## COURSE STRUCTURE

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<th>SUBJECT</th>
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<tr>
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### II YEAR I SEMESTER

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### II YEAR II SEMESTER

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### B.TECH. CIVIL ENGINEERING

#### III YEAR I SEMESTER

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#### III YEAR II SEMESTER

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## IV YEAR I SEMESTER
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## IV YEAR II SEMESTER
### COURSE STRUCTURE

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<td>Design and Drawing of Hydraulic Structures</td>
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**NOTE:** All University Examinations (Theory and Practical) are of 3 hours duration.  
* : TUTORIAL  
T: Theory periods per week  P: Practical Periods per week / D: Drawing Periods per week  
C: Total Credits for the subject
1. 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 competence 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 by the students. Hence, it is suggested that they read it on their own with 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 and practice of language skills.

2. OBJECTIVES:
   a. To improve the language proficiency of the students in English with emphasis on LSRW skills.
   b. To equip the students to study academic subjects with greater facility through the theoretical and practical components of the English syllabus.
   c. To develop the study skills and communication skills in formal and informal situations.

3. 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 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 all the nine units of the prescribed text: Learning English : A Communicative Approach.)
   • 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
   • 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 the non-detailed text or other 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
   - Editing a passage

4. 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 Eight Units, are prescribed:

For Detailed study

For Non-detailed study

A. STUDY MATERIAL:
Unit – I

Unit – II

Unit – III

Unit – IV

Unit – V

Unit – VI

*Exercises from the lessons not prescribed shall also be used for classroom tasks.

Unit – VII
Exercises on
Reading and Writing Skills
Reading Comprehension
Situational dialogues
Letter writing
Essay writing

Unit – VIII
Practice Exercises on Remedial Grammar covering
Common errors in English, Subject-Verb agreement, Use of Articles and Prepositions,
Tense and aspect

Vocabulary development covering
Synonyms & Antonyms, one-word substitutes, prefixes & suffixes, Idioms & phrases, words often confused.

REFERENCES :
1. Strengthen Your English, Bhaskaran & Horsburgh, Oxford University Press
3. Murphy’s English Grammar with CD, Murphy, Cambridge University Press
4. English Skills for Technical Students by Orient Longman
8. Developing Communication Skills by Krishna Mohan & Meera Benerji (Macmillan)
10. The Oxford Guide to Writing and Speaking, John Seely, Oxford
UNIT – I

UNIT – II
Non-homogeneous linear differential equations of second and higher order with constant coefficients with RHS term of the type e^ax, Sin ax, cos ax, polynomials in x, e^ax V(x), xV(x), method of variation of parameters.

UNIT – III
Rolle’s Theorem – Lagrange’s Mean Value Theorem – Cauchy’s mean value Theorem – Generalized Mean Value theorem (all theorems without proof) Functions of several variables – Functional dependence- Jacobian- Maxima and Minima of functions of two variables with constraints and without constraints

UNIT – IV
Radius, Centre and Circle of Curvature – Evolutes and Envelopes Curve tracing – Cartesian , polar and Parametric curves.

UNIT – V
Applications of integration to lengths, volumes and surface areas in Cartesian and polar coordinates multiple integrals - double and triple integrals – change of variables – change of order of integration.

UNIT – VI
Sequences – series – Convergences and divergence – Ratio test – Comparison test – Integral test – Cauchy’s root test – Raabe’s test – Absolute and conditional convergence

UNIT – VII

UNIT – VIII

Text Books:

References:
UNIT I

UNIT II

ACOUSTICS OF BUILDINGS: Basic requirement of acoustically good hall - 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 remedy.

UNIT III

SUPERCONDUCTIVITY: General properties - Meissner effect - Penetration depth - Type I and Type II superconductors - Flux quantization – DC and AC Josephson effect – BCS Theory - Applications of superconductors.

UNIT IV

UNIT V

UNIT VI
FIBER OPTICS AND HOLOGRAPHY: Introduction - Principle of optical fiber - Acceptance angle and acceptance cone - Numerical aperture - Types of optical fibers and refractive index profiles - Attenuation in optical fibers - Application of optical fibers – Basic principles of holography – Construction and reconstruction of image on hologram – Applications of holography.

UNIT VII


UNIT VIII

TEXT BOOKS:
REFERENCES:
1. Nanotechnology by Mark Ratner and Daniel Ratner, Pearson Education.
2. Introduction to solid state physics by C. Kittel; Wiley Eastern Ltd.
3. Materials Science and Engineering by V. Raghavan; Prentice-Hall India.
4. Engineering Physics by Dr. M. Arumugam; Anuradha Agencies.
UNIT I: Water Technology-I:

UNIT II: Water Technology-II:

UNIT III: Science of Corrosion:

UNIT IV: Protective Coatings and their applications:
Surface Preparation: (1) Solvent Cleaning (2) Alkali Cleaning (3) Pickling and Etching (4) Sand Blasting (5) Mechanical Cleaning.

Types of Protective Coatings: Metallic Coatings – Anodic Coatings, Galvanization, Cathodic Coatings – Tinning, Metal Cladding, Electroplating Ex: Chromium Plating, Metal Spraying, Cementation–Sheradizing, Colourizing, Chromizing.

Chemical Conversion Coatings: (1) Phosphate (2) Chromate (3) Anodized Coatings.

UNIT V: Polymer Science and Technology:

UNIT VI: Refractories and Insulators:
Refractories – Definition, Classification With Examples; Criteria of a Good Refractory Material; Causes for the failure of a Refractory Material; Insulators – Definition and Classification with Examples; Characteristics of Insulating Materials; Thermal Insulators, Electrical Insulators - Their Characteristics and Engineering Applications.

UNIT VII: Lubricants:
Principles and function of lubricants - Types of Lubrication and Mechanism – Thick Film or Hydrodynamic Lubrication, Thin Film or Boundary Lubrication, Extreme Pressure Lubrication. Classification and properties of lubricants-Viscosity, flash and fire point, cloud and pour point, aniline point, Neutralization Number and mechanical strength.

UNIT VIII: Inorganic Cementing Materials:

TEXT BOOKS:
REFERENCE:
UNIT – I

UNIT – II

UNIT – III

UNIT – IV

UNIT – V

UNIT – VI
Kinematics: Rectilinear and Curve linear motion – Velocity and Acceleration – Motion of a Rigid Body – Types and their Analysis in Planar Motion.

UNIT – VII

UNIT – VIII

TEXT BOOKS:

REFERENCES:
UNIT - I
Algorithm / pseudo code, flowchart, program development steps, structure of C program, A Simple C program, identifiers, basic data types and sizes, Constants, variables, arithmetic, relational and logical operators, increment and decrement operators, conditional operator, bit-wise operators, assignment operators, expressions, type conversions, conditional expressions, precedence and order of evaluation.

Input-output statements, statements and blocks, if and switch statements, loops- while, do-while and for statements, break, continue, goto and labels, programming examples.

UNIT - II
Designing structured programs, Functions, basics, parameter passing, storage classes- extern, auto, register, static, scope rules, block structure, user defined functions, standard library functions, recursive functions, header files, C preprocessor, example c programs.

UNIT - III
Arrays- concepts, declaration, definition, accessing elements, storing elements, arrays and functions, two-dimensional and multi-dimensional arrays, applications of arrays, pointers- concepts, initialization of pointer variables, pointers and function arguments, address arithmetic, Character pointers and functions, pointers to pointers, pointers and multidimensional arrays, dynamic memory managements functions, command line arguments, c program examples.

UNIT - IV
Derived types- structures- declaration, definition and initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bitfields, C program examples.

UNIT - V
Input and output – concept of a file, text files and binary files, streams, standard I/o, Formatted I/o, file I/o operations, error handling, C program examples.

UNIT - VI
Searching – Linear and binary search methods, sorting – Bubble sort, selection sort, Insertion sort, Quick sort, merge sort.

UNIT – VII
Introduction to data structures, singly linked lists, doubly linked lists, circular list, representing stacks and queues in C using arrays and linked lists, infix to post fix conversion, postfix expression evaluation.

UNIT - VIII
Trees- Binary tree, terminology, representation, traversals, graphs- terminology, representation, graph traversals (dfs & bfs)

TEXT BOOKS :

REFERENCES :
2. The C Programming Language, B.W. Kernighan, Dennis M.Ritchie, PHI/Pearson Education
UNIT – I
INTRODUCTION TO ENGINEERING DRAWING: Principles of Engineering Graphics and their Significance – Drawing Instruments and their Use – Conventions in Drawing – Lettering – BIS Conventions. Curves used in Engineering Practice & their Constructions -Conic Sections including the Rectangular Hyperbola (General method only) - Cycloid, Epicycloid and Hypocycloid - Involute. – Helices – scales used in engineering practice and representative fraction- the principals – construction of plain diagonal and vernier scales

UNIT – II
DRAWING OF PROJECTIONS OR VIEWS ORTHOGRAPHIC PROJECTION IN FIRST ANGLE
PROJECTION ONLY: Principles of Orthographic Projections – Conventions – First and Third Angle Projections Projections of Points and Lines inclined to both planes, True lengths, traces.

UNIT – III
PROJECTIONS OF PLANES & SOLIDS: Projections of regular Planes, auxiliary planes and Auxiliary projection inclined to both planes. Projections of Regular Solids inclined to both planes – Auxiliary Views. Sections and Sectional views of Right Regular Solids – Prism, Cylinder, Pyramid, Cone – Auxiliary views.

UNIT – IV
DEVELOPMENT AND INTERPENETRATION OF SOLIDS: Development of Surfaces of Right Regular Solids – Prisms, Cylinder, Pyramid Cone and their parts. Interpenetration of Right Regular Solids – Intersection of Cylinder Vs Cylinder, Cylinder Vs Prism, Cylinder Vs Cone.

UNIT – V

UNIT – VI
TRANSFORMATION OF PROJECTIONS: Conversion of Isometric Views to Orthographic Views – Conventions.

UNIT – VII
PERSPECTIVE PROJECTIONS: Perspective View: Points, Lines, Plane Figures and Simple Solids, Vanishing Point Methods (General Method only).

UNIT – VIII
Introduction to Computer aided Drafting: Generation of points, lines, curves, polygons, simple solids, dimensioning.

TEXT BOOK:
1. Engineering Drawing. N.D. Bhat / Charotar
2. Engineering graphics with Auto CAD- R.B. Choudary/Anuradha Publishes

REFERENCES:
2. Engineering Drawing- Johle/Tata Macgraw Hill.
Any ten of the following experiments are to be performed during the Academic year.

**Sl. No.** | **Name of the Experiment**
--- | ---
1. | Determination of Refractive Index of the material of a Prism - Spectrometer.
2. | Dispersive power of the material of a Prism - Spectrometer.
3. | Cauchy’s constants - Spectrometer.
5. | Determination of thickness of a thin object using parallel fringes.
7. | Determination of Rigidity modulus of a material in the form of a wire – Torsional pendulum
8. | Melde’s Experiment - Transverse and Longitudinal modes.
10. | Single slit diffraction using Sodium lamp.
11. | Double slit diffraction using Sodium lamp.
14. | Time constant of R-C Circuit.
15. | L-C-R Circuit.
16. | Verification of laws of stretched string - Sonometer.
18. | Study of Characteristics of LED and LASER sources.
19. | Study of Characteristics of p-i-n and avalanche photo diode detectors.
22. | Magnetic field along the axis of a current carrying coil - Stewart and Gee’s method.
23. | Hall effect.
25. | Energy gap of a material of p-n junction.
26. | Determination of Young’s modulus and Poisson’s ratio by Cornu’s method
27. | Thermo Electric effect – Seebeck effect and Peltier effect.

**REDOX TITRATIONS:**

**IODOMETRY:**

**COMPLEXOMETRY:**
4. Preparation of Standard EDTA solution and Estimation of Calcium/Hardness of Water.
5. Preparation of Standard EDTA and Estimation of Copper.

**PRECIPITATION TITRATION:**

**ANALYSIS OF MINERALS:**
7. Percentage Purity of Pyrolusite.

**COLORIMETRIC ESTIMATIONS:**
9. Manganese in Steel
10. Iron in Cement

**TEXT BOOKS:**
1. Chemistry Pre-lab manual by Dr K.N.Jayaveera and K.B. Chandra Sekhar, S.M. Enterprizes Ltd.
Objectives:
To make the student learn a programming language.
To teach the student to write programs in C solve the problems
To introduce the student to simple linear and non-linear data structures such as lists, stacks, queues, trees and graphs.

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:
   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) Write C programs that use both recursive and non-recursive functions
   i) To find the factorial of a given integer.
   ii) To find the GCD (greatest common divisor) of two given integers.
   iii) To solve Towers of Hanoi problem.

Week 4
a) The total distance travelled by a vehicle in 't' seconds is given by distance = ut+1/2at^2 where 'u' and 'a' are the initial velocity (m/sec) and acceleration (m/sec^2). 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 form the user, performs the operation and then prints the result. (Consider the operators +, -, *, /, % and use Switch Statement)

Week 5
a) Write a C program to find both the largest and smallest number 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 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 + ……….. + 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 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**

Write a C program that uses functions to perform the following operations on singly linked list:

i) Creation  ii) Insertion  iii) Deletion  iv) Traversal

**Week 14**

Write a C program that uses functions to perform the following operations on doubly linked list:

i) Creation  ii) Insertion  iii) Deletion  iv) Traversal in both ways

**Week 15**

Write programs that implement stack (its operations) using

i) Arrays  ii) Pointers

**Week 16**

Write C programs that implement Queue (its operations) using

i) Arrays  ii) Pointers

**Week 17**

Write a C program that uses Stack operations to perform the following:

i) Converting infix expression into postfix expression
ii) Evaluating the postfix expression

**Week 18**

Write a C program that uses functions to perform the following:

i) Creating a Binary Tree of integers
ii) Traversing the above binary tree in preorder, inorder and postorder.

**Week 19**

Write C programs that use both recursive and non recursive functions to perform the following searching operations for a key value in a given list of integers:

i) Linear search  ii) Binary search
Week 20
Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
   i) Bubble sort   ii) Quick sort

Week 21
Write C programs that implement the following sorting methods to sort a given list of integers in ascending order:
   i) Insertion sort   ii) Merge sort

Week 22
Write C programs to implement the Lagrange interpolation and Newton- Gregory forward interpolation.

Week 23
Write C programs to implement the linear regression and polynomial regression algorithms.

Week 24
Write C programs to implement Trapezoidal and Simpson methods.

Text Books
JAWAHarlAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

I Year B.Tech  C.E.  T  P  C

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ENGINEERING WORK SHOP PRACTICE

1. TRADES FOR EXERCISES:
1. Carpentry
2. Fitting
3. Tin-Smithy and Development of jobs carried out and soldering.
4. Black Smithy
5. House-wiring
6. Foundry
7. IT Workshop-I : Computer hard ware , identification of parts , Disassembly, Assembly of computer to working conditioin,
   Simple diagnostic exercises.
8. IT workshop-II : Installation of Operating system windows and Linux , simple diagnostic exercises.

II TRADES FOR DEMONSTRATION & EXPOSURE:
1. Plumbing
2. Welding
3. Machine Shop
4. Power tools in construction, Wood working, Electrical Engg & Mechanical Engg
5. Metal Cutting (water plasma)

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

1 Year B.Tech  C.E.  

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:
1. To expose the students to a variety of self-instructional, learner-friendly modes of language learning.
2. To help the students cultivate the habit of reading passages from the computer monitor, thus providing them with the required facility to face computer-based competitive exams such as GRE, TOEFL, GMAT etc.
3. To enable them to learn better pronunciation through stress on word accent, intonation and rhythm.
4. To train them to use language effectively to face interviews, group discussions, public speaking.
5. To initiate them into greater use of the computer in resume preparation, report writing, format-making etc.

SYLLABUS:

The following course content is prescribed for the English Language Laboratory sessions:
1. Introduction to the Sounds of English- Vowels, Diphthongs & Consonants.
2. Introduction to Stress and Intonation.
3. Situational Dialogues / Role Play.
5. 'Just A Minute' Sessions (JAM).
6. Describing Objects / Situations / People.
7. Information Transfer
8. Debate
10. Giving Directions.

Minimum Requirement:
The English Language Lab shall have two parts:

i) 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.

ii) 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:

i) P – IV Processor
   a) Speed – 2.8 GHZ
   b) RAM – 512 MB Minimum
   c) Hard Disk – 80 GB

ii) Headphones of High quality

Suggested Software:

• Cambridge Advanced Learners' English Dictionary with CD.
• The Rosetta Stone English Library
• Clarity Pronunciation Power – Part I
• Mastering English in Vocabulary, Grammar, Spellings, Composition
• Dorling Kindersley series of Grammar, Punctuation, Composition etc.
• Language in Use, Foundation Books Pvt Ltd with CD.
• Oxford Advanced Learner’s Compass, 7th Edition
• Learning to Speak English - 4 CDs
• Microsoft Encarta with CD
• Murphy’s English Grammar, Cambridge with CD
• English in Mind, Herbert Puchta and Jeff Stranks with Meredith Levy, Cambridge

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. Spoken English (CIEFL) in 3 volumes with 6 cassettes, OUP.
4. English Language Communication : A Reader cum Lab Manual Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai
5. Speaking English Effectively by Krishna Mohan & NP Singh (Macmillan)
8. English Skills for Technical Students, WBSCTE with British Council, OL

DISTRIBUTION AND WEIGHTAGE OF MARKS

English Language Laboratory Practical Paper:
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.
UNIT – II

UNIT-III

UNIT –IV

UNIT-V
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear (standard type) equations.

UNIT –VI
Method of separation of variables – Classification of second order linear Partial Differential Equations, solutions of one dimensional heat equation, wave equation and two-dimensional Laplace’s equation under initial and boundary conditions.

UNIT –VII

UNIT-VIII

Text Books:

References:
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.

UNIT II DC MACHINES

UNIT III TRANSFORMERS
Principle of operation of single phase transformers – emf equation – losses – efficiency and regulation

UNIT IV AC MACHINES

UNIT V INSTRUMENTS
Basic Principle of indicating instruments – permanent magnet moving coil and moving iron instruments.

UNIT VI DIODE AND ITS CHARACTERISTICS
P-N junction diode, symbol, V-I Characteristics, Diode Applications, Rectifiers – Half wave, Full wave and Bridge rectifiers (simple Problems)

UNIT VII TRANSISTORS
P-N-P and N-P-N Junction transistor, Transistor as an amplifier, SCR characteristics and applications

UNIT VIII: CATHODE RAY OSCILLOSCOPE
Principles of CRT (Cathode Ray Tube), Deflection, Sensitivity, Electrostatic and Magnetic deflection, Applications of CRO - Voltage, Current and frequency measurements.

TEXT BOOKS:
1. Essentials of Electrical and Computer Engineering by David V. Kems, JR. J. David Irwin
2. Principles of Electrical and Electronics Engineering by V.K.Mehta, S.Chand & Co.

REFERENCES:
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA
II YEAR B.TECH. C.E.I –SEM

STRENGTH OF MATERIALS – I

UNIT – I
SIMPLE STRESSES AND STRAINS:

UNIT - II

UNIT – III
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, u.d.l., 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 – IV
FLEXURAL STRESSES:

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

UNIT – VI
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.

UNIT – VII
THIN CYLINDERS:

UNIT – VIII
THICK CYLINDERS:

TEXT BOOKS:

REFERENCES:
**BUILDING MATERIALS AND CONSTRUCTION**

**UNIT – I**
**STONES, BRICKS AND TILES:**

**UNIT-II**

**UNIT – III**
**LIME AND CEMENT:**

**UNIT-IV**

**UNIT - V**
**MASONARY :**
Types of masonry, English and Flemish bonds, Rubble and Ashlar masonry, cavity and partition walls.

**UNIT – VI**
**FOUNDATIONS:**
Foundations: Shallow foundations – Spread, combined strap and mat footings.

**UNIT – VII**
**BUILDING COMPONENTS:** Lintels, Arches, Vaults-stair cases – Types. Different types of floors-Concrete, Mosaic, Terrazo floors, Pitched, flat and curved Roofs. Lean-to-Roof, Coupled Roofs, Trussed roofs- King and Queen Post Trusses. RCC Roofs, Madras Terrace/Shell Roofs.

**UNIT – VIII**
**FINISHINGS :** Proofing Damp and water proofing- materials used. Plastering, pointing, white washing and distempering – Painting – Constituents of a paint – Types of paints – Painting of new/old Wood – Varnish – Form work and scaffolding.

**TEXT BOOKS:**

**REFERENCES:**
2. Building materials by P.C. Varghese, Prentice-Hall of India private Ltd, New Delhi
UNIT – I
INTRODUCTION: Overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications.

UNIT – II
DISTANCES AND DIRECTION: Distance measurement conventions and methods; use of chain and tape, Electronic distance measurements, Meridians, Azimuths and Bearings, declination, computation of angle.

UNIT – III
LEVELING AND CONTOURING: Concept and Terminology, Temporary and permanent adjustments- method of leveling, Characteristics and Uses of contours- methods of conducting contour surveys and their plotting.

UNIT – IV
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 - V

UNIT – VI
TACHEOMETRIC SURVEYING:
Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.

UNIT – VII
Curves: Types of curves, design and setting out – simple and compound curves.

UNIT - VIII
Introduction to geodetic surveying, Total Station and Global positioning system, Introduction to Geographic information system (GIS).

TEXT BOOKS:
1. “Surveying (Vol – 1, 2 & 3), by B.C.Punmia, Ashok Kumar Jain and Arun Kumar Jain - Laxmi Publications (P) Ltd., New Delhi

REFERENCES:
2. Arror K R “Surveying Vol 1, 2 & 3), Standard Book House, Delhi, 2004
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.

UNIT II
Hydrostatic forces on submerged plane. Horizontal, Vertical, inclined and curved surfaces – Center of pressure. Derivations and problems.

UNIT III
FLUID KINEMATICS: Description of fluid flow. Stream line, path line and streak lines, and stream tube. Classification of flows: Steady, unsteady, uniform, nonuniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two, three dimensional flows – stream and velocity potential functions, flownet analysis.

UNIT IV
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 (Explanationary) Momentum equation and its application – forces on pipe bend.

UNIT V
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 deviations BL in transition, separation of BL, control of BL, flow around submerged objects-Drag and Lift- Magnus effect.

UNIT VI
Reynold’s experiment – Characteristics of Laminar & Turbulent flows. Flow between parallel plates, Flow through long tubes, flow through inclined tubes.

UNIT VII

UNIT VIII
MEASUREMENT OF FLOW: Pitot tube, Venturi meter and orifice meter – classification of orifices, flow over rectangular, triangular and trapezoidal and Stepped notches --Broad crested weirs.

TEXT BOOKS:
3. Introduction to Fluid Machines by Edward J. Shaughnessy, Jr, Ira M. Katz and James P. Schaffer, Oxford University Press, New Delhi

REFERENCES:
4. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi
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

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. Brinell’s / Rock well’s hardness testing machine
6. Setup for spring tests
7. Compression testing machine
8. Izod Impact machine
9. Shear testing machine
10. Beam setup for Maxwell’s theorem verification.
11. Continuous beam setup
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA
II YEAR B.TECH. C.E.I –SEM

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)
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
KAKINADA
II YEAR B.TECH. C.E.II –SEM

PROBABILITY AND STATISTICS

UNIT-I
Probability: Sample space and events – Probability – The axioms of probability – Some
Elementary theorems - Conditional probability – Baye’s theorem.

UNIT-II

UNIT-III
Binomial and poison distributions Normal distribution – related properties.

UNIT-IV
Sampling distribution: Populations and samples - Sampling distributions of mean (known and unknown) proportions, sums and differences.

UNIT-V
Estimation: Point estimation – interval estimation - Bayesian estimation.

UNIT-VI
Test of Hypothesis – Means– Hypothesis concerning one and two means– Type I and Type II errors. One tail, two-tail tests.

UNIT-VII
Tests of significance – Student’s t-test, F-test, ² test. Estimation of proportions.

UNIT-VIII
Queueing Theory: Pure Birth and Death Process M/M/1 Model and Simple Problems.

Text Books:


References:

JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

II YEAR B.TECH. C.E. II-SEM

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2  +1t   3   4

BUILDING PLANNING AND DRAWING

PART-A

UNIT – I
Building Byelaws and Regulations:

UNIT – II
Residential Buildings: Minimum standards for various parts of buildings – requirements of different rooms and their grouping – characteristics of various types of residential buildings.

UNIT – III
Public Buildings: Planning of Educational institutions, hospitals, dispensaries, Office buildings, banks, industrial buildings, hotels and motels, buildings for recreation.

UNIT – IV
Planning of construction projects – scheduling and monitoring Bar chart – CPM and PERT Network planning – computation of times and floats – their significance.

PART-B

UNIT – V
SIGN CONVENTIONS AND BONDS: Brick, Stone, Plaster, Sand filling, Concrete, Glass, Steel, Cast iron, Copper alloys, Aluminium alloys etc., Lead, Zinc, tin, white lead etc., Earth, Rock, Timber and Marble. English bond & Flemish bond odd & even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT - VI

UNIT – VII
SLOPED AND FLAT ROOF BUILDINGS

UNIT - VIII
Given line diagram with specification to draw, plan, sections section and elevation

FINAL EXAMINATION PATTERN:
The end examination paper should consist of Part A and Part B. Part A consist of five questions in planning portion out of which three questions are to be answered. Part B should consist of two questions from drawing part out of which one is to be answered in drawing sheet. Weight age for Part – A is 60% and Part- B is 40%.

TEXT BOOKS:
2. PERT and CPM – Project planning and control with by Dr.B.C.Punmia & Khandelwal – Laxmi publications.
3. ‘A’ Series & ‘B’ Series of JNTU Engineering College, Anantapur,

REFERENCE:
1. Building by laws bye state and Central Governments and Municipal corporations.
UNIT I
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 FAILURES:
Introduction – Various Theories of failures like Maximum Principal stress theory – Maximum Principal strain theory – Maximum shear stress theory – Maximum strain energy theory – Maximum shear strain energy theory.

UNIT II
TORSION OF CIRCULAR SHAFTS:

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 III
COLUMNS AND STRUTS:

UNIT - IV
Laterally loaded struts – subjected to uniformly distributed and concentrated loads – Maximum B.M. and stress due to transverse and lateral loading.

UNIT – V
DIRECT AND BENDING STRESSES:
Stresses under the combined action of direct loading and B.M., 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 B.M. about both axis.

UNIT – VI
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.

UNIT – VII
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 - VIII
ANALYSIS OF PIN-JOINTED PLANE FRAMES:
Determination of Forces in members of plane, pin-jointed, perfect trusses by (i) method of joints and (ii) method of sections.
Analysis of various types of cantilever and simply – supported trusses.- by method of joints, method of sections.
**TEXT BOOKS:**
2. Introduction to Strength of Materials by U.C. Jindal, Galgotia publications.

**REFERENCES:**
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.

UNIT II
OPEN CHANNEL FLOW II: 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 - III
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.

UNIT – IV
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 - V
HYDRAULIC TURBINES – I: 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.

UNIT – VI
HYDRAULIC TURBINES – II: Governing of turbines-surge tanks-unit and specific turbines-unit speed-unit quantity-unit power-specific speed performance characteristics-geometric similarity-cavitation.

UNIT – VII

UNIT – VIII

TEXT BOOKS:
2. A text of Fluid mechanics and hydraulic machines by Dr. R.K. Bansal - Laxmi Publications (P) ltd., New Delhi

REFERENCES :
3. Fluid mechanics and fluid machines by Rajput, S.Chand &Co.
UNIT - I
Multidisciplinary nature of Environmental Studies: Definition, Scope and Importance – Need for Public Awareness.

UNIT - II
Natural Resources: Renewable and non-renewable resources – Natural resources and associated problems – Forest resources – Use and over – exploitation, deforestation, case studies – Timber extraction – Mining, dams and other effects on forest and tribal people – Water resources – Use and over utilization of surface and ground water – Floods, drought, conflicts over water, dams – benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies. - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies. - Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources. Case studies. Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification. Role of an individual in conservation of natural resources. Equitable use of resources for sustainable lifestyles.

UNIT - III
Ecosystems: Concept of an ecosystem. - Structure and function of an ecosystem. - Producers, consumers and decomposers. - Energy flow in the ecosystem - Ecological succession. - Food chains, food webs and ecological pyramids. - Introduction, types, characteristic features, structure and function of the following ecosystem:
- Forest ecosystem
- Grassland ecosystem
- Desert ecosystem
- Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

UNIT - IV

UNIT - V
Environmental Pollution: Definition, Cause, effects and control measures of:
- Air pollution
- Water pollution
- Soil pollution
- Marine pollution
- Noise pollution
- Thermal pollution
- Nuclear hazards

Solid waste Management: Causes, effects and control measures of urban and industrial wastes. - Role of an individual in prevention of pollution. - Pollution case studies. - Disaster management: floods, earthquake, cyclone and landslides.

UNIT - VI

UNIT - VII
UNIT - VIII
Field work: Visit to a local area to document environmental assets River/forest/grassland/hill/mountain - Visit to a local polluted site-Urban/Rural/industrial/ Agricultural Study of common plants, insects, birds. - Study of simple ecosystemspond, river, hill slopes, etc.

TEXT BOOK:
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:
1. Textbook of Environmental Sciences and Technology by M. Anji Reddy, BS Publication.
UNIT – I
PROPPED CANTILEVERS : Analysis of propped cantilevers-shear force and Bending moment diagrams-Deflection of propped cantilevers.

UNIT – II
FIXED BEAMS – Introduction to statically indeterminate beams with U.D.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-Deflection of fixed beams effect of sinking of support, effect of rotation of a support.

UNIT – III
CONTINUOUS BEAMS : Introduction-Clapeyron’s theorem of three moments- Analysis of continuous beams with constant moment of inertia with one or both ends fixed-continuous beams with overhang, continuous beams with different moment of inertia for different spans-Effects of sinking of supports-shear force and Bending moment diagrams.

UNIT-IV
Slope-Deflection Method: Introduction, derivation of slope deflection equation, application to continuous beams with and without settlement of supports.

UNIT – V
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-Deflections of simple beams and pin jointed trusses.

UNIT – VI
MOVING LOADS : 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.

UNIT – VII
INFLUENCE LINES : 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-single point load, U.D.load longer than the span, U.D.load shorter than the span-Influence lines for forces in members of Pratt and Warren trusses.

UNIT –VIII
INDETERMINATE STRUCTURAL ANALYSIS : Indeterminate Structural Analysis – Determination of static and kinematic indeterminacies –Solution of trusses with upto two degrees of internal and external indeterminacies –Castigliano’s theorem

TEXT BOOKS:
3. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
5. Basic structural Analysis by C.S. Reddy, Tata McGrawhill, New Delhi

REFERENCES:
5. Introduction to structural analysis by B.D. Nautiyal, New age international publishers, New Delhi
LIST OF EXERCISES:
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. Det 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.
SYLLABUS:

1. Calibration of Venturimeter & Orifice meter
2. Determination of Coefficient of discharge for a small orifice by a constant head method.
3. Determination of Coefficient of discharge for an external mouth piece by variable head method.
4. Calibration of contracted Rectangular Notch and/or Triangular Notch
5. Determination of Coefficient of loss of head in a sudden contraction and friction factor.
6. Verification of Bernoulli’s equation.
7. Impact of jet on vanes
9. Performance test on Pelton wheel turbine
10. Performance test on Francis turbine.
11. Efficiency test on centrifugal pump.
12. Efficiency test on reciprocating pump.

LIST OF EQUIPMENT:

1. Venturimeter setup.
2. Orifice meter setup.
3. Small orifice setup.
4. External mouthpiece setup.
5. Rectangular and Triangular notch setups.
6. Friction factor test setup.
7. Bernoulli’s theorem setup.
8. Impact of jets.
10. Pelton wheel and Francis turbines.
11. Centrifugal and Reciprocating pumps.
Unit I Introduction to Managerial Economics:

Unit II Elasticity of Demand:
Definition, Types, Measurement and Significance of Elasticity of Demand. Demand Forecasting, Factors governing demand forecasting, methods of demand forecasting (survey methods, statistical methods, expert opinion method, test marketing, controlled experiments, judgmental approach to demand forecasting)

Unit III Theory of Production and 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, Opportunity cost, Fixed vs Variable costs, Explicit costsVs. Implicit costs, Out of pocket costs vs. Imputed costs. Break-even Analysis (BEA)-Determination of Break-Even Point (simple problems)- Managerial Significance and limitations of BEA.

Unit IV Introduction to Markets & Pricing Policies:
Market structures: Types of competition, Features of Perfect competition, Monopoly and Monopolistic Competition. Price-Output Determination in case of Perfect Competition and Monopoly.

Unit V Business & New Economic Environment:

Unit VI Capital and Capital Budgeting:
Capital and its significance, Types of Capital, Estimation of Fixed and Working capital requirements, Methods and sources of raising finance. 
Nature and scope of 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 VII Introduction to Financial Accounting:

Unit VIII Financial Analysis through ratios:
Computation, Analysis and Interpretation of Liquidity Ratios (Current Ratio and quick ratio), Activity Ratios (Inventory turnover ratio and Debtor Turnover ratio), Capital structure Ratios (Debt- Equity ratio, Interest Coverage ratio), and Profitability ratios (Gross Profit Ratio, Net Profit ratio, Operating Ratio, P/E Ratio and EPS).

TEXT BOOKS:

REFERENCES:
3. Suma Damodaran, Managerial Economics, Oxford University Press.
4. Lipsey & Chrystal, Economics, Oxford University Press.

**Prerequisites:** Nil

**Objective:** To explain the basic principles of managerial economics, accounting and current business environment underlying business decision making.

**Codes/Tables:** Present Value Tables need to be permitted into the examinations Hall.

**Question Paper Pattern:** 5 Questions to be answered out of 8 questions.
   Each question should not have more than 3 bits.
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

III YEAR B.TECH. C.E. I–SEM

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DESIGN OF REINFORCED CONCRETE STRUCTURES

UNIT – I

UNIT – II

UNIT – III
Beams : Limit state analysis and design of singly reinforced, doubly reinforced, T and L beam sections.

UNIT – IV
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 – V

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

UNIT – VII
Design of Two-way slabs, one way slab, continuous slab using IS Coefficients.

UNIT – VIII
Limit state design for serviceability for deflection, cracking and codal provision.

NOTE: All the designs to taught in Limit State Method
Following plates should be prepared by the students.
1. Reinforcement particulars of T-beams and L-beams.
2. Reinforcement detailing of continuous beams.
3. Reinforcement particulars of columns and footings.
4. Detailing of One way, Two way and continuous slabs

FINAL EXAMINATION PATTERN:
The end examination paper should consist of Part A and Part B. Part A consist of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part – A is 40% and Part- B is 60%.

TEXT BOOKS:

REFERENCES:
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

III YEAR B.TECH. C.E. I –SEM

CONCRETE TECHNOLOGY

UNIT – I

UNIT – II

UNIT – III

UNIT – IV

UNIT – V
TESTING OF HARDENED CONCRETE: Compression tests – Tension tests – Factors affecting strength – Flexure tests – Splitting tests – Non-destructive testing methods – codal provisions for NDT.

UNIT – VI

UNIT – VII

UNIT – VIII

TEXT BOOKS:
2. Concrete Technology by M.S.Shetty. – S.Chand & Co. ; 2004

REFERENCES:
2. Concrete Technology by A.R. Santha Kumar, Oxford university Press, New Delhi
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.

UNIT-II
Abstraction from rainfall-evaporation, factors affecting evaporation, measurement of evaporation-evapotranspiration-Infiltration, factors affecting infiltration, measurement of infiltration, infiltration indices. Runoff-components of runoff, factors affecting runoff, stream gauging, effective rainfall, separation of base flow.

UNIT-III
Unit Hydrograph, definition, and limitations of applications of Unit hydrograph, derivation of Unit Hydrograph, S-hydrograph, IUH, Synthetic Unit Hydrograph.

UNIT-IV
Design Discharge, Computation of design discharge-rational formula, SCS method, flood frequency analysis-Gumbel's method, log pearson III method, basic concepts of flood routing-hydraulic and hydrologic routing, channel and reservoir routing.

UNIT-V
Ground water occurrence, types of aquifers, aquifer parameters, porosity, specific yield, permeability, transmissivity and storage coefficient, types of wells, Darcy's law, radial flow to wells in confined and unconfined aquifers.

UNIT-VI
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, preparation of land for Irrigation, standards of quality for Irrigation water.

UNIT-VII
Soil-water-plant relationship, vertical distribution of soil moisture, soil moisture constants, soil moisture tension, consumptive use, estimation of consumptive use, Duty and delta, factors affecting duty, depth and frequency of Irrigation, irrigation efficiencies.

UNIT-VIII
Classification of canals, design of Irrigation canals by Kennedy’s and Lacey’s theories, balancing depth of cutting, canal lining.

TEXT BOOKS:
2. Irrigation and water power engineering by Punnia & Lal, Laxmi publications pvt. Ltd., New Delhi

REFERENCES:
1. Elementary hydrology by V.P.Singh, PHI publications.
UNIT I

UNIT – II
TWO HINGED ARCHES: Determination of horizontal thrust bending moment, normal thrust and radial shear – Rib shortening and temperature stresses, tied arches – fixed arches – (No analytical question).

UNIT-III

UNIT – IV
Slope deflection method: Derivation of slope deflection equation of supports application to continuous beams including settlement of supports single bay, single sway, portal frame including side sway.

UNIT – V
Moment Distribution method – Stiffness and carry over factors – Distribution factors – Analysis of continuous beams with and without sinking of supports – storey portal frames – including Sway-Substitute frame analysis by two cycle.

UNIT – VI
Analysis of continuous beams – including settlement of supports and single bay portal frames with side sway by Kani’s method.

UNIT – VII
Flexibility methods, Introduction, application to continuous beams including support settlements.

UNIT – VIII
Stiffness method: Introduction, application to continuous beams including support settlements.

TEXT BOOKS:
1. Analysis of Structures – Vol.1 & 2 by Bhavikath, Vikas publications

REFERENCES:
2. Theory of structures by Ramamuratam
3. Structural Analysis by C.S. Reddy, Tata Macgrawhill, New Delhi
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

III YEAR B.TECH. C.E. 1–SEM

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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 draw backs. 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: Feldspers, Quartz, Flint, Jasper, Olivine, Augite, Hornblende, Muscovite, Biotite, Asbestos, Chlorite, Kyanite, Garnet, Talc, Calcite. Study of other common economics minerals such as Pyrite, Hematite, Magnetite, Chorite, Galena, Pyrolusite, Graphite, Magnesite, and Bauxite.

UNIT - III

UNIT - IV
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. Their importance Insitu and drift soils, common types of soils, their origin and occurrence in India, Stabilisation of soils.

UNIT - V
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, their causes and effect; measures to be taken to prevent their occurrence. Importance of study of ground water, earth quakes and land slides.

UNIT – VI

UNIT - VII

UNIT - VIII
TUNNELS: 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) Principals of Engineering Geology by K.V.G.K. Gokhale – B.S publications

REFERENCES:
2. Krynine & Judd, Principles of Engineering Geology & Geotechnics, CBS Publishers & Distribution,
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

III YEAR B.TECH. C.E. 1–SEM

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ENGINEERING GEOLOGY LAB.

1. Study of physical properties and identification of minerals referred under theory.
2. Megasopic description and identification of rocks referred under theory.
3. Interpretation and drawing of sections for geological maps showing tilted beds, faults, uniformities etc.

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.
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.
- Group Discussion – dynamics of group discussion, intervention, summarizing, modulation of voice, body language, relevance, fluency and coherence.
- Interview Skills – concept and process, pre-interview planning, opening strategies, answering strategies, interview through tele and video-conferencing.
- Resume’ writing – structure and presentation, planning, defining the career objective, projecting ones strengths and skill-sets, summary, formats and styles, letter-writing.
- Reading comprehension – reading for facts, guessing meanings from context, scanning, skimming, inferring meaning, critical reading.

4. Minimum Requirement:
The English Language Lab shall have two parts:
   i) 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.
   ii) 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:
   iii) **P – IV Processor**
       a) Speed – 2.8 GHZ.
       b) RAM – 512 MB Minimum
       c) Hard Disk – 80 GB
   iv) 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 CLIFFS)

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:**
5. **English Language Communication : A Reader cum Lab Manual** Dr A Ramakrishna Rao, Dr G Natanam & Prof SA Sankaranarayanan, Anuradha Publications, Chennai
8. **Books on TOEFL/GRE/GMAT/CAT** by Barron’s/cup
9. **IELTS series with CDs** by Cambridge University Press.
15. **Technical Communication** by Meenakshi Raman & Sangeeta Sharma, Oxford University Press.

**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.
UNIT – I

UNIT – II
INDEX PROPERTIES OF SOILS: Grain size analysis – Sieve and Hydrometer methods – consistency limits and indices – I.S. Classification of soils

UNIT – III

UNIT – IV
SEEPAGE THROUGH SOILS: Total, neutral and effective stresses – quick sand condition – Seepage through soils – Flownets: Characteristics and Uses.

UNIT – V
STRESS DISTRIBUTION IN SOILS: Boussinesq’s and Wester gaard’s theories for point loads and areas of different shapes – Newmark’s influence chart.

UNIT – VI
COMPACTATION: Mechanism of compaction – factors affecting – effects of compaction on soil properties. – Field compaction Equipment - compaction control.

UNIT – VII
CONSOLIDATION: Stress history of clay; e-p and e-log p curves – magnitude and rate of 1-D consolidation – Terzaghi’s Theory.

UNIT – VIII

TEXT BOOKS:

REFERENCES:
3. Geotechnical Engineering by Purushotham Raj
UNIT – I

UNIT-II
SOURCES OF WATER: Comparison from quality and quantity and other considerations – intakes – infiltration galleries distribution systems. – requirements – methods and layouts.

UNIT III

UNIT – IV

UNIT-V
Distribution systems -Design procedures- 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

UNIT – VII
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 of design – biological treatment – trickling filters – standard and high rate.

UNIT-VIII

TEXT BOOKS:
3. Elements of environmental engineering by K.N. Duggal, S. Chand Publishers

REFERENCES :
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, Prentice Hall of India
6. Unit operations in Environmental Engineering by R. Elangovan and M.K. Saseetharan, New age International
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

III YEAR B.TECH. C.E. II-SEM

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DESIGN OF STEEL STRUCTURES

UNIT - I
Welded connections: Introduction, Advantages and disadvantages of welding. Strength of welds-Butt and fillet welds; Permissible stresses – IS Code requirements. Design of welds fillet weld subjected to moment acting in the plane and at right angles to the plane of the joints, beam to beam and beam to Column connections.

UNIT – II
Beams: Allowable stresses, design requirements as per IS Code-Design of simple and compound beams-Curtailment of flange plates, Beam to beam connection, check for deflection, shear, buckling, check for bearing, laterally unsupported beams.

UNIT – III
Tension members and compression members : General Design of members subjected to direct tension and bending – effective length of columns. Slenderness ratio – permissible stresses. Design of compression members, struts etc.


UNIT – V

UNIT - VI
Roof Trusses: Different types of trusses – Design loads – Load combinations IS Code recommendations, structural details – Design of simple roof trusses involving the design of purlins, members and joints – tubular trusses.

UNIT – VII

UNIT - VIII
Gantry girder impact factors - longitudinal forces, Design of Gantry girders.
Note: The students should prepare the following plates.
Plate 1 Detailing of simple beams
Plate 2 Detailing of Compound beams including curtailment of flange plates.
Plate 3 Detailing of Column including lacings and battens.
Plate 4 Detailing of Column bases – slab base and gusseted base
Plate 5 Detailing of steel roof trusses including particulars at joints.
Plate 6 Detailing of Plate girder including curtailing, splicing and stiffeners.

FINAL EXAMINATION PATTERN:
The end examination paper should consist of Part A and Part B. Part A consists of two questions in Design and Drawing out of which one question is to be answered. Part B should consist of five questions and design out of which three are to be answered. Weightage for Part − A is 40% and Part- B is 60%.

TEXT BOOKS
1. Design of Steel Structures by Ramachandra. Vol– 1, Universities Press, KAKINADA
2. Structural Design and Drawing by N.Krishna Raju; University Press, KAKINADA.
3. Design of steel structures by S.K. Duggal, Tata Mcgraw Hill, New Delhi

REFERENCES
2. Structural design in steel by Sarwar Alam Raz, New Age International Publishers, New Delhi
3. Design of Steel Structures by P.Dayaratnam; S. Chand Publishers
4. Design of Steel Structures by M.Raghupathi, Tata Mc. Graw-Hill

IS Codes:
1) IS -800 – 1984
2) IS – 875 – Part III
3) Steel Tables,
These codes and steel tables are permitted in the examinations.
UNIT-I
Diversion Head works: Types of Diversion head works-diversion and storage head works, weirs and barrages, layout of diversion head works, components. Causes and failure of hydraulic structures on permeable foundations, Bligh’s creep theory, Khosla’s theory, determination of uplift pressure, impervious floors using Bligh’s and Khosla’s theory, exit gradient, functions of U/s and d/s sheet piles.

UNIT-II
Canal structures I: types of falls and their location, design principles of Sarda type fall, trapezoidal notch fall and straight glacs fall.

UNIT-III
Canal structures II: canal regulation works, principles of design of distributory and head regulators, canal outlets, types of canal modules, proportionality, sensitivity and flexibility.

UNIT-IV
Cross Drainage works: types, selection of site, design principles of aqueduct, siphon aqueduct and super passage.

UNIT-V
Types of dams, merits and demerits, factors affecting selection of type of dam, factors governing selecting site for dam, types of reservoirs, selection of site for reservoir, zones of storage of a reservoir, reservoir yield, estimation of capacity of reservoir using mass curve.

UNIT-VI
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, stability analysis, drainage galleries.

UNIT-VII
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-VIII
Spillways: types of spillways, design principles of Ogee spillways, types of spillway gates.

TEXT BOOKS:
1. Irrigation engineering and hydraulic structures by S.K Garg, Khanna publishers.
2. Irrigation engineering by K.R. Arora

REFERENCES:
1. Irrigation and water resources engineering by G.L. Asawa, New Age International Publishers
2. Concrete dams by Varshney.
3. Theory and Design of Hydraulic structures by Varshney, Gupta & Gupta
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

III YEAR B.TECH. C.E. II-SEM

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ESTIMATING AND COSTING

UNIT – I

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
2. Estimating and Costing by G.S. Birdie

REFERENCES:
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. Chakraborthi; Laxmi publications.
TRANSPORTATION ENGINEERING

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.

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 Superelevation and Extra widening- Design of Transition Curves-Design of Vertical alignment-Gradients- Vertical curves.

UNIT – III
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.

UNIT – IV
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.

UNIT – V
INTERSECTION DESIGN:
Types of Intersections- Conflicts at Intersections- Types of At-Grade Intersections- Channelisation: Objectives –Traffic Islands and Design criteria-Types of Grade Separated Intersections- Rotary Intersection – Concept of Rotary and Design Criteria- Advantages and Disadvantages of Rotary Intersection.

UNIT – VI
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 – Adzing of Sleepers- Sleeper density.

UNIT – VII
GEOMETRIC DESIGN OF RAILWAY TRACK:
Gradients- Grade Compensation- Cant and Negative Superelevation- Cant Deficiency – Degree of Curve – Crossings and Turn outs .

UNIT – VIII
AIRPORT ENGINEERING:

TEXT BOOKS:

REFERENCES:
LIST OF EXPERIMENTS
1. Atterberg’s Limits.
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

Any eight experiments may be completed.

LIST OF EQUIPMENT:
1. Casagrande’s liquid limit apparatus.
2. Apparatus for plastic and Shrinkage limits
3. Field Density apparatus for
   a) Core cutter method
   b) Sand Replacement method
4. Set of sieves: 4.75mm, 2mm, 1mm, 0.6mm, 0.42mm, 0.3mm, 0.15mm, and 0.075mm.
5. Hydrometer
6. Permeability Apparatus for
   a) Constant Head test
   b) Variable Head test
7. Universal Auto compactor for IS light and heavy compaction tests.
8. Apparatus for CBR test
10. 10 tons loading frame with proving rings of 0.5 tons and 5 tons capacity
11. One dimensional consolidation test apparatus with all accessories.
12. Tri-axial cell with provision for accommodating 38 mm dia specimens.
13. Box shear test apparatus
14. Laboratory vane shear apparatus.
15. Hot Air ovens (Range of Temperature 50-150°C)
17. Electronic balances of 500 gm capacity with 0.01gm least count and 5 kg capacity with least count of 1gm
18. Measuring Jars
   - 1000CC - 6
   - 100CC - 4
19. Mercury
   - 500 gm
20. Rammers
   - 2
   Crow bars - 2
LIST OF EXPERIMENTS
1. Determination of pH and Turbidity
2. Determination of Conductivity and Total dissolved solids.
3. Determination of Alkalinity/Acidity.
4. Determination of Chlorides.
5. Determination and Estimation of total solids, organic solids and inorganic solids.
6. Determination of iron.
10. Determination of B.O.D
11. Determination of C.O.D
NOTE: At least 8 of the above experiments are to be conducted.

LIST OF EQUIPMENT
1) pH meter,
2) Turbidity meter,
3) Conductivity meter,
4) Hot air oven,
5) Muffle furnace,
6) Dissolved Oxygen meter,
7) U – V visible spectrophotometer,
8) Reflux Apparatus,
9) Jar Test Apparatus,
10) BOD incubator.

TEXT BOOKS:
1. Chemistry for Environmental Engineering by Sawyer and Mc. Carty

REFERENCE
1. Relevant IS Codes.
JAWAHARLAL NEHRU TECHNOLOGICAL UNIVERSITY
KAKINADA

IV YEAR B.TECH. C.E. I-SEM

GEOTECHNICAL ENGINEERING – II

UNIT – I

UNIT – II

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.

UNIT – V
SHALLOW FOUNDATIONS: Types - choice of foundation – Location of depth – Safe Bearing Capacity – Terzaghi, Meyerhof, Skempton and IS Methods

UNIT-VI
Safe bearing pressure based on N-value – allowable bearing pressure; safe bearing capacity and settlement from plate load test – allowable settlements of structures - Settlement Analysis

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.

UNIT-VIII

TEXT BOOKS:

REFERENCES:
UNIT -I

UNIT -II
Principles of Elasticity: Equilibrium equations – strain displacement relationships in matrix form – Constitutive relationships for plane stress, plane strain and Axi-symmetric bodies of revolution with axi-symmetric loading.

UNIT -III
One Dimensional FEM: Stiffness matrix for bar element - shape functions for one dimensional elements – one dimensional problems.

UNIT -IV
Two Dimensional FEM: Different types of elements for plane stress and plane strain analysis – Displacement models – generalized coordinates – shape functions – convergent and compatibility requirements – Geometric invariance – Natural coordinate system – area and volume coordinates

UNIT -V
Generation of element stiffness and nodal load matrices for 3-node triangular element and four node rectangular elements.

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

UNIT-VII
Axi-symmetric analysis- Basic principles-Formulation of 4-node iso-parametric axi-symmetric element

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

TEXT BOOK:
2. Finite element analysis by S.S. Bhavakatti-New age international publishers
3. Finite element analysis by David V Hutton, Tata Mcgraw Hill, New Delhi

REFERENCES:
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 System: 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.

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:
2. Principals of Geo physical Information Systems – Peter A Burragh and Rachael

REFERENCES:
5. Fundamental of GIS by Mechanical designs John Wiley & Sons.
UNIT – I
Air Pollution – sources of pollution – Classification – effects on human beings – Global effects of Air pollution.

UNIT – II
Air pollution Control Methods – Particulate control devices – General Methods of Controlling Gaseous Emission.

UNIT – III

UNIT – IV

UNIT – V
Solid waste Management – sources, composition and properties of solid waste – collection and handling – separation and processing.

UNIT – VI
Solid waste disposal methods – Land filling – Incineration composting.

UNIT – VII

UNIT – VIII

TEXT BOOKS:
1. Environmental Science and Engineering by J.G.Henry and G.W.Heinke – Person Education.

REFERENCES:
1. Physico – Chemical process for waster quality control by Weber
2. Air Pollution and Control by MN Rao & H.N.Rao


UNIT – VIII  **Shear walls**: Types – Design of Shear walls as per IS:13920 – Detailing of reinforcements.

**TEXT BOOKS:**

**REFERENCES:**
3. Structural Dynamics by Mario Pauz.

**IS Codes**: IS:1893, IS:4326 and IS:13920.
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

UNIT – III
Industrial waste water discharges into streams. Lakes and oceans and problems.

UNIT – IV

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:

REFERENCES:
1. Liquid waste of Industry by Newmerow.
UNIT-I: TRAFFIC CHARACTERISTICS:
Basic characteristics of Traffic- Volume, Speed and Density- Relationship among Traffic parameters.

UNIT-II: TRAFFIC MEASUREMENT:

UNIT-III: HIGHWAY CAPACITY:
Definition of Capacity – Importance of capacity – Factors affecting Capacity- Concept of Level of Service- Different Levels of Service- Concept of Service Volume- Peak Hour Factor.

UNIT-IV: PARKING STUDIES:
Types of parking facilities – Onstreet and Off Street Parking Facilities- Parking Studies- Parking Inventory Study – Parking Survey by Patrolling Method- Analysis of Parking Data and parking characteristics-Multi Story Car Parking Facility-Design standards.

UNIT-V: TRAFFIC CONTROL & REGULATION:

UNIT-VI: TRAFFIC & ENVIRONMENT:
Detrimental effect of traffic on environment – Air Pollution – Pollutants due to Traffic – Measures to reduce Air Pollution due to Traffic- Noise Pollution – Measures to reduce Noise Pollution.

UNIT-VII: TRAFFIC SIGNS AND ROAD MARKINGS:
Types of Traffic Signs- cautionary,Regulatory and Informative Signs- Specifications- Pavement markings- Types of Markings – Lane markings and Object markings- Standards and Specifications for Road Markings.

UNIT-VIII: HIGHWAY SAFETY:

TEXT BOOK:


REFERENCES:-

1 Transportation Engineering – An Introduction – C. J. Khisty, Prentice Hall
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 past optimality analysis.

UNIT – IV
SDynamics programming: Belman’s of principles of optimality forward and backward recursive dynamic programming, case of dimensionality, application of dynamic for resource allocation.

UNIT – V
Non-linear optimization techniques: Clerical of method optimization, Kuch-Tucler, gradential 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 socio economic intuitional 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:

REFERENCES:
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 SOx, NOx, CO, HC etc., air-fuel ratio. Computation and Control of products of combustion.

UNIT – IV
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-V
Lapse Rates, Pressure Systems, Winds and moisture plume behaviour and plume Rise Models; Gaussian Model for Plume Dispersion.

UNIT-VI
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 – VII
General Methods of Control of NOx and Sox emissions – In-plant Control Measures, process changes, dry and wet methods of removal and recycling.

UNIT – VIII
Air Quality Management – Monitoring of SPM, SO; NO and CO Emission Standards.

TEXT BOOKS:

REFERENCE:
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
Stabilisation: Methods of stabilization-mechanical-cement- lime-bituminous-chemical stabilization with calcium chloride, sodium silicate and gypsum

UNIT – VI

UNIT – VII
Geosynthetics : Geotextiles- Types, Functions and applications – geogrids and geomembranes – functions and applications.

UNIT - VIII

TEXT BOOKS:

REFERENCES:
3. Robert M. Koerner, Designing with Geosynthetics, Prentice Hall New Jercy, USA
GIS :
SOFTWARE :
1. Arc GIS 9.0
2. ERDAS 8.7
3. Mapinfo 6.5

Any one or Equivalent.

EXERCISES:
1. Digitization of Map/Toposheet
2. Creation of thematic maps.
3. Study of features estimation
4. Developing Digital Elevation model
5. Simple applications of GIS in water Resources Engineering & Transportation Engineering.

CAD:
SOFTWARE:
1. STAAD PRO or Equivalent

EXERCISIES:
1. 2-D Frame Analysis and Design
2. Steel Tabular Truss Analysis and Design
3. 3-D Frame Analysis and Design
4. Retaining Wall Analysis and Design
5. Simple tower Analysis and Design

TEXT BOOK:
I. ROAD AGGREGATES:
1. Aggregate Crushing value
2. Aggregate Impact Test.
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.
5. Workability test on concrete by compaction factor, slump and Vee-bee.
7. Bulking of sand.
8. Non-Destructive testing on concrete (for demonstration)

LIST OF EQUIPMENT:
1. Apparatus for aggregate crushing test.
2. Aggregate Impact testing machine
3. Pycnometers.
4. Los angles Abrasion test machine
5. Deval’s Attrition test machine
6. Length and elongation gauges
7. Bitumen penetration test setup.
8. Bitumen Ductility test setup.
9. Ring and ball apparatus
10. Penskey – Morten’s apparatus
11. Vical’s apparatus
12. Specific gravity bottle.
13. Lechatlier’s apparatus.
14. Slump and compaction factor setups
UNIT – I
Design of Retaining walls, cantilever and counterfort

UNIT – II
Design of RCC water tanks, Circular and rectangular types.

UNIT – III
Design of steel water tanks

UNIT - IV
Introduction to bunkers, silos and Chimney, concepts of loading and Design.

UNIT – V
Introduction to concrete bridges, IRC loading, slab bridges and T-beam bridges design concepts.

UNIT – VI
Design of plate girder railway bridges and gantry girders.

UNIT – VII
Design of steel truss bridges for railway loading

UNIT – VIII
Multistory building system – detailing for Ductility, Design for earthquake and wind forces.

TEXT BOOKS:
1. Advanced Reinforced concrete structures by Vargheesh, Pranties Hall of India Pvt. Ltd.

REFERENCES:
2. Reinforced concrete design by S.U.Pillai and D.Menon, Tata McGrawhill Publishing company
3. Advanced Reinforced Concrete Design by P.C. Varghese, Prentice Hall India.

Codes: Relevant!S: codes.
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
Analysis of Pumping Test Data – I: Steady flow groundwater 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.

UNIT – IV

UNIT – V

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
Saline Water Intrusion in aquifer: Occurrence of saline water intrusions, Ghyben- Herzberg relation, Shape of interface, control of seawater intrusion.

UNIT – VIII
Groundwater Basin Management: Concepts of conjunction use, Case studies.

TEXT BOOKS:
2. Groundwater by H.M.Raghunath, Wiley Eastern Ltd.

REFERENCES:
UNIVERSITY
KAKINADA

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

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
Procurement of relevant soil quality, Impact prediction, Assessment of Impact significance, Identification and Incorporation of mitigation measures. E I A in 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 – V
Assessment of Impact of development Activities on Vegetation and wildlife, environmental Impact of Deforestation – Causes and effects of deforestation.

UNIT – VI
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.

UNIT-VII

UNIT-VIII
Case studies and preparation of Environmental Impact assessment statement for various Industries.

TEXT BOOKS:
1. Environmental Impact Assessment Methodologies, by Y. Anjaneyulu, B.S. Publication, Sultan Bazar, KAKINADA.
2. Environmental Science and Engineering, by J. Glynn and Gary W. Hein Ke – Prentice Hall Publishers

REFERENCES:
2. Environmental Pollution and Control, by Dr H.S. Bhatia – Galgotia Publication (P) Ltd, Delhi
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
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.

UNIT-IV
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
LAND MANAGEMENT: Land use and 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.

TEXT BOOKS:
1. Watershed Management by JVS Murthy. - New Age International Publishers,

REFERENCE:
1. Land and Water Management by VVN Murthy. - Kalyani Publications,
2. Irrigation and Water Management by D.K.Majumdar, Prentice Hall of India.
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, Magne 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 Mugne method, Anchorage zone strusses – Approximate method of design – Anchorage zone reinforcement – Transfer of prestress pre-tensioned members.

UNIT – VII

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:
2. Prestressed Concrete by N.Rajasekharan; - Narosa publications.

REFERENCE:
1. Prestressed Concrete by Ramamrutham; Dhanpatrai Publications.

Codes: BIS code on prestressed concrete, IS 1343.
UNIT – I
Types of pavement – Factors affecting design of pavements – wheel loads – ESWL Concept- tyre pressure – contact pressure, Material characteristics – Environmental and other factors.

UNIT – II
Stresses in flexible pavement – layered systems concept – one layer system – Boussinesq Two layer system – Burmister Theory for Pavement Design.

UNIT – III
Stresses in rigid pavements – relative stiffness of slab, modulus of sub-grade reaction – stresses due to warping, stresses due to loads, stresses due to friction.

UNIT – IV
Pavement design: CBR Method of Flexible Pavement Design- IRC method of flexible pavement design.- AASHO Method of Flexible Pavement design

UNIT – V
IRC method of Rigid pavement design – Importance of Joints in Rigid Pavements- Types of Joints – Use of Tie Bars and Dowell Bars.

UNIT – VI

UNIT – VII

UNIT – VIII

TEXT BOOKS:

REFERENCES:

CODES:
UNIT – I
Theory of vibrations: Basic definitions- free and forced vibrations with and without damping for single degree freedom system- Resonance and its effect – magnification – Logarithmic decrement – Transmissibility

UNIT – II
Natural frequency of foundation – Soil system: Barkan’s and IS methods – pressure bulb concept – Pauw’s Analogy.

UNIT – III

UNIT – IV
Dynamic Soil Properties: Field and Laboratory methods of determination – Uphole, Down hole and cross hole methods – Cyclic plate load test – Block vibration test – Determination of Damping factor.

UNIT – V
Machine Foundations: Types, Design criteria, permissible amplitudes and bearing pressure.

UNIT – VI
Block foundation: Degrees of freedom - analysis under different modes of vibration

UNIT – VII
Analysis of Two Degree freedom systems under free and forced vibrations -Principles of Design of Foundations for reciprocating and impact machines as per IS code.

Unit – VIII
Vibration Isolation: Types and methods – Isolating materials and their properties

TEXT BOOKS:
2) Soil Dynamics by Shamsher Prakash

REFERENCES:
2) Vibration of Soils and Foundations by Richart, Hall and Woods, Prentice Hall, eaglewood Cliffs, New Jersey, USA.
UNIT - I
Moment Distribution method: Application to the analysis of portal frames with inclined legs, gable frames.

UNIT – II
Strain energy method: Application to the analysis of continuous beams and simple portal frames.

UNIT - III
Influence lines: Influence line diagrams for Reaction, Shearing force and Bending moment in case of determinate beams and Influence line diagrams for member forces in determinate trusses – application of influence line diagrams.

UNIT - IV
Analysis Two hinged and Three hinged arches using influence lines.

UNIT - V
Flexibility Method: Introduction to the structural analysis by flexibility concept using Matrix approach and application to continuous beams and plane trusses.

UNIT - VI
Stiffness method: Introduction to the structural analysis by stiffness concept using Matrix approach and application to continuous beams and plane trusses.

UNIT - VII
Analysis of portal frames by flexibility and stiffness methods. Drawing of bending moment diagram.

UNIT - VIII

TEXT BOOKS:
3. Comprehensive Structural Analysis Vol.1&2 by Dr. Vaidyanathan and Dr. P.Perumal - by Laxmi, publications Pvt. Ltd., New Delhi

REFERENCES:
1. Structural Analysis by D.S.Prakash Rao - Sagar books
Design and drawing of the following hydraulic structures.
1. Sloping glacis weir.
2. Tank sluice with tower head
3. Type III Syphon aqueduct.
4. Surplus weir.
5. Trapezoidal notch fall.

Final Examination pattern: Any two questions of the above six designs may be asked out of which the candidate has to answer one question. The duration of examination will be three hours.

TEXT BOOKS:
1. Design of minor irrigation and canal structures by C.Satyanarayana Murthy, Wiley eastern Ltd.