIII

Water Resources Applications – II: Reservoir sedimentation, Fluvial Geomorphology, water resources management and monitoring, Ground Water Targeting, Identification of sites for artificial Recharge structures, Drainage Morphometry, Inland water quality survey and management, water depth estimation and bathymetry.

TEXT BOOKS:

1. Remote Sensing and its applications by LRA Narayana University Press 1999.
2. Principles of Geo physical Information Systems – Peter A Burrough and Rachael A. Mc Donnell. Oxford Publishers 2004.

REFERENCES:

1. Concepts & Techniques of GIS by C.P.Lo Albert, K.W. Young, Prentice Hall (India) Publications.
2. Remote Sensing and Geographical Information systems by M.Anji Reddy JNTU Hyderabad 2001, B.S.Publications.
3. GIS by Kang – tsung chang, TMH Publications & Co.,
4. Basics of Remote sensing & GIS by S.Kumar, Laxmi Publications.
5. Fundamental of GIS by Mechanical designs John Wiley & Sons

UNIT - VII

Design Of Rigid Pavements: Calibrated Mechanistic Design Process, PCA, AASHTO & IRC Specifications, Introduction to Prestressed and Continuously Reinforced Cement-Concrete Pavement Design.

UNIT – VIII

Design of Pavement – Pavement design for low volume roads, Rural road designs – code of practices.

REFERENCES:

1. Design of Functional Pavements, Nai C. Yang, McGraw Hill Publications
2. Concrete Pavements, AF Stock, Elsevier, Applied Science Publishers
3. Principles of Pavement Design, Yoder J. & Wittraz Mathew, W. John Wiley & Sons Inc
4. Pavement Analysis & Design, Yang H. Huang, Prentice Hall Inc.
5. Pavement and Surfacing for Highway & Airports, Micheal Sargious, Applied Science Publishers Limited.
6. IRC Codes for Flexible and Rigid Pavements design

IV Year B.Tech. C.E. I – Sem

L	T/P/D	C
3	1/-	3

(57007) ESTIMATING AND COSTING**UNIT – I**

General items of work in Building Standard Units Principles of working out quantities for detailed and abstract estimates – Approximate method of Estimating, Earthwork for roads and canals

UNIT – II

Detailed Estimates of Buildings.

UNIT – III

Earthwork for roads and canals

UNIT - IV

Rate Analysis – Working out data for various items of work over head and contingent charges.

UNIT - V

Reinforcement bar bending and bar requirement schedules.

UNIT-VI

Contracts – Types of contracts – Contract Documents – Conditions of contract.

UNIT – VII

Valuation of buildings.

UNIT - VIII

Standard specifications for different items of building construction.

TEXT BOOKS

1. Estimating and Costing by B.N. Dutta, UBS publishers, 2000.
2. Estimating and Costing by G.S. Birdie

REFERENCES :

1. Standard Schedule of rates and standard data book by public works department.
2. I. S. 1200 (Parts I to XXV – 1974/ method of measurement of building and Civil Engineering works – B.I.S.)
3. Estimation, Costing and Specifications by M. Chakraborti; Laxmi publications.
4. National Building Code

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4	1/-/-	4

**(57008) WATER RESOURCES PLANNING AND
MANAGEMENT (ELECTIVE-III)**

UNIT - I

Introduction: concepts of systems analysis, definition, systems approach to water resources planning and management, role of optimization models, objective function and constraints, types of optimization techniques.

UNIT - II

Linear programming - I: Formulation linear programming models, graphical method, simplex method, application of linear programming in water resources.

UNIT - III

Linear programming - II: Revised simplex method, duality in linear programming, sensitivity and post optimality analysis.

UNIT - IV

Dynamic programming: Belman's principles of optimality forward and backward recursive dynamic programming, case of dimensionality, application of dynamic programming for resource allocation.

UNIT - V

Non-linear optimization techniques: Clerical of method optimization, Kuch-Tucker, gradient based research techniques for simple unconstrained optimization.

UNIT - VI

Simulation: application of simulation techniques in water resources.

UNIT - VII

Water-resources economics: Principles of Economics analysis, benefit cost analysis- Multi-purpose Projects - Cost Allocation among various Projects - Alternative Single Project- Socio economic intuition and pricing of water resources.

UNIT - VIII

Water resources management: Planning of reservoir system, optimal operation of single reservoir system, allocation of water resources, optimal cropping pattern, conjunctive use of surface and sub-surface water resources.

TEXT BOOKS:

1. Water Resources System Analysis - Vedula & Mujumdar - Tata Mc. Graw Hill Company Ltd. 2005.
2. Water Resources Economics - James & Lee. Oxford Publishers 2005

REFERENCE:

1. Optimal design of water distribution networks P.R. Bhave, Narosa Publishing house 2003.

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L	T/P/D	C
4	1/-/-	4

**(57009) FINITE ELEMENT METHODS (ELECTIVE-III)
UNIT - I**

Introduction to Finite Element Method - Basic Equations in Elasticity - equation - concept of plane stress - plane strain advantages and disadvantages of FEM.

UNIT - II

Element shapes - nodes - nodal degree of freedom - strain displacement relations.

UNIT - III

Finite Element Analysis (FEA) of - one dimensional problems - Bar element - Shape functions stiffness matrix - stress - strain

UNIT - IV

FEA Beam elements - stiffness matrix - shape function - continuous beams.

UNIT - V

FEA Two dimensional problem - CST - LST element - shape function - stress - strain.

UNIT - VI

Lagrangian - Serendipity elements - Hermit polynomials - regular, irregular 2D & 3D - Element - shape functions.

UNIT - VII

Isoparametric formulation - Concepts of, isoparametric elements for 2D analysis - formulation of CST element, 4-noded and 8-noded iso-parametric quadrilateral elements.

UNIT-VIII

Solution Techniques: Numerical Integration, Static condensation, assembly of elements and solution techniques for static loads.

TEXT BOOK:

1. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. Finite element method by Logan daryl

REFERENCES:

1. Finite element method by chandrupatta, belegunda
2. Finite element analysis by p. zeshu, TMH

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4	1/-	4

(57010) DISASTER MANAGEMENT AND MITIGATION (ELECTIVE-III)

Unit-I

Environmental Hazards & Disasters: Meaning of Environmental hazards, Environmental Disasters and Environmental stress. Concept of Environmental Hazards, Environmental stress & Environmental Disasters. Different approaches & relation with human Ecology - Landscape Approach - Ecosystem Approach - Perception approach - Human ecology & its application in geographical researches.

Unit -II

Types of Environmental hazards & Disasters: Natural hazards and Disasters - Man induced hazards & Disasters - Natural Hazards- Planetary Hazards/ Disasters - Extra Planetary Hazards/ disasters - Planetary Hazards- Endogenous Hazards - Exogenous Hazards -

Unit -III

Endogenous Hazards - Volcanic Eruption - Earthquakes - Landslides - Volcanic Hazards/ Disasters - Causes and distribution of Volcanoes - Hazardous effects of volcanic eruptions - Environmental impacts of volcanic eruptions - Earthquake Hazards/ disasters - Causes of Earthquakes - Distribution of earthquakes - Hazardous effects of - earthquakes - - Earthquake Hazards in India -- Human adjustment, perception & mitigation of earthquake.

Unit -IV

Exogenous hazards/ disasters - Infrequent events- Cumulative atmospheric hazards/ disasters, Infrequent events: Cyclones - Lightning - Hailstorms, Cyclones: Tropical cyclones & Local storms - Destruction by tropical cyclones & local storms (causes, distribution human adjustment, perception & mitigation), Cumulative atmospheric hazards/ disasters : - Floods- Droughts- Cold waves- Heat waves
Floods:- Causes of floods- Flood hazards India- Flood control measures (Human adjustment, perception & mitigation), Droughts:- Impacts of droughts- Drought hazards in India- Drought control measures- Extra Planetary Hazards/ Disasters- Man induced Hazards /Disasters- Physical hazards/ Disasters- Soil Erosion
Soil Erosion:— Mechanics & forms of Soil Erosion- Factors & causes of Soil Erosion- Conservation measures of Soil Erosion, Chemical hazards/

disasters:— Release of toxic chemicals, nuclear explosion- Sedimentation processes, Sedimentation processes:- Global Sedimentation problems- Regional Sedimentation problems- Sedimentation & Environmental problems- Corrective measures of Erosion & Sedimentation, Biological hazards/ disasters:- Population Explosion.

Unit -V

Emerging approaches in Disaster Management- Three Stages

1. Pre- disaster stage (preparedness)
2. Emergency Stage
3. Post Disaster stage-Rehabilitation

Unit -VI

Natural Disaster Reduction & Management

- a) Provision of Immediate relief measures to disaster affected people
- b) Prediction of Hazards & Disasters
- c) Measures of adjustment to natural hazards

Unit -VII

Disaster Management- An integrated approach for disaster preparedness, mitigation & awareness.

Mitigation- Institutions- discuss the work of following Institution.

- a. Meteorological observatory
- b. Seismological observatory
- c. Volcanology institution
- d. Hydrology Laboratory
- e. Industrial Safety inspectorate
- f. Institution of urban & regional planners
- g. Chambers of Architects
- h. Engineering Council
- i. National Standards Committee

Integrated Planning- Contingency management Preparedness -

- a) Education on disasters
- b) Community involvement
- c) The adjustment of Human Population to Natural hazards & disasters
Role of Media

Monitoring Management- Discuss the programme of disaster research & mitigation of disaster of following organizations.

- a) International Council for Scientific Unions (ICSU)- Scientific committee on problems of the Environment (SCOPE), International Geosphere- Biosphere programme (IGBP)
- b) World federation of Engineering Organizations (WFEO)
- c) National Academy of Sciences
- d) World Meteorological organizations (WMO)
- e) Geographical Information System (GIS)
- f) International Association of Seismology & Physics of Earth's Interior (IASPEI)
- g) Various U.N agencies like UNCRD, IDNDR, WHO, UNESCO, UNICEF, UNLP.

Unit – VIII

- A regional survey of Land Subsidence, Coastal Disaster, Cyclonic Disaster & Disaster in Hills with particular reference to India
- Ecological planning for sustainability & sustainable development in India- Sustainable rural development: A Remedy to Disasters -Role of Panchayats in Disaster mitigations
- Environmental policies & programmes in India- Institutions & National Centres for Natural Disaster reduction, Environmental Legislations in India, Awareness, Conservation Movement, Education & training

TEXT BOOK:

Disaster Mitigation: Experiences And Reflections by Pardeep Sahu

REFERENCES

- R.B. Singh (Ed) Environmental Geography, Heritage Publishers New Delhi, 1990
- Savinder Singh Environmental Geography, Prayag Pustak Bhawan, 1997
- Kates, R.J & White, G.F The Environment as Hazards, Oxford, New York, 1978
- R.B. Singh (Ed) Disaster Management, Rawat Publication, New Delhi, 2000
- H.K. Gupta (Ed) Disaster Management, Universities Press, India, 2003
- R.B. Singh, Space Technology for Disaster Mitigation in India (INCEID), University of Tokyo, 1994
- Dr. Satender, Disaster Management in Hills, Concept Publishing Co., New Delhi, 2003
- A.S. Arya Action Plan For Earthquake, Disaster, Mitigation in V.K. Sharma (Ed) Disaster Management IIPA Publication New Delhi, 1994
- R.K. Bhandari An overview on Natural & Man made Disaster & their Reduction, CSIR, New Delhi
- M.C. Gupta Manuals on Natural Disaster management in India, National Centre for Disaster Management, IIPA, New Delhi, 2001

(57011) ADVANCED FOUNDATION ENGINEERING**UNIT – I**

Introduction-Bearing capacity of Footings subjected to Eccentric and inclined loading – Meyerhoff's, Hansen's, Vesic theories – Foundations on layered soils.

UNIT – II

Elastic settlement of Footings embedded in sands and clays of Infinite thickness – Footings on soils of Finite thickness-Schmertmann's method, Janbu method.

UNIT – III

Pile Foundations – static and dynamic methods-pile groups-negative skin friction-under reamed piles.

UNIT – IV

Settlement of Pile groups resting in sands and clays –laterally loaded piles-ultimate capacity of laterally loaded piles.

UNIT – V

Lateral Earth pressures-Rankine - Coulomb's and graphical methods – Stability of cantilever and counterfort retaining walls, Reinforced earth retaining walls.

UNIT – VI

Cantilever sheet piles and anchored bulkheads. Earth pressure diagram - Determination of Depth of embedment in sands and clays – Timbering of trenches- Earth pressure diagrams – Forces in struts.

UNIT – VII

Caissons and well foundations: Types of caissons – well foundations - Different shapes of wells – Components of wells – functions and Design – Design Criteria – Sinking of wells – lateral stability by Terzaghi's analysis.

UNIT – VIII

Foundations in Expansive soils Problems in Expansive soils – Mechanism of swelling-Swell Pressure and Swelling potential-Heave-foundation practices-Sand cushion-CNS technique – under – reamed pile Foundations – Granular pile – anchor technique. stabilization of expansive soils.

TEXT BOOKS:

- 1 Das, B.M., - (1999) Principles of Foundation Engineering -4th edition PWS Publishing, Singapore
- 2 Bowles, J.E., (1988) Foundation Analysis and Design - 4th Edition, McGraw-Hill International.
- 3 Geotechnical Engineering: Principles and practices of soil mechanics and foundation Engineering by VNS Murthy, Taylor & Francis Group

REFERENCE BOOKS:

- 1 Geotechnical Engineering by C. Venkataraman, New Age International Pvt.Ltd, Publishers (2002).
- 2 Analysis and Design of Substructures - Swami Saran, Oxford & IBH Publishing Company Pvt.Ltd (1998).
- 3 Basics and Applied Soil Mechanics by Gopal Ranjan & ASR Rao, New Age International Pvt.Ltd. Publishers (2002).

IV Year B.Tech. C.E. I -Sem

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(57601) CONCRETE AND HIGHWAY MATERIALS LAB

I. ROAD AGGREGATES:

1. Aggregate Crushing value
2. Aggregate Impact Test.
3. Specific Gravity and Water Absorption.
4. Attrition Test
5. Abrasion Test.
6. Shape tests

II. BITUMINOUS MATERIALS:

1. Penetration Test.
2. Ductility Test.
3. Softening Point Test.
4. Flash and fire point tests.

III. CEMENT AND CONCRETES:

TESTS ON CEMENTS:

1. Normal Consistency or fineness of cement.
2. Initial setting time and final setting time of cement.
3. Specific gravity and soundness of cement.
4. Compressive strength of cement.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
6. Young's modulus and compressive strength of concrete.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration)

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IV Year B.Tech. C.E. I – Sem

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(57602) ENVIRONMENTAL ENGINEERING LAB

LIST OF EXPERIMENTS

1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids (Organic and Inorganic)
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides
5. Determination of iron.
6. Determination of Dissolved Oxygen.
7. Determination of Nitrates
8. Determination of Optimum dose of coagulant
9. Determination of Chlorine demand
10. Determination of total Phosphorous.
11. Determination of B.O.D
12. Determination of C.O.D
13. Determination of Optimum coagulant dose.
14. Determination of Chlorine demand.
15. Presumptive coliform test.

NOTE : At least 8 of the above experiments are to be conducted.

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IV Year B.Tech. C.E. II-Sem

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(58001) GROUND IMPROVEMENT TECHNIQUES (ELECTIVE-IV)

UNIT – I

Dewatering: methods of de-watering- sumps and interceptor ditches- single, multi stage well points - vacuum well points- Horizontal wells-foundation drains-blanket drains- criteria for selection of fill material around drains – Electro-osmosis.

UNIT – II

Grouting: Objectives of grouting- grouts and their properties- grouting methods- ascending, descending and stage grouting- hydraulic fracturing in soils and rocks- post grout test.

UNIT – III

In – situ densification methods in granular Soils:– Vibration at the ground surface, Impact at the Ground Surface, Vibration at depth, Impact at depth.

UNIT - IV

In – situ densification methods in Cohesive soils:– preloading or dewatering, Vertical drains – Sand Drains, Sand wick geodrains – Stone and lime columns – thermal methods.

UNIT – V

Reinforced Earth: Principles – Components of reinforced earth – factors governing design of reinforced earth walls – design principles of reinforced earth walls.

UNIT – VI

Geosynthetics : Description, properties, functions and applications of geosynthetics

UNIT – VII

Geoenvironmental application of geosynthetics : Geomembranes for landfills and ponds, Geosynthetic clay liner, Designing with GCLs, Filtration, Erosion control, slope protection.

UNIT – VIII

Stabilization: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum.

Expansive soils: Problems of expansive soils – tests for identification – methods of determination of swell pressure. Improvement of expansive soils – Foundation techniques in expansive soils – under reamed piles.

TEXT BOOKS:

1. Hausmann M.R. (1990), Engineering Principles of Ground Modification, McGraw-Hill International Edition.
2. Purushotham Raj Ground Improvement Techniques, Laxmi Publications, New Delhi

REFERENCES:

1. Moseley M.P. (1993) Ground Improvement, Blackie Academic and Professional, Boca Taton, Florida, USA.
2. Xanthakos P.P, Abramson, L.W and Brukwe, D.A (1994) Ground Control and Improvement, John Wiley and Sons, New York, USA.
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jersey, USA

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IV Year B. Tech. C.E. II –Sem

L	T/P/D	C
3	1/4	3

**(58002) DESIGN AND DRAWING OF
IRRIGATION STRUCTURES
(ELECTIVE-IV)**

Design and drawing of the following hydraulic structures.

Group A

1. Surplus weir.
2. Syphon Well Drop
3. Trapezoidal notch fall.
4. Tank sluice with tower head

Group B

1. Sloping glacis weir.
2. Canal regulator
3. Under Tunnel.
4. Type III Syphon aqueduct

Final Examination pattern:

The Question paper is divided into two parts with two questions in each part. The student has to answer ONE question from each part. Part I should cover the designs and drawings from Group A for 45 marks and Part II should cover only designs from group B carrying 30 marks.

The duration of examination will be FOUR hours.

However, the students are supposed to practise the drawings for Group B structures also for internal evaluation.

TEXT BOOKS:

1. Water Resources Engineering - Principles and Practice by Challa ; Satyanarayana Murthy, New Age International Publishers.
2. Irrigation engineering and Hydraulic structures by S.K.Garg, Standard Book House.

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IV Year B.Tech. C.E. II-Sem

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3 1/- 3

**(58003) AIRPORT PLANNING AND DESIGN
(ELECTIVE - IV)**

UNIT - I The Air Transportation Systems

1. Introduction and history
2. Air transport and the national economy
3. Growth of air transport and future trends
4. Aviation organizations and their functions

UNIT - II Components of Air Transportation

1. Airports and airways
2. Airlines and air passengers
3. Operating environment

UNIT - III Airport Planning

1. Types of airport planning studies
2. Forecasting in aviation and airport planning

UNIT - IV Airport Configuration

1. Runway configurations
2. Taxiway configurations

UNIT - V

1. Introduction of Airport configurations
2. Analysis of wind
3. Site selection approach

UNIT - VI Planning and Design of the Terminal Area

1. The passenger terminal system
2. The terminal planning process
3. The apron-gate system

UNIT - VII Airport Space Traffic Control

1. Airways
2. Navigation aids

UNIT - VIII

1. Air Traffic Control
2. Air traffic control facilities
3. Air safety & Regulation issues

TEXT BOOK

1. Khanna S K, Arora M G and Jain S S. Airport Planning and Design, Neredchand and Brothers, Roorkee, 1994.

REFERENCES

1. Rangwala, Airport Engineering, Charotar Publishing House, 1996.
2. Air Transportation Planning & design - Virendra Kumar & Statish Chandhra - Gal Gotu Publishers (1999).

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IV Year B.Tech. C.E. II-Sem

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3 1/- 3

**(58004) PRESTRESSED CONCRETE STRUCTURES
(ELECTIVE-IV)**

UNIT - I

INTRODUCTION: Historic development - General principles of prestressing pretensioning and post tensioning - Advantages and limitations of prestressed concrete - Materials - High strength concrete and high tensile steel their characteristics.

UNIT - II

I.S.Code provisions, Methods and Systems of Prestressing: Pre-tensioning and post tensioning methods - Analysis of post tensioning - Different systems of prestressing like Hoyer System, Magnel System Freyssinet system and Gifford - Udall System.

UNIT - III

LOSSES OF PRESTRESS: Loss of prestress in pre-tensioned and post-tensioned members due to various causes like elastic shortage of concrete, shrinkage of concrete, creep of concrete, Relaxation of steel, slip in anchorage bending of member and frictional losses.

UNIT - IV

Analysis of sections for flexure; Elastic analysis of concrete beams prestressed with straight, concentric, eccentric, bent and parabolic tendons.

UNIT - V

DESIGN OF SECTIONS FOR FLEXURE AND SHEAR: Allowable stress, Design criteria as per I.S.Code - Elastic design of simple rectangular and I-section for flexure, shear, and principal stresses - design for shear in beams - Kern - lines, cable profile.

UNIT - VI

ANALYSIS OF END BLOCKS: by Guyon's method and Magnel method, Anchorage zone stresses - Approximate method of design - Anchorage zone reinforcement - Transfer of prestress pre-tensioned members.

UNIT - VII

Composite section: Introduction – Analysis of stress – Differential shrinkage – General design considerations

UNIT - VIII

DEFLECTIONS OF PRESTRESSED CONCRETE BEAMS: Importance of control of deflections factors influencing deflections short term deflections of uncracked members prediction of long term deflections.

TEXT BOOKS:

1. Prestressed Concrete by Krishnu Raju; - Tata Mc.Graw Hill Publications.
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

REFERENCE:

1. Prestressed Concrete by Ramamurtham; Dhampatram Publications.
2. Design of Prestressed concrete structures (Third Edition) by T.Y. Lin & Ned H.Burns. John Wiley & Sons.

Codes: BIS code on prestressed concrete, IS 1343.

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L	T/P/D	C
3	1/-	3

**(58005) DATA BASE MANAGEMENT SYSTEMS
(ELECTIVE - IV)**

UNIT I :

Data base System Applications, data base System VS file System – View of Data – Data Abstraction – Instances and Schemas – data Models – the ER Model – Relational Model – Other Models Database Languages – DDL – DML – database Access for applications Programs – data base Users and Administrator – Transaction Management – data base System Structure – Storage Manager – the Query Processor

UNIT II :

History of Data base Systems, Data base design and ER diagrams – Beyond ER Design Entities, Attributes and Entity sets – Relationships and Relationship sets – Additional features of ER Model – Concept Design with the ER Model – Conceptual Design for Large enterprises.

UNIT III :

Introduction to the Relational Model – Integrity Constraint Over relations – Enforcing Integrity constraints – Querying relational data – Logical data base Design – Introduction to Views – Destroying /altering Tables and Views.

Relational Algebra – Selection and projection set operations – renaming – Joins – Division – Examples of Algebra overviews – Relational calculus – Tuple relational Calculus – Domain relational calculus – Expressive Power of Algebra and calculus.

UNIT IV :

Form of Basic SQL Query – Examples of Basic SQL Queries – Introduction to Nested Queries – Correlated Nested Queries Set – Comparison Operators – Aggregative Operators – NULL values – Comparison using Null values – Logical connectivity's – AND, OR and NOT – Impact on SQL Constructs – Outer Joins – Disallowing NULL values – Complex Integrity Constraints in SQL Triggers and Active Data bases.

UNIT V :

Schema refinement – Problems Caused by redundancy – Decompositions – Problem related to decomposition – reasoning about FDS – FIRST, SECOND, THIRD Normal forms – BCNF – Lossless Join Decomposition – Dependency preserving Decomposition – Schema refinement in Data base Design – Multi valued Dependencies – FORTH Normal Form.

UNIT VI :

Transaction Concept- Transaction State- Implementation of Atomicity and Durability – Concurrent – Executions – Serializability- Recoverability – Implementation of Isolation – Testing for serializability- Lock –Based Protocols – Timestamp Based Protocols- Validation- Based Protocols – Multiple Granularity.

UNIT VII :

Recovery and Atomicity – Log – Based Recovery – Recovery with Concurrent Transactions – Buffer Management – Failure with loss of nonvolatile storage-Advance Recovery systems- Remote Backup systems.

UNIT VIII :

Data on External Storage – File Organization and Indexing – Cluster Indexes, Primary and Secondary Indexes – Index data Structures – Hash Based Indexing – Tree base Indexing – Comparison of File Organizations – Indexes and Performance Tuning- Intuitions for tree Indexes – Indexed Sequential Access Methods (ISAM) – B+ Trees: A Dynamic Index Structure.

TEXT BOOKS :

1. Data base Management Systems, Raghurama Krishnan, Johannes Gehrke, TATAMcGrawHill 3rd Edition
2. Data base System Concepts, Silberschatz, Korth, McGraw hill, V edition.

REFERENCES :

1. Data base Systems design, Implementation, and Management, Peter Rob & Carlos Coronel 7th Edition.
2. Fundamentals of Database Systems, Elmasri Navrate Pearson Education
3. Introduction to Database Systems, C.J.Date Pearson Education
4. Oracle for Professionals, The X Team, S.Shah and V.Shah, SPD,
5. Database Systems Using Oracle: A Simplified guide to SQL and PL/SQL, Shah, PHI.
6. Fundamentals of Database Management Systems, M.T., Gillenson, Wiley Student Edition.

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IV Year B.Tech. C.E. II –Sem

L	T/P/D	C
3	1/4	3

(58006) REHABILITATION AND RETROFITTING OF STRUCTURES

UNIT – I Introduction – Deterioration of Structures – Distress in Structures – Causes and Prevention.

UNIT – II Mechanism of Damage – Types of Damage.

UNIT – III Corrosion of Steel Reinforcement – Causes – Mechanism and Prevention.

UNIT – IV Damage of Structures due to Fire – Fire Rating of Structures – Phenomena of Desiccation.

UNIT – V Inspection and Testing – Symptoms and Diagnosis of Distress – Damage assessment – NDT.

UNIT – VI Repair of Structure – Common Types of Repairs – Repair in Concrete Structures – Repairs in Under Water Structures – Gunning – Shot Crete – Underpinning.

UNIT – VII Strengthening of Structures – Strengthening Methods – Retrofitting – Jacketing.

UNIT – VIII Health Monitoring of Structures – Use of Sensors – Building Instrumentation.

TEXT BOOKS:

1. Concrete Repair and Maintenance Illustrated, RS Means Company Inc W H Ranso, (1981)
2. Building Failures - Diagnosis and Avoidance, EF & N Spon, London, B. A. Richardson, (1991).

REFERENCE

1. Concrete Technology by A.R. Shantakumar, Oxford University press
2. Defects and Deterioration in Buildings, E F & N Spon, London
3. Non-Destructive Evaluation of Concrete Structures by Bunggy
4. Maintenance and Repair of Civil Structures. B.L. Gupta and Amit Gupta, Standard Publications.

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IV Year B.Tech. C.E. II -Sem

L T/P/D C
3 -/- 3

(58007) MANAGEMENT SCIENCE

Unit I

Introduction to Management: Entrepreneurship and organization - Nature and Importance of Management, Functions of Management, Taylor's Scientific Management Theory, Fayol's Principles of Management, Maslow's Theory of Human Needs, Douglas McGregor's Theory X and Theory Y, Herzberg's Two-Factor Theory of Motivation, Systems Approach to Management, Leadership Styles, Social responsibilities of Management.

Unit II

Designing Organisational Structures: Departmentation and Decentralisation, Types of Organisation structures - Line organization, Line and staff organization, functional organization, Committee organization, matrix organization, Virtual Organisation, Cellular Organisation, team structure, boundaryless organization, inverted pyramid structure, lean and flat organization structure and their merits, demerits and suitability.

Unit III

Operations Management: Principles and Types of Plant Layout, Methods of production (Job, batch and Mass Production), Work Study - Basic procedure involved in Method Study and Work Measurement, Statistical Quality Control: $\bar{X}$ chart, R chart, c chart, p chart, (simple Problems), Acceptance Sampling, Deming's contribution to quality.

Unit IV

A) Materials Management: Objectives, Need for Inventory control, EOQ, ABC Analysis, Purchase Procedure, Stores Management and Stores Records - Supply Chain Management

B) Marketing: Functions of Marketing, Marketing Mix, Marketing Strategies based on Product Life Cycle, Channels of distribution.

Unit V

Human Resources Management (HRM): Evolution of HRM, Concepts of HRM, Basic functions of HR Manager: Manpower planning, Recruitment, Selection, Training and Development, Placement, Wage and Salary Administration, Promotion, Transfer, Separation, Performance Appraisal, Grievance Handling and Welfare Administration, Job Evaluation and Merit Rating.

Unit VI

Project Management (PERT/CPM): Network Analysis, Programme Evaluation and Review Technique (PERT), Critical Path Method (CPM), Identifying critical path, Probability of Completing the project within given

time, Project Cost Analysis, Project Crashing, (simple problems)

Unit VII

Strategic Management: Mission, Goals, Objectives, Policy, Strategy, Programmes, Elements of Corporate Planning Process, Environmental Scanning, SWOT Analysis, Steps in Strategy Formulation and Implementation, Generic Strategy alternatives.

Unit VIII

Contemporary Management Practices: Basic concepts of Just-In-Time (JIT) System, Total Quality Management (TQM), Six sigma and Capability Maturity Model (CMM) Levels, Value Chain Analysis, Enterprise Resource Planning (ERP), Performance Management, Business Process outsourcing (BPO), Business Process Re-engineering 5S Model, Deming's PDCA, Kaizen, Poka-Yoke, Muda, Benchmarking, Balanced Score Card.

TEXT BOOK:

1. Aryasri: *Management Science*, TMH, New Delhi, 2009

REFERENCE BOOKS:

1. Stoner, Management, Pearson, 2009
2. Kotler Philip & Keller Kevin Lane: *Marketing Management PHI*, 2009.
3. Koontz, Weihrich, & Aryasri: *Principles of Management*, TMH, 2009.
4. Thomas N. Duening & John M. Ivancevich *Management—Principles and Guidelines*, Cengage, 2009.
5. Kunishka Bedi: *Production and Operations Management*, Oxford University Press, 2009.
6. Memoria & S.V. Ganker, *Personnel Management*, Himalaya, 2009
7. Schermerhorn: *Management*, Wiley, 2009.
8. Parnell: *Strategic Management*, Biztantra, 2009.
9. L.S. Srinath: *PERT/CPM*, Affiliated East-West Press, 2009.
10. William J. Stevenson & Ceyhan Ozgur: *Introduction to Management Science*, TMH, 2007.

Pre-requisites: Managerial Economics

Objective : To familiarize with the process of management and to provide basic insights into select contemporary management practices.

Codes/Tables : Normal Distribution Function Table need to be permitted into the examination Hall.

Question Paper Pattern: 5 Questions to be answered out of 8 questions.

The question paper should contain atleast 2 practical problems, one each from units -III & VI Each question should not have more than 3 bits.

Unit VIII will have only short questions, not essay questions.

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
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IV Year B.Tech. C.E. II -Sem

L	T/P/D	C
0	-/-	2

(58601) INDUSTRIAL TRAINING

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IV Year B.Tech. C.E. II -Sem

L	T/P/D	C
0	-6/-	2

(58602) SEMINAR

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IV Year B.Tech. C.E. II -Sem

L	T/P/D	C
0	-15/-	10

(58603) PROJECT

**JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
HYDERABAD**

IV Year B.Tech. C.E. II -Sem

L	T/P/D	C
0	-/-	2

(58604) COMPREHENSIVE VIVA