COURSE STRUCTURE AND SYLLABUS

For

CIVIL ENGINEERING

(Applicable for batches admitted from 2016-2017)

JAWAHarlAL NEHRU TECHNOLOGICAL UNIVERSITY: KAKINADA
KAKINADA - 533 003, Andhra Pradesh, India
### I Year - I Semester

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**Total Credits** 21

### III Year - II Semester

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**Total Credits** 21
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**Total Credits** 22

### IV Year - II Semester

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**Total Credits** 24

**Total Course Credits** = 48 + 44 + 42 + 46 = 180
SYLLABUS

I Year - I Semester

ENGLISH –I
(Common to All Branches)

Introduction:

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

As far as the detailed Textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing. The nondetailed Textbooks are meant for extensive reading for pleasure and profit.

Thus the stress in the syllabus in primarily on the development of communicative skills and fostering of ideas.

Objectives:

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
3. To develop the communication skills of the students in both formal and informal situations.

LISTENING SKILLS:

Objectives:

1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds and regions.
3. To enable the students to listen for general content, to fill up information and for specific information.

SPEAKING SKILLS:

Objectives:

1. To make the students aware of the importance of speaking for their personal and professional communication.
2. To enable the students to express themselves fluently and accurately in social and professional success.
3. To help the students describe objects, situations and people.
4. To make the students participate in group activities like roleplays, discussions and debates.
5. To make the students participate in Just a Minute talks.

READING SKILLS:

Objectives:

1. To enable the students to comprehend a text through silent reading.
2. To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
3. To enable the students to skim and scan a text.
4. To enable the students to identify the topic sentence.
5. To enable the students to identify discourse features.
6. To enable the students to make intensive and extensive reading.

WRITING SKILLS:

Objectives:

1. To make the students understand that writing is an exact formal skills.
2. To enable the students to write sentences and paragraphs.
3. To make the students identify and use appropriate vocabulary.
4. To enable the students to narrate and describe.
5. To enable the students capable of note-making.
6. To enable the students to write coherently and cohesively.
7. To make the students to write formal and informal letters.
8. To enable the students to describe graphs using expressions of comparison.
9. To enable the students to write technical reports.

Methodology:

1. The class are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.
4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.
5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.
Assessment Procedure: Theory

1. The formative and summative assessment procedures are to be adopted (mid exams and end semester examination).
2. Neither the formative nor summative assessment procedures should test the memory of the content of the texts given in the textbook. The themes and global comprehension of the units in the present day context with application of the language skills learnt in the unit are to be tested.
3. Only new unseen passages are to be given to test reading skills of the learners. Written skills are to be tested from sentence level to essay level. The communication formats—emails, letters and reports-- are to be tested along with appropriate language and expressions.
4. Examinations:
   I mid exam + II mid exam (15% for descriptive tests+10% for online tests)= 25%
   
   (80% for the best of two and 20% for the other)
   
   Assignments= 5%
   
   End semester exams=70%

5. Three take home assignments are to be given to the learners where they will have to read texts from the reference books list or other sources and write their gist in their own words.

The following text books are recommended for study in I B.Tech I Semester (Common for all branches) and I B.Pharma I Sem of JNTU Kakinada from the academic year 2016-17 (R-16 Regulations)

DETAILED TEXTBOOK:

ENGLISH FOR ENGINEERS AND TECHNOLOGISTS, Published by Orient Blackswan Pvt Ltd

NON-DETAILED TEXTBOOK:

PANORAMA: A COURSE ON READING, Published by Oxford University Press India

The course content along with the study material is divided into six units.

UNIT I:

1. 'Human Resources' from English for Engineers and Technologists.

OBJECTIVE:
To develop human resources to serve the society in different ways.

OUTCOME:
The lesson motivates the readers to develop their knowledge different fields and serve the society accordingly.

2. 'An Ideal Family' from Panorama: A Course on Reading

**OBJECTIVE:**
To develop extensive reading skill and comprehension for pleasure and profit.

**OUTCOME:**
Acquisition of writing skills

**UNIT 2:**

1. 'Transport: Problems and Solutions' from English for Engineers and Technologists.

**OBJECTIVE:**
To highlight road safety measures whatever be the mode of transport.

**OUTCOME:**
The lesson motivates the public to adopt road safety measures.

2. 'War' from 'Panorama: A Course on Reading'

**OBJECTIVE:**
To develop extensive reading skill and comprehension for pleasure and profit.

**OUTCOME:**
Acquisition of writing skills

**UNIT 3:**

1. 'Evaluating Technology' from English for Engineers and Technologists.

**OBJECTIVE:**
To highlight the advantages and disadvantages of technology.

**OUTCOME:**
The lesson creates an awareness in the readers that mass production is ultimately detrimental to biological survival.

2. 'The Verger' from 'Panorama: A Course on Reading'

**OBJECTIVE:**
To develop extensive reading skill and comprehension for pleasure and profit.

**OUTCOME:**
Acquisition of writing skills

**UNIT 4:**

1. 'Alternative Sources of Energy' from English for Engineers and Technologists.

**OBJECTIVE:**
To bring into focus different sources of energy as alternatives to the depleting sources.

**OUTCOME:**
The lesson helps to choose a source of energy suitable for rural India.

2. 'The Scarecrow' from Panorama: A Course on Reading

**OBJECTIVE:**
To develop extensive reading skill and comprehension for pleasure and profit.

**OUTCOME:**
Acquisition of writing skills

UNIT 5:
1. 'Our Living Environment' from English for Engineers and Technologists.

OBJECTIVE:
To highlight the fact that animals must be preserved because animal life is precious.

OUTCOME:
The lesson creates an awareness in the reader as to the usefulness of animals for the human society.

2. 'A Village Host to Nation' from Panorama : A Course on Reading

OBJECTIVE:
To develop extensive reading skill and comprehension for pleasure and profit.

OUTCOME:
Acquisition of writing skills

UNIT 6:
1. 'Safety and Training' from English for Engineers and Technologists.

OBJECTIVE:
To highlight the possibility of accidents in laboratories, industries and other places and to follow safety measures.

OUTCOME:
The lesson helps in identifying safety measures against different varieties of accidents at home and in the workplace.

2. 'Martin Luther King and Africa' from Panorama : A Course on Reading

OBJECTIVE:
To develop extensive reading skill and comprehension for pleasure and profit.

OUTCOME:
Acquisition of writing skills

NOTE:
All the exercises given in the prescribed lessons in both detailed and non-detailed textbooks relating to the theme and language skills must be covered.

OVERALL COURSE OUTCOME:

1. Using English languages, both written and spoken, competently and correctly.
2. Improving comprehension and fluency of speech.
MODEL QUESTION PAPER FOR THEORY

PART- I
Six short answer questions on 6 unit themes
One question on eliciting student's response to any of the themes

PART-II
Each question should be from one unit and the last question can be a combination of two or more units.
Each question should have 3 sub questions: A, B & C
A will be from the main text: 5 marks
B from non-detailed text: 3 marks
C on grammar and Vocabulary: 6 marks
Course Objectives:

1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.

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

1. Solve linear differential equations of first, second and higher order.
2. Determine Laplace transform and inverse Laplace transform of various functions and use Laplace transforms to determine general solution to linear ODE.
3. Calculate total derivative, Jacobian and minima of functions of two variables.

UNIT I: Differential equations of first order and first degree:
Linear-Bernoulli-Exact-Reducible to exact.

UNIT II: Linear differential equations of higher order:
Non-homogeneous equations of 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.
Applications: LCR circuit, Simple Harmonic motion.

UNIT III: Laplace transforms:
Laplace transforms of standard functions- Shifting theorems - Transforms of derivatives and integrals – Unit step function – Dirac’s delta function- Inverse Laplace transforms- Convolution theorem (with out proof).
Applications: Solving ordinary differential equations (initial value problems) using Laplace transforms.

UNIT IV: Partial differentiation:
Introduction- Homogeneous function-Euler’s theorem-Total derivative-Chain rule-Generalized Mean value theorem for single variable (without proof)-Taylor’s and Mc Laurent’s series expansion of functions of two variables– Functional dependence- Jacobian.
Applications: Maxima and Minima of functions of two variables without constraints and Lagrange’s method (with constraints).
UNIT V: First order Partial differential equations:
Formation of partial differential equations by elimination of arbitrary constants and arbitrary functions – solutions of first order linear (Lagrange) equation and nonlinear (standard types) equations.

UNIT VI: Higher order Partial differential equations:
Solutions of Linear Partial differential equations with constant coefficients. RHS term of the type $e^{axby}, \sin(ax+by), \cos(ax+by), x^m y^n$. Classification of second order partial differential equations.

Text Books:

Reference Books:
3. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
Knowledge of basic concepts of Chemistry for Engineering students will help them as professional engineers later in design and material selection, as well as utilizing the available resources.

**Learning Objectives:**

- Plastics are nowadays used in household appliances; also they are used as composites (FRP) in aerospace and automotive industries.
- Fuels as a source of energy are a basic need of any industry, particularly industries like thermal power stations, steel industry, fertilizer industry etc., and hence they are introduced.
- The basics for the construction of galvanic cells are introduced. Also if corrosion is to be controlled, one has to understand the mechanism of corrosion which itself is explained by electrochemical theory.
- With the increase in demand, a wide variety of materials are coming up; some of them have excellent engineering properties and a few of these materials are introduced.
- Water is a basic material in almost all the industries, more so where steam is generated and also where it is supplied for drinking purposes.
- Materials used in major industries like steel industry, metallurgical industries and construction industries and electrical equipment manufacturing industries are introduced. Also lubrication is introduced.

**UNIT I: HIGH POLYMERS AND PLASTICS**

*Polymerisation:*- Introduction- Mechanism of polymerization - Stereo regular polymers – methods of polymerization (emulsion and suspension) -Physical and mechanical properties – *Plastics* as engineering materials: advantages and limitations – Thermoplastics and Thermosetting plastics – Compounding and fabrication (4/5 techniques)- Preparation, properties and applications of polyethylene, PVC, Bakelite Teflon and polycarbonates

*Elastomers :-* Natural rubber- compounding and vulcanization – Synthetic rubbers : Buna S, Buna N, Thiokol and polyurethanes – Applications of elastomers.


**UNIT II: FUEL TECHNOLOGY**

Explosives:- Rocket fuels

UNIT III: ELECTROCHEMICAL CELLS AND CORROSION
Galvanic cells - Reversible and irreversible cells – Single electrode potential – Electrochemical series and uses of this series- Standard electrodes (Hydrogen and Calomel electrodes) - Concentration Cells – Batteries: Dry Cell - Ni-Cd cells - Ni-Metal hydride cells - Li cells - Zinc – air cells.
Corrosion :- Definition – Theories of Corrosion (chemical & electrochemical) – Formation of galvanic cells by different metals, by concentration cells, by differential aeration and waterline corrosion – Passivity of metals – Pitting corrosion - Galvanic series – Factors which influence the rate of corrosion - Protection from corrosion – Design and material selection – Cathodic protection - Protective coatings: – Surface preparation – Metallic (cathodic and anodic) coatings - Methods of application on metals (Galvanizing, Tinning, Electroplating, Electroless plating).

UNIT IV: CHEMISTRY OF ADVANCED MATERIALS
Liquid crystals:- Introduction – Types – Applications
Super conductors:-Type –I, Type II – Characteristics and applications
Green synthesis:- Principles - 3or 4 methods of synthesis with examples – R₄M₄ principles

UNIT V: WATER TECHNOLOGY

UNIT VI: CHEMISTRY OF ENGINEERING MATERIALS AND FUEL CELLS
Refractories: - Definition, characteristics, classification, properties, failure of refractories
Lubricants: - Definition, function, Theory and mechanism of lubricants, properties (Definition and importance)
Cement: - Constituents, manufacturing, hardening and setting, deterioration of cement
Insulators: - Thermal and electrical insulators
Fuel cells: - Hydrogen Oxygen fuel cells – Methanol Oxygen fuel cells

Outcome: The advantages and limitations of plastic materials and their use in design would be understood. Fuels which are used commonly and their economics, advantages and limitations are discussed. Reasons for corrosion and some methods of corrosion control would be understood. The students would be now aware of materials like nano materials and fullerenes and their uses. Similarly liquid crystals and superconductors are understood. The importance of green synthesis is well understood and how they are different from conventional methods is also explained. The impurities present in raw water, problems associated with them and how to avoid them are understood. The advantages and limitations
of plastic materials and their use in design would be understood. The commonly used industrial materials are introduced.

**Standard Books:**

1. Engineering Chemistry by Jain and Jain; Dhanpat Rai Publicating Co.

**Reference Books:**

5. Text book of Nano-science and nanotechnology by B.S. Murthy, P. Shankar and others, University Press, IIM
Objectives: The students completing this course are expected to understand the concepts of forces and its resolution in different planes, resultant of force system, Forces acting on a body, their free body diagrams using graphical methods. They are required to understand the concepts of centre of gravity and moments of inertia and their application, Analysis of frames and trusses, different types of motion, friction and application of work - energy method.

UNIT – I

Objectives: The students are to be exposed to the concepts of force and friction, direction and its application.


Friction: Introduction, limiting friction and impending motion, coulomb’s laws of dry friction, coefficient of friction, cone of friction

UNIT II

Objectives: The students are to be exposed to application of free body diagrams. Solution to problems using graphical methods and law of triangle of forces.


UNIT – III

Objectives: The students are to be exposed to concepts of centre of gravity.

Centroid: Centroids of simple figures (from basic principles ) – Centroids of Composite Figures

Centre of Gravity: Centre of gravity of simple body (from basic principles), centre of gravity of composite bodies, Pappus theorems.
UNIT IV

Objective: The students are to be exposed to concepts of moment of inertia and polar moment of inertia including transfer methods and their applications.

Area moments of Inertia: Definition – Polar Moment of Inertia, Transfer Theorem, Moments of Inertia of Composite Figures, Products of Inertia, Transfer Formula for Product of Inertia. Mass Moment of Inertia: Moment of Inertia of Masses, Transfer Formula for Mass Moments of Inertia, mass moment of inertia of composite bodies.

UNIT – V

Objectives: The students are to be exposed to motion in straight line and in curvilinear paths, its velocity and acceleration computation and methods of representing plane motion.


UNIT – VI

Objectives: The students are to be exposed to concepts of work, energy and particle motion


TEXT BOOKS:


REFERENCES:

Learning objectives:
Formulating algorithmic solutions to problems and implementing algorithms in C.
- Notion of Operation of a CPU, Notion of an algorithm and computational procedure, editing and executing programs in Linux.
- Understanding branching, iteration and data representation using arrays.
- Modular programming and recursive solution formulation.
- Understanding pointers and dynamic memory allocation.
- Understanding miscellaneous aspects of C.
- Comprehension of file operations.

UNIT-I:

UNIT-II:
Assignment - Implicit Type Conversions, Explicit Type Conversions (Casts), Assignment Variations, Mathematical Library Functions, Interactive Input, Formatted Output, Format Modifiers.

UNIT -III:
Control Flow-Relational Expressions - Logical Operators:
Selection: if-else Statement, nested if, examples, Multi-way selection: switch, else-if, examples.

UNIT-IV
Modular Programming: Function and Parameter Declarations, Returning a Value, Functions with Empty Parameter Lists, Variable Scope, Variable Storage Class, Local
Variable Storage Classes, Global Variable Storage Classes, Pass by Reference, Passing Addresses to a Function, Storing Addresses, Using Addresses, Declaring and Using Pointers, Passing Addresses to a Function.
Case Study: Swapping Values, Recursion - Mathematical Recursion, Recursion versus Iteration.

UNIT-V:
Arrays & Strings
Arrays: One-Dimensional Arrays, Input and Output of Array Values, Array Initialization, Arrays as Function Arguments, Two-Dimensional Arrays, Larger Dimensional Arrays - Matrices
Strings: String Fundamentals, String Input and Output, String Processing, Library Functions

UNIT-VI:
Pointers, Structures, Files
Pointers: Concept of a Pointer, Initialisation of pointer variables, pointers as function arguments, passing by address, Dangling memory, address arithmetic, character pointers and functions, pointers to pointers, Dynamic memory management functions, command line arguments.
Structures: Derived types, Structures declaration, Initialization of structures, accessing structures, nested structures, arrays of structures, structures and functions, pointers to structures, self referential structures, unions, typedef, bit-fields.
Data Files: Declaring, Opening, and Closing File Streams, Reading from and Writing to Text Files, Random File Access

Outcomes:
- Understand the basic terminology used in computer programming
- Write, compile and debug programs in C language.
- Use different data types in a computer program.
- Design programs involving decision structures, loops and functions.
- Explain the difference between call by value and call by reference
- Understand the dynamics of memory by the use of pointers
- Use different data structures and create/update basic data files.

Text Books:
3. The C programming Language, Dennis Richie and Brian Kernighan, Pearson Education.

Reference Books:
3. Programming in C, ReemaThareja, OXFORD.
Course Learning Objectives:
The objectives of the course is to impart
- Overall understanding of the natural resources
- Basic understanding of the ecosystem and its diversity
- Acquaintance on various environmental challenges induced due to unplanned anthropogenic activities
- An understanding of the environmental impact of developmental activities
- Awareness on the social issues, environmental legislation and global treaties

Course Outcomes:
The student should have knowledge on
- The natural resources and their importance for the sustenance of the life and recognize the need to conserve the natural resources
- The concepts of the ecosystem and its function in the environment. The need for protecting the producers and consumers in various ecosystems and their role in the food web
- The biodiversity of India and the threats to biodiversity, and conservation practices to protect the biodiversity
- Various attributes of the pollution and their impacts and measures to reduce or control the pollution along with waste management practices
- Social issues both rural and urban environment and the possible means to combat the challenges
- The environmental legislations of India and the first global initiatives towards sustainable development.
- About environmental assessment and the stages involved in EIA and the environmental audit.

Syllabus:


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 Forest ecosystem, Grassland ecosystem, Desert ecosystem, Aquatic ecosystems.

UNIT – II Natural Resources: Natural resources and associated problems

Forest resources – Use and over – exploitation, deforestation – 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, Sustainable mining of Granite, Literate, Coal, Sea and River sands.

Food resources: World food problems, changes caused by non-agriculture activities-effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity

Energy resources: Growing energy needs, renewable and non-renewable energy sources use of alternate energy sources Vs Oil and Natural Gas Extraction.

Land resources: Land as a resource, land degradation, Wasteland reclamation, 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 Biodiversity and its conservation: Definition: genetic, species and ecosystem diversity- classification - Value of biodiversity: consumptive use, productive use, social-

Biodiversity at national and local levels. India as a mega-diversity nation - Hot-spots of biodiversity - Threats to biodiversity: habitat loss, man-wildlife conflicts - Endangered and endemic species of India – Conservation of biodiversity: conservation of biodiversity.

UNIT – IV Environmental Pollution: Definition, Cause, effects and control measures of Air pollution, Water pollution, Soil pollution, Noise pollution, Nuclear hazards. Role of an individual in prevention of pollution. - Pollution case studies, Sustainable Life Studies. Impact of Fire Crackers on Men and his well being.

Solid Waste Management: Sources, Classification, effects and control measures of urban and industrial solid wastes. Consumerism and waste products, Biomedical, Hazardous and e– waste management.


The student should Visit an Industry / Ecosystem and submit a report individually on any issues related to Environmental Studies course and make a power point presentation.

**Text Books:**
1. Environmental Studies, K. V. S. G. Murali Krishna, VGS Publishers, Vijayawada

**Reference:**
2. A Textbook of Environmental Studies, Shaashi Chawla, TMH, New Delhi
1. Introduction to Chemistry laboratory – Molarity, Normality, Primary, secondary standard solutions, Volumetric titrations, Quantitative analysis, Qualitative analysis, etc.

2. Trial experiment - Determination of HCl using standard Na₂CO₃ solution.

3. Determination of alkalinity of a sample containing Na₂CO₃ and NaOH.

4. Determination of KMnO₄ using standard Oxalic acid solution.

5. Determination of Ferrous iron using standard K₂Cr₂O₇ solution.

6. Determination of Copper using standard K₂Cr₂O₇ solution.


8. Determination of Copper using standard EDTA solution.


10. Determination of pH of the given sample solution using pH meter.

11. Conductometric titration between strong acid and strong base.

12. Conductometric titration between strong acid and weak base.

13. Potentiometric titration between strong acid and strong base.

14. Potentiometric titration between strong acid and weak base.

15. Determination of Zinc using standard EDTA solution.

16. Determination of Vitamin – C.

Outcomes: The students entering into the professional course have practically very little exposure to lab classes. The experiments introduce volumetric analysis; redox titrations with different indicators; EDTA titrations; then they are exposed to a few instrumental methods of chemical analysis. Thus at the end of the lab course, the student is exposed to different methods of chemical analysis and use of some commonly employed instruments. They thus acquire some experimental skills.
Reference Books
ENGLISH – COMMUNICATION SKILLS LAB -I

I Year - I Semester

L T P C
0 0 3 2

PREScribed LAB Manual FOR Semester I:

.ReadFile

'INTERACT: English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd.

OBJECTIVES:

To enable the students to learn through practice the communication skills of listening, speaking, reading and writing.

OUTCOME:

A study of the communicative items in the laboratory will help the students become successful in the competitive world.

The course content along with the study material is divided into six units.

UNIT 1:

1. WHY study Spoken English?
2. Making Inquiries on the phone, thanking and responding to Thanks
   Practice work.

UNIT 2:

1. Responding to Requests and asking for Directions
   Practice work.

UNIT 3:

1. Asking for Clarifications, Inviting, Expressing Sympathy, Congratulating
2. Apologising, Advising, Suggesting, Agreeing and Disagreeing
   Practice work.

UNIT 4:

1. Letters and Sounds
   Practice work.

UNIT 5:

1. The Sounds of English
   Practice work.
UNIT 6:

1. Pronunciation
2. Stress and Intonation

Practice work.

Assessment Procedure: Laboratory

1. Every lab session (150 minutes) should be handled by not less than two teachers (three would be ideal) where each faculty has to conduct a speaking activity for 20/30 students.
2. The teachers are to assess each learner in the class for not less than 10 speaking activities, each one to be assessed for 10 marks or 10%. The average of 10 day-to-day activity assessments is to be calculated for 10 marks for internal assessment.

The rubric given below has to be filled in for all the students for all activities.

The rubric to assess the learners:

<table>
<thead>
<tr>
<th>Body language</th>
<th>Fluency &amp; Audibility</th>
<th>Clarity in Speech</th>
<th>Neutralization of accent</th>
<th>Appropriate Language</th>
<th>Total 10 marks</th>
<th>Remarks</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gesture &amp; Postures</td>
<td>Eye Contact</td>
<td></td>
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<tr>
<td>Gesture &amp; Postures</td>
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</tr>
</tbody>
</table>

- **Lab Assessment: Internal (25 marks)**
  1. Day-to-Day activities: 10 marks
  2. Completing the exercises in the lab manual: 5 marks
  3. Internal test (5 marks written and 5 marks oral)

- **Lab Assessment: External (50 marks)**
  1. Written test: 20 marks (writing a dialogue, note-taking and answering questions on listening to an audio recording).
  2. Oral: Reading aloud a text or a dialogue- 10 marks
  3. Viva-Voce by the external examiner: 20 marks
Reference Books:

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. Unlock, Listening and speaking skills 2, Cambridge University Press
4. Spring Board to Success, Orient BlackSwan
5. A Practical Course in effective english speaking skills, PHI
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education
OBJECTIVES:
• Understand the basic concept of C Programming, and its different modules that includes conditional and looping expressions, Arrays, Strings, Functions, Pointers, Structures an File programming.

• Acquire knowledge about the basic concept of writing a program.

• Role of constants, variables, identifiers, operators, type conversion and other building blocks of C Language.

• Use of conditional expressions and looping statements to solve problems associated with conditions and repetitions.

• Role of Functions involving the idea of modularity.

Programming

Exercise - 1 Basics
a) What is an OS Command, Familiarization of Editors - vi, Emacs
b) Using commands like mkdir, ls, cp, mv, cat, pwd, and man
c) C Program to Perform Adding, Subtraction, Multiplication and Division of two numbers From Command line

Exercise - 2 Basic Math
a) Write a C Program to Simulate 3 Laws at Motion
b) Write a C Program to convert Celsius to Fahrenheit and vice versa

Exercise - 3 Control Flow - I
a) Write a C Program to Find Whether the Given Year is a Leap Year or not.
b) Write a C Program to Add Digits & Multiplication of a number

Exercise – 4 Control Flow - II
a) Write a C Program to Find Whether the Given Number is
   i) Prime Number
   ii) Armstrong Number
b) Write a C program to print Floyd Triangle
c) Write a C Program to print Pascal Triangle

Exercise – 5 Functions
a) Write a C Program demonstrating of parameter passing in Functions and returning values.
b) Write a C Program illustrating Fibonacci, Factorial with Recursion without Recursion
**Exercise – 6** Control Flow - III  
  a) Write a C Program to make a simple Calculator to Add, Subtract, Multiply or Divide Using switch…case  
  b) Write a C Program to convert decimal to binary and hex (using switch call function the function)

**Exercise – 7** Functions - Continued  
Write a C Program to compute the values of sin x and cos x and e^x values using Series expansion. (use factorial function)

**Exercise – 8** Arrays  
Demonstration of arrays  
a) Search-Linear.  
b) Sorting-Bubble, Selection.  
c) Operations on Matrix.

**Exercises - 9** Structures  
a) Write a C Program to Store Information of a Movie Using Structure  
b) Write a C Program to Store Information Using Structures with Dynamically Memory Allocation  
c) Write a C Program to Add Two Complex Numbers by Passing Structure to a Function

**Exercise - 10** Arrays and Pointers  
a) Write a C Program to Access Elements of an Array Using Pointer  
b) Write a C Program to find the sum of numbers with arrays and pointers.

**Exercise – 11** Dynamic Memory Allocations  
a) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using malloc () function.  
b) Write a C program to find sum of n elements entered by user. To perform this program, allocate memory dynamically using calloc () function.  
Understand the difference between the above two programs

**Exercise – 12** Strings  
a) Implementation of string manipulation operations with library function.  
     i) copy  
     ii) concatenate  
     iii) length  
     iv) compare  
b) Implementation of string manipulation operations without library function.  
     i) copy  
     ii) concatenate  
     iii) length  
     iv) compare
Exercise -13 Files
a) Write a C programming code to open a file and to print its contents on screen.
b) Write a C program to copy files

Exercise - 14 Files Continue
a) Write a C program that merges two files and stores their contents in another file.
b) Write a C program to delete a file.

OUTCOMES:

• Apply and practice logical ability to solve the problems.
• Understand C programming development environment, compiling, debugging, and linking and executing a program using the development environment
• Analyzing the complexity of problems, Modularize the problems into small modules and then convert them into programs
• Understand and apply the in-built functions and customized functions for solving the problems.
• Understand and apply the pointers, memory allocation techniques and use of files for dealing with variety of problems.
• Document and present the algorithms, flowcharts and programs in form of user-manuals
• Identification of various computer components, Installation of software

Note:

a) All the Programs must be executed in the Linux Environment. (Mandatory)
b) The Lab record must be a print of the LATEX (.tex) Format.
Introduction:

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

As far as the detailed Textbooks are concerned, the focus should be on the skills of listening, speaking, reading and writing. The nondetailed Textbooks are meant for extensive reading for pleasure and profit.

Thus the stress in the syllabus is primarily on the development of communicative skills and fostering of ideas.

Objectives:

1. To improve the language proficiency of the students in English with emphasis on LSRW skills.
2. To enable the students to study and comprehend the prescribed lessons and subjects more effectively relating to their theoretical and practical components.
3. To develop the communication skills of the students in both formal and informal situations.

LISTENING SKILLS:

Objectives:

1. To enable the students to appreciate the role of listening skill and improve their pronunciation.
2. To enable the students to comprehend the speech of people belonging to different backgrounds and regions.
3. To enable the students to listen for general content, to fill up information and for specific information.
SPEAKING SKILLS:

Objectives:

1. To make the students aware of the importance of speaking for their personal and professional communication.
2. To enable the students to express themselves fluently and accurately in social and professional success.
3. To help the students describe objects, situations and people.
4. To make the students participate in group activities like roleplays, discussions and debates.
5. To make the students participate in Just a Minute talks.

READING SKILLS:

Objectives:

1. To enable the students to comprehend a text through silent reading.
2. To enable the students to guess the meanings of words, messages and inferences of texts in given contexts.
3. To enable the students to skim and scan a text.
4. To enable the students to identify the topic sentence.
5. To enable the students to identify discourse features.
6. To enable the students to make intensive and extensive reading.

WRITING SKILLS:

Objectives:

1. To make the students understand that writing is an exact formal skills.
2. To enable the students to write sentences and paragraphs.
3. To make the students identify and use appropriate vocabulary.
4. To enable the students to narrate and describe.
5. To enable the students capable of note-making.
6. To enable the students to write coherently and cohesively.
7. To make the students to write formal and informal letters.
8. To enable the students to describe graphs using expressions of comparison.
9. To enable the students to write technical reports.

Methodology:

1. The class are to be learner-centered where the learners are to read the texts to get a comprehensive idea of those texts on their own with the help of the peer group and the teacher.
2. Integrated skill development methodology has to be adopted with focus on individual language skills as per the tasks/exercise.
3. The tasks/exercises at the end of each unit should be completed by the learners only and the teacher intervention is permitted as per the complexity of the task/exercise.

4. The teacher is expected to use supplementary material wherever necessary and also generate activities/tasks as per the requirement.

5. The teacher is permitted to use lecture method when a completely new concept is introduced in the class.

Assessment Procedure: Theory

1. The formative and summative assessment procedures are to be adopted (mid exams and end semester examination).

2. Neither the formative nor summative assessment procedures should test the memory of the content of the texts given in the textbook. The themes and global comprehension of the units in the present day context with application of the language skills learnt in the unit are to be tested.

3. Only new unseen passages are to be given to test reading skills of the learners. Written skills are to be tested from sentence level to essay level. The communication formats—emails, letters and reports—are to be tested along with appropriate language and expressions.

4. Examinations:
   - Mid exam + II mid exam (15% for descriptive tests + 10% for online tests) = 25%

   (80% for the best of two and 20% for the other)

   Assignments = 5%

   End semester exams = 70%

5. Three take home assignments are to be given to the learners where they will have to read texts from the reference books list or other sources and write their gist in their own words.

6. The following text books are recommended for study in I B.Tech II Semester (Common for all branches) and I B.Pharma II Sem of JNTU Kakinada from the academic year 2016-17 (R-16 Regulations)

DETAILED TEXTBOOK: ENGLISH ENCOUNTERS Published by Maruthi Publishers.

DETAILED NON-DETAIL: THE GREAT INDIAN SCIENTISTS Published by Cengage learning

The course content along with the study material is divided into six units.

UNIT 1:

1. ’The Greatest Resource- Education’ from English Encounters

OBJECTIVE:
Schumacher describes the education system by saying that it was mere training, something more than mere knowledge of facts.

**OUTCOME:**

The lesson underscores that the ultimate aim of Education is to enhance wisdom.

2. 'A P J Abdul Kalam' from The Great Indian Scientists.

**OBJECTIVE:**

The lesson highlights Abdul Kalam's contributions to Indian science and the awards he received.

**OUTCOME:**

Abdul Kalam's simple life and service to the nation inspires the readers to follow in his footsteps.

**UNIT 2:**

1. 'A Dilemma' from English Encounters

**OBJECTIVE:** The lesson centres on the pros and cons of the development of science and technology.

**OUTCOME:** The lesson enables the students to promote peaceful co-existence and universal harmony among people and society.

2. 'C V Raman' from The Great Indian Scientists.

**OBJECTIVE:**

The lesson highlights the dedicated research work of C V Raman and his achievements in Physics.

**OUTCOME:**

The Achievements of C V Raman are inspiring and exemplary to the readers and all scientists.

**UNIT 3:**

1. 'Cultural Shock': Adjustments to new Cultural Environments from English Encounters.

**OBJECTIVE:**

The lesson depicts of the symptoms of Cultural Shock and the aftermath consequences.
OUTCOME:
The lesson imparts the students to manage different cultural shocks due to globalization.

2. 'Homi Jehangir Bhabha' from The Great Indian Scientists.

OBJECTIVE:
The lesson highlights Homi Jehangir Bhabha's contributions to Indian nuclear programme as architect.

OUTCOME:
The seminal contributions of Homi Jehangir Bhabha to Indian nuclear programme provide an aspiration to the readers to serve the nation and strengthen it.

UNIT 4:
1. 'The Lottery' from English Encounters.

OBJECTIVE:
The lesson highlights insightful commentary on cultural traditions.

OUTCOME:
The theme projects society's need to reexamine its traditions when they are outdated.

2. 'Jagadish Chandra Bose' from The Great Indian Scientists.

OBJECTIVE:
The lesson gives an account of the unique discoveries and inventions of Jagadish Chandra Bose in Science.

OUTCOME: The Scientific discoveries and inventions of Jagadish Chandra Bose provide inspiration to the readers to make their own contributions to science and technology, and strengthen the nation.

UNIT 5:
1. 'The Health Threats of Climate Change' from English Encounters.

OBJECTIVE:
The essay presents several health disorders that spring out due to environmental changes

OUTCOME:
The lesson offers several inputs to protect environment for the sustainability of the future generations.
2. 'Prafulla Chandra Ray' from The Great Indian Scientists.

OBJECTIVE:

The lesson given an account of the experiments and discoveries in Pharmaceuticals of Prafulla Chandra Ray.

OUTCOME:

Prafulla Chandra Ray's scientific achievements and patriotic fervour provide inspiration to the reader.

UNIT 6:

1. 'The Chief Software Architect' from English Encounters

OBJECTIVE:

The lesson supports the developments of technology for the betterment of human life.

OUTCOME:

Pupil get inspired by eminent personalities who toiled for the present day advancement of software development.

2. 'Srinivasa Ramanujan' from The Great Indian Scientists.

OBJECTIVE:

The lesson highlights the extraordinary achievements of Srinivasa Ramanujan, a great mathematician and the most romantic figure in mathematics.

OUTCOME:

The lesson provides inspiration to the readers to think and tap their innate talents.

NOTE:

All the exercises given in the prescribed lessons in both detailed and non-detailed textbooks relating to the theme and language skills must be covered.
MODEL QUESTION PAPER FOR THEORY

PART- I

Six short answer questions on 6 unit themes

One question on eliciting student's response to any of the themes

PART- II

Each question should be from one unit and the last question can be a combination of two or more units.

Each question should have 3 sub questions: A, B & C

A will be from the main text: 5 marks

B from non-detailed text: 3 marks

C on grammar and Vocabulary: 6 marks
Course Objectives:
1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
3. Understand the most basic numerical methods to solve simultaneous linear equations.

Course Outcomes: At the end of the Course, Student will be able to:
1. Calculate a root of algebraic and transcendental equations. Explain relation between the finite difference operators.
2. Compute interpolating polynomial for the given data.
4. Find Fourier series and Fourier transforms for certain functions.
5. Identify/classify and solve the different types of partial differential equations.

UNIT I: Solution of Algebraic and Transcendental Equations:

UNIT II: Interpolation:

UNIT III: Numerical Integration and solution of Ordinary Differential equations:

UNIT IV: Fourier Series:
Introduction- Periodic functions – Fourier series of -periodic function - Dirichlet’s conditions – Even and odd functions –Change of interval– Half-range sine and cosine series.

UNIT V: Applications of PDE:
Method of separation of Variables- Solution of One dimensional Wave, Heat and two-dimensional Laplace equation.

UNIT VI: Fourier Transforms:
Text Books:


Reference Books:

1. Dean G. Duffy, Advanced engineering mathematics with MATLAB, CRC Press
Course Objectives:
1. The course is designed to equip the students with the necessary mathematical skills and techniques that are essential for an engineering course.
2. The skills derived from the course will help the student from a necessary base to develop analytic and design concepts.
3. Understand the most basic numerical methods to solve simultaneous linear equations.

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

1. Determine rank, Eigenvalues and Eigen vectors of a given matrix and solve simultaneous linear equations.
2. Solve simultaneous linear equations numerically using various matrix methods.
3. Determine double integral over a region and triple integral over a volume.
4. Calculate gradient of a scalar function, divergence and curl of a vector function. Determine line, surface and volume integrals. Apply Green, Stokes and Gauss divergence theorems to calculate line, surface and volume integrals.

UNIT I: Linear systems of equations:

UNIT II: Eigen values - Eigen vectors and Quadratic forms:
Applications: Free vibration of a two-mass system.

UNIT III: Multiple integrals:
Curve tracing: Cartesian, Polar and Parametric forms.
Multiple integrals: Double and triple integrals – Change of variables – Change of order of integration.
Applications: Finding Areas and Volumes.

UNIT IV: Special functions:
Beta and Gamma functions- Properties - Relation between Beta and Gamma functions- Evaluation of improper integrals.
Applications: Evaluation of integrals.

UNIT V: Vector Differentiation:
Gradient- Divergence- Curl - Laplacian and second order operators- Vector identities.
Applications: Equation of continuity, potential surfaces
UNIT VI: Vector Integration:
Line integral – Work done – Potential function – Area- Surface and volume integrals Vector integral theorems: Greens, Stokes and Gauss Divergence theorems (without proof) and related problems.
Applications: Work done, Force.

Text Books:

Reference Books:
OBJECTIVES: Physics curriculum which is re-oriented to the needs of Circuit branches of graduate engineering courses offered by JNTUniv.Kkd. that serves as a transit to understand the branch specific advanced topics. The courses are designed to:

- Impart concepts of Optical Interference, Diffraction and Polarization required to design instruments with higher resolution - Concepts of coherent sources, its realization and utility optical instrumentation.
- Study the Structure-property relationship exhibited by solid crystal materials for their utility.
- Tap the Simple harmonic motion and its adaptability for improved acoustic quality of concert halls.
- To explore the Nuclear Power as a reliable source required to run industries
- To impart the knowledge of materials with characteristic utility in appliances.

UNIT-I
INTERFERENCE: Principle of Superposition – Coherent Sources – Interference in thin films (reflection geometry) – Newton’s rings – construction and basic principle of Interferometers.

UNIT-II
DIFFRACTION: Fraunhofer diffraction at single slit cases of double slit, N-slits & Circular Aperture (Qualitative treatment only)-Grating equation - Resolving power of a grating, Telescope and Microscopes.

UNIT-III
POLARIZATION: Types of Polarization-production - Nicol Prism -Quarter wave plate and Half Wave plate – Working principle of Polarimeter (Sacharimeter)

UNIT-IV
ACOUSTICS: Reverberation time - Sabine’s formula – Acoustics of concert-hall.
ULTRASONICS: Production - Ultrasonic transducers- Non-Destructive Testing – Applications.

UNIT-V
CRYSTALLOGRAPHY & X-RAY DIFFRACTION: Basis and lattice – Bravais systems-Symmetry elements- Unit cell- packing fraction – coordination number- Miller indices – Separation between successive (h k l) planes – Bragg’s law.

UNIT-VI
MAGNETISM: Classification based on Field, Temperature and order/disorder – atomic origin – Ferromagnetism- Hysteresis- applications of magnetic materials (Para & Ferro).


Outcome: Construction and working details of instruments, i.e., Interferometer, Diffractometer and Polarimeter are learnt. Study Acoustics, crystallography magnetic and dielectric materials enhances the utility aspects of materials.

Text Books:

Reference books:
2. Lasers and Non-Linear optics by B.B.Laud , Newage international publishers (2008)
Learning Objectives: The content of this course shall provide the student the basic concepts of various mechanical systems and exposes the student to a wide range of equipment and their utility in a practical situation. It shall provide the fundamental principles of materials, fuels, Steam, I.C. Engines, compressors, hydraulic machines and transmission systems that usually exist in any process plant.

UNIT –I:
Stresses and strains: kinds of – stress-strains, elasticity and plasticity, Hooks law, stress – strain diagrams, modules of elasticity, Poisson’s ratio, linear and volumetric strain, relation between E, N, and K, bars of uniform strength, compound bars and temperature stresses.

UNIT– II:
Types of supports – loads – Shear force and bending moment for cantilever and simply supported beams without overhanging for all types of loads.

Theory of simple bending, simple bending formula, Distribution of Flexural and Shear stress in Beam section – Shear stress formula – Shear stress distribution for some standard sections

UNIT-III:
Thin cylindrical shells: stress in cylindrical shells due to internal pressures, circumferential stress, longitudinal stress, design of thin cylindrical shells, spherical shells, change in dimension of the shell due to internal pressure, change in volume of the shell due to internal pressure.

Thick Cylinders: Lame’s equation- cylinders subjected to inside and outside pressures columns and Struts.
UNIT-IV:
Steam boilers and Reciprocating air compressors: Classification of boilers, essentialities of boilers, selection of different types of boilers, study of boilers, boiler mountings and accessories.

Reciprocating air compressors: uses of compressed air, work done in single stage and two-stage compression, inter cooling and simple problems.

UNIT-V:
Internal combustion engines: classification of IC engines, basic engine components and nomenclature, working principle of engines, Four strokes and two stroke petrol and diesel engines, comparison of CI and SI engines, comparison of four stroke and two stroke engines, simple problems such as indicated power, brake power, friction power, specific fuel consumption, brake thermal efficiency, indicated thermal efficiency and mechanical efficiency.

UNIT-VI:
Transmission systems:Belts –Ropes and chain: belt and rope drives, velocity ratio, slip, length of belt , open belt and cross belt drives, ratio of friction tensions, centrifugal tension in a belt, power transmitted by belts and ropes, initial tensions in the belt, simple problems.

Gear trains: classification of gears, gear trains velocity ratio, simple, compound –reverted and epicyclic gear trains.

Outcomes: After completing the course, the student shall be able to determine:

- The stress/strain of a mechanical component subjected to loading.
- The performance of components like Boiler, I.C. Engine, Compressor, Steam/Hydraulic turbine, Belt, Rope and Gear.
- The type of mechanical component suitable for the required power transmission.

Text Books:


Reference Book:

Learning Objectives:

- Engineering drawing being the principle method of communication for engineers, the objective is to introduce the students, the techniques of constructing the various types of polygons, curves and scales. The objective is also to visualize and represent the 3D objects in 2D planes with proper dimensioning, scaling etc.

UNIT-I:

Objective: To introduce the students to use drawing instruments and to draw polygons, Engg. Curves.

Polygons: Constructing regular polygons by general methods, inscribing and describing polygons on circles.

Curves: Parabola, Ellipse and Hyperbola by general methods, cycloids, involutes, tangents & normals for the curves.

UNIT-II:

Objective: To introduce the students to use scales and orthographic projections, projections of points & simple lines.

Scales: Plain scales, diagonal scales and vernier scales

Orthographic Projections: Horizontal plane, vertical plane, profile plane, importance of reference lines, projections of points in various quadrants, projections of lines, lines parallel either to of the reference planes (HP, VP or PP)

UNIT-III:

Objective: The objective is to make the students draw the projections of the lines inclined to both the planes.

Projections of straight lines inclined to both the planes, determination of true lengths, angle of inclination and traces - HT, VT

UNIT-IV:

Objective: The objective is to make the students draw the projections of the plane inclined to both the planes.

Projections of planes: regular planes perpendicular/parallel to one plane and inclined to the other reference plane; inclined to both the reference planes.
UNIT-V:

Objective: The objective is to make the students draw the projections of the various types of solids in different positions inclined to one of the planes.

Projections of Solids – Prisms, Pyramids, Cones and Cylinders with the axis inclined to one of the planes.

UNIT-VI:

Objective: The objective is to represent the object in 3D view through isometric views. The student will be able to represent and convert the isometric view to orthographic view and vice versa.

Conversion of isometric views to orthographic views; Conversion of orthographic views to isometric views.

Text Books:

Reference Books:
PRESCRIBED LAB MANUAL FOR SEMESTER II:

'INTERACT': English Lab Manual for Undergraduate Students' Published by Orient Blackswan Pvt Ltd.

**OBJECTIVES:**
To enable the students to learn demonstratively the communication skills of listening, speaking, reading and writing.

**OUTCOME:**
A study of the communicative items in the laboratory will help the students become successful in the competitive world.
The course content along with the study material is divided into six units.

**UNIT 1:**

1. Debating  
   Practice work

**UNIT 2:**

1. Group Discussions  
   Practice work

**UNIT 3:**

1. Presentation Skills  
   Practice work

**UNIT 4:**

1. Interview Skills  
   Practice work

**UNIT 5:**

1. Email,  
   2. Curriculum Vitae  
   Practice work

**UNIT 6:**

1. Idiomatic Expressions  
2. Common Errors in English  
   Practice work
Reference Books:

1. Strengthen your communication skills by Dr M Hari Prasad, Dr Salivendra Raju and Dr G Suvarna Lakshmi, Maruti Publications.
2. English for Professionals by Prof Eliah, B.S Publications, Hyderabad.
3. Unlock, Listening and speaking skills 2, Cambridge University Press
4. Spring Board to Success, Orient BlackSwan
5. A Practical Course in effective english speaking skills, PHI
6. Word power made handy, Dr shalini verma, Schand Company
7. Let us hear them speak, Jayashree Mohanraj, Sage texts
8. Professional Communication, Aruna Koneru, Mc Grawhill Education
9. Cornerstone, Developing soft skills, Pearson Education
I Year - II Semester

ENGINEERING/APPLIED PHYSICS LAB
(Any 10 of the following listed experiments)

Objective: Training field oriented Engineering graduates to handle instruments and their design methods to improve the accuracy of measurements.

LIST OF EXPERIMENTS:
3. Determination of thickness of a spacer using wedge film and parallel interference fringes.
4. Determination of Rigidity modulus of a material- Torsional Pendulum.
7. Verification of laws of vibrations in stretched strings – Sonometer.
9. L- C- R Series Resonance Circuit.
10. Study of I/V Characteristics of Semiconductor diode.
11. I/V characteristics of Zener diode.
13. Magnetic field along the axis of a current carrying coil – Stewart and Gee’s apparatus.
15. Hall Effect in semiconductors.
18. Determination of Young’s modulus by method of single cantilever oscillations.
20. Determination of Planck’s constant using photocell.

Outcome: Physics lab curriculum gives fundamental understanding of design of an instrument with targeted accuracy for physical measurements.
Objective: Training Engineering students to prepare a technical document and improving their writing skills.

LIST OF EXPERIMENTS
1. Hall Effect
2. Crystal Structure
3. Hysteresis
4. Brewster’s angle
5. Magnetic Levitation / SQUID
6. Numerical Aperture of Optical fiber
7. Photoelectric Effect
8. Simple Harmonic Motion
9. Damped Harmonic Motion
10. LASER – Beam Divergence and Spot size
11. B-H curve
12. Michelson’s interferometer
13. Black body radiation

URL: www.vlab.co.in

Outcome: Physics Virtual laboratory curriculum in the form of assignment ensures an engineering graduate to prepare a technical/mini-project/ experimental report with scientific temper.
ENGINEERING WORKSHOP & IT WORKSHOP

ENGINEERING WORKSHOP:
Course Objective: To impart hands-on practice on basic engineering trades and skills.
Note: At least two exercises to be done from each trade.

Trade:

Carpentry
1. T-Lap Joint
2. Cross Lap Joint
3. Dovetail Joint
4. Mortise and Tennon Joint

Fitting
1. Vee Fit
2. Square Fit
3. Half Round Fit
4. Dovetail Fit

Black Smithy
1. Round rod to Square
2. S-Hook
3. Round Rod to Flat Ring
4. Round Rod to Square headed bolt

House Wiring
1. Parallel / Series Connection of three bulbs
2. Stair Case wiring
3. Florescent Lamp Fitting
4. Measurement of Earth Resistance

Tin Smithy
1. Taper Tray
2. Square Box without lid
3. Open Scoop
4. Funnel
IT WORKSHOP:

OBJECTIVES:

- Understand the basic components and peripherals of a computer.
- To become familiar in configuring a system.
- Learn the usage of productivity tools.
- Acquire knowledge about the netiquette and cyber hygiene.
- Get hands on experience in trouble shooting a system?

1. System Assembling, Disassembling and identification of Parts / Peripherals

2. Operating System Installation-Install Operating Systems like Windows, Linux along with necessary Device

   Drivers.

3. MS-Office / Open Office

   b. Spread Sheet - organize data, usage of formula, graphs, charts.
   c. Power point - features of power point, guidelines for preparing an effective presentation.
   d. Access- creation of database, validate data.


5. Internet and World Wide Web-Search Engines, Types of search engines, netiquette, cyber hygiene.

6. Trouble Shooting-Hardware trouble shooting, Software trouble shooting.

7. MATLAB- basic commands, subroutines, graph plotting.

8. LATEX-basic formatting, handling equations and images.

OUTCOMES:

- Common understanding of concepts, patterns of decentralization implementation in Africa †
- Identified opportunities for coordinated policy responses, capacity building and implementation of best practices †
- Identified instruments for improved decentralization to the local level †
- Identified strategies for overcoming constraints to effective decentralization and sustainable management at different levels.
**TEXT BOOKS:**

5. Scott Mueller’s Upgrading and Repairing PCs, 18/e, Scott. Mueller, QUE, Pearson, 2008
7. Comdex Information Technology course tool kit Vikas Gupta, WILEY Dreamtech.
8. Introduction to Information Technology, ITL Education Solutions limited, Pearson Education.
Course Objectives: To acquaint students with the fundamental concepts of probability and statistics and to develop an understanding of the role of statistics in engineering. Also to introduce numerical techniques to solve the real world applications.

Course Outcomes: At the end of the Course, Student will be able to:
1. Examine, analyze, and compare various Probability distributions for both discrete and continuous random variables.
2. Describe and compute confidence intervals for the mean of a population.
3. Describe and compute confidence intervals for the proportion and the variance of a population and test the hypothesis concerning mean, proportion and variance and perform ANOVA test.
4. Fit a curve to the numerical data.

UNIT I: Discrete Random variables and Distributions:

UNIT II: Continuous Random variable and distributions:

UNIT III: Sampling Theory:
Introduction - Population and samples- Sampling distribution of means (\(\sigma\) known)-Central limit theorem- t-distribution- Sampling distribution of means (\(\sigma\) unknown)- Sampling distribution of variances -\(\chi^2\) and F-distributions- Point estimation- Maximum error of estimate - Interval estimation.

UNIT IV: Tests of Hypothesis:
Introduction –Hypothesis-Null and Alternative Hypothesis- Type I and Type II errors –Level of significance - One tail and two-tail tests- Tests concerning one mean and proportion, two means- Proportions and their differences- ANOVA for one-way and two-way classified data.

UNIT V: Curve fitting and Correlation:
Introduction - Fitting a straight line –Second degree curve-exponential curve-power curve by method of least squares-Goodness of fit. Correlation and Regression – Properties.
UNIT VI: Statistical Quality Control Methods:

Text Books:


Reference Books:

2. **William Menden Hall, Robert J. Bever and Barbara Bever**, Introduction to probability and statistics, Cengage learning, 2009
Preamble:
This course covers the topics related to analysis of various electrical circuits, operation of various electrical machines, various electronic components to perform well in their respective fields.

Learning Objectives:
- To learn the basic principles of electrical law’s and analysis of networks.
- To understand the principle of operation and construction details of DC machines.
- To understand the principle of operation and construction details of transformer.
- To understand the principle of operation and construction details of alternator and 3-Phase induction motor.
- To study the operation of PN junction diode, half wave, full wave rectifiers and OP-AMPS.
- To learn the operation of PNP and NPN transistors and various amplifiers.

Outcomes:
- Able to analyse the various electrical networks.
- Able to understand the operation of DC generators, 3-point starter and conduct the Swinburne’s Test.
- Able to analyse the performance of transformer.
- Able to explain the operation of 3-phase alternator and 3-phase induction motors.
- Able to analyse the operation of half wave, full wave rectifiers and OP-AMPS.
- Able to explain the single stage CE amplifier and concept of feedback amplifier.

UNIT – I, ELECTRICAL CIRCUITS:
Basic definitions, Types of network elements, Ohm’s Law, Kirchhoff’s Laws, inductive networks, capacitive networks, series, parallel circuits and star-delta and delta-star transformations.

UNIT – II, DC MACHINES:
Principle of operation of DC generator – emf equation - types – DC motor types –torque equation – applications – three point starter, swinburne’s Test, speed control methods.

UNIT – III, TRANSFORMERS:
Principle of operation of single phase transformers – e.m.f equation – losses –efficiency and regulation.

UNIT V, RECTIFIERS & LINEAR ICs: PN junction diodes, diode applications (Half wave and bridge rectifiers). Characteristics of operation amplifiers (OP-AMP) - application of OP-AMPS(inverting, non inverting, integrator and differentiator).

UNIT VI, TRANSISTORS: PNP and NPN junction transistor, transistor as an amplifier, single stage CE Amplifier, frequency response of CE amplifier, concepts of feedback amplifier.

TEXT BOOKS:
3. Electrical Circuit Theory and Technology by John Bird, Routledge Taylor &Francis Group

REFERENCES:
1. Basic Electrical Engineering, M. S. Naidu and S. Kamakshiah, TMH Publications
4. Industrial Electronics, G. K. Mittal, PHI
Course Learning Objectives:

- To impart preliminary concepts of Strength of Material and Principles of Elasticity and Plasticity Stress strain behavior of materials and their governing laws. Introduce student the moduli of Elasticity and their relations.
- To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions and to draw the diagrams of variation across the length.
- To give concepts of stresses developed in the cross section and bending equations calculation of section modulus of sections with different cross sections.
- The concepts above will be utilized in measuring deflections in beams under various loading and support conditions.
- To classify cylinders based on their thickness and to derive equations for measurement of stresses across the cross section when subjected to external pressure.

Course Outcomes:

- The student will be able to understand the basic materials behavior under the influence of different external loading conditions and the support conditions.
- The student will be able to draw the diagrams indicating the variation of the key performance features like bending moment and shear forces.
- The student will have knowledge of bending concepts and calculation of section modulus and for determination of stresses developed in the beams and deflections due to various loading conditions.
- The student will be able to assess stresses across section of the thin and thick cylinders to arrive at optimum sections to withstand the internal pressure using Lame’s equation.

SYLLABUS:

UNIT – II: Shear Force And Bending Moment: Definition of beam – Types of beams – Concept of shear force and bending moment – S.F and B.M diagrams for cantilever, simply supported and overhanging beams subjected to point loads, 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: Shear Stresses: Derivation of formula – Shear stress distribution across various beam sections like rectangular, circular, triangular, I, T angle sections, built up beams, shear centre.


TEXT BOOKS:


2. Strength of Materials by S. Ramamrutham,

REFERENCES:

II Year - I Semester

BUILDING MATERIALS AND CONSTRUCTION

I. Objectives of the course:

- Initiating the student with the knowledge of basic building materials and their properties.
- Imparting the knowledge of course pattern in masonry construction and flat roofs and techniques of forming foundation, columns, beams, walls, sloped and flat roofs.
- The student is to be exposed to the various patterns of floors, walls, different types of paints and varnishes.
- Imparting the students with the techniques of formwork and scaffolding.
- The students should be exposed to classification of aggregates, moisture content of the aggregate.

II. Course outcome:

Upon the successful completion of the course:

- The student should be able to identify different building materials and their importance in building construction.
- The student is expected to differentiate brick masonry, stone masonry construction and use of lime and cement in various constructions.
- The student should have learnt the importance of building components and finishings.
- The student is expected to know the classification of aggregates, sieve analysis and moisture content usually required in building construction.

UNIT I: Stones, Bricks And Tiles

- Characteristics of good tile - manufacturing methods, types of tiles. Uses of materials like Aluminium, Gypsum, Glass and Bituminous materials

UNIT II Masonry

UNIT III: Lime And Cement  

UNIT IV: Building Components  
Lintels, arches, vaults, stair cases – types. Different types of floors – Concrete, Mosaic, Terrazzo floors, Pitched, flat roofs. Lean to roof, Coupled Roofs. Trussed roofs – King and Queen post Trusses. R.C.C Roofs, Madras Terrace and Pre fabricated roofs.

UNIT V: Finishings  

UNIT VI: Aggregates  
Classification of aggregate – Coarse and fine aggregates- particle shape and texture – Bond and Strength of aggregate – Specific gravity – Bulk Density, porosity and absorption – Moisture content of Aggregate- Bulking of sand – Sieve analysis.

Text Books:

References:
4. Building construction, P. C. Verghese, PHI Learning (P) Ltd.

***
II Year - I Semester

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SURVEYING

Course Learning Objectives:
To introduce the students to basic principles of surveying, various methods of linear and angles measuring instruments and enable the students to use surveying equipments.

Course Outcomes:
Upon successful completion of the course, the student will be able:

- To demonstrate the basic surveying skills
- To use various surveying instruments.
- To perform different methods of surveying
- To compute various data required for various methods of surveying.
- To integrate the knowledge and produce topographical map.

Syllabus:

UNIT – I, Introduction:
definition-Uses of surveying- overview of plane surveying (chain, compass and plane table), Objectives, Principles and classifications – Errors in survey measurements

UNIT – II Distances And Direction:
Electronic distance measurements (EDM)- principles of electro optical EDM-Errors and corrections to linear measurements- Compass survey-Meridians, Azimuths and Bearings, declination, computation of angle. Traversing-Purpose-types of traverse-traverse computation-traverse adjustments-Introduction omitted measurements

UNIT – III Leveling And Contouring:

UNIT – IV Theodolite:
Description, principles-uses and adjustments – temporary and permanent, measurement of horizontal and vertical angles. Principles of Electronic Theodolite – Introduction to Trigonometrical leveling. Tachometric Surveying:
Stadia and tangential methods of Tacheometry. Distance and Elevation formulae for Staff vertical position.
UNIT – V Curves: Types of curves, design and setting out – simple and compound curves-Introduction to geodetic surveying, Total Station and Global positioning system

UNIT – VI 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.

Text Books:
4. Surveying and levelling, R. Subramanian, Oxford University press.

References:
3. Higher Surveying, A.M. Chandra, New Age International Pvt Ltd.
II Year - I Semester

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FLUID MECHANICS

Course Learning Objectives:

- To understand the properties of fluids and fluid statics
- To derive the equation of conservation of mass and its application
- To solve kinematic problems such as finding particle paths and stream lines
- To use important concepts of continuity equation, Bernoulli’s equation and turbulence, and apply the same to problems
- To analyze laminar and turbulent flows
- To understand the various flow measuring devices
- To study in detail about boundary layers theory

Course Outcomes:

Upon successful completion of this course the students will be able to:

- Understand the various properties of fluids and their influence on fluid motion and analyse a variety of problems in fluid statics and dynamics.
- Calculate the forces that act on submerged planes and curves.
- Identify and analyse various types of fluid flows.
- Apply the integral forms of the three fundamental laws of fluid mechanics to turbulent and laminar flow through pipes and ducts in order to predict relevant pressures, velocities and forces.
- Draw simple hydraulic and energy gradient lines.
- Measure the quantities of fluid flowing in pipes, tanks and channels.

Syllabus:

UNIT I Introduction : Dimensions and units – Physical properties of fluids - specific gravity, viscosity, surface tension, vapour pressure and their influences on fluid motion, pressure at a point, Pascal’s law, Hydrostatic law -atmospheric, gauge and vacuum pressures- measurement of pressure. Pressure gauges, Manometers: Differential and Micro Manometers.

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

Fluid Kinematics: Description of fluid flow, Stream line, path line and streak line and stream tube. Classification of flows: Steady, unsteady, uniform, non-uniform, laminar, turbulent, rotational and irrotational flows – Equation of continuity for one, two, three dimensional flows – stream and velocity potential functions, flow net analysis.
UNIT – III Fluid Dynamics: Surface and body forces – Euler’s and Bernoulli’s equations for flow along a stream line - Momentum equation and its application – forces on pipe bend.


Closed Conduit Flow: Darcy-Weisbach equation, Minor losses – pipes in series – pipes in parallel – Total energy line and hydraulic gradient line, variation of friction factor with Reynold’s number – Moody’s Chart, Pipe network problems, Hazen-Williams formula, Hard-Cross Method,


UNIT – VI Boundary Layer Theory: Boundary layer (BL) – concepts, Prandtl contribution, Characteristics of boundary layer along a thin flat plate, Vonkarman 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.

Text Books:


References:

1. Mechanics of Fluids, Merle C. Potter, David C. Wiggert and Bassem H. Ramadan, CENGAGE Learning


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II Year - I Semester

SURVEYING FIELD WORK-I

List of Field Works:

1. Survey by chain survey of road profile with offsets in case of road widening.
2. Survey in an area by chain survey (Closed circuit)
3. Determination of distance between two inaccessible points by using compass.
4. Finding the area of the given boundary using compass (Closed Traverse)
5. Plane table survey; finding the area of a given boundary by the method of Radiation
6. Plane table survey; finding the area of a given boundary by the method of intersection.
7. Two Point Problem by the plane table survey.
8. Fly levelling : Height of the instrument method (differential levelling)
11. Fly levelling; Longitudinal Section and Cross sections of a given road profile.

Note: Any 10 field work assignments must be completed.

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STRENGTH OF MATERIALS LAB

List of Experiments
1. Tension test on Steel bar
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. Brinnell’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
12. Electrical Resistance gauges
Course Objectives:

*To give basic insights and inputs to the student to inculcate Human values to grow as a responsible human beings with proper personality.

*Professional Ethics instills the student to maintain ethical conduct and discharge their professional duties.

Outcome:

*It gives a comprehensive understanding of a variety issues that are encountered by every professional in discharging professional duties.

*It provides the student the sensitivity and global outlook in the contemporary world to fulfill the professional obligations effectively.


UNIT III: Engineering Ethics and Social Experimentation:

UNIT IV: Engineers’ Responsibilities towards Safety and Risk:
UNIT V: Engineers’ Duties and Rights:

UNIT VI: Global Issues:

References:

4. Engineering Ethics, Harris, Pritchard and Rabins, Cengage Learning, New Delhi.
9. Human Values And Professional Ethics, Jayshree Suresh and B. S. Raghavan, S.Chand Publications
Objectives of the course:

- Initiating the student to different building bye-laws and regulations.
- Imparting the planning aspects of residential buildings and public buildings.
- Giving training exercises on various signs and bonds and different building units.
- Imparting the skills and methods of planning of various buildings.

Course outcome:

- Upon successful completion of the course:
  - Student should be able to plan various buildings as per the building by-laws.
  - The student should be able to distinguish the relation between the plan, elevation and cross section and identify the form and functions among the buildings.
  - The student is expected to learn the skills of drawing building elements and plan the buildings as per requirements.

UNIT I: Building Byelaws and Regulations
Introduction- terminology- objectives of building byelaws- floor area ratio- floor space index- principles under laying building bye laws- classification of buildings- open space requirements – built up area limitations- height of buildings- wall thickness – lightening and ventilation requirements.

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 and relationship between plan, elevation and forms and functions

UNIT III: Public Buildings
Planning of educational institutions, hospitals, dispensaries, office buildings, banks, industrial buildings, hotels and motels, buildings for recreation, Landscaping requirements.

UNIT IV: Sign Conventions And Bonds
Brick, stone, plaster, sand filling, concrete, glass, steel, cast iron, copper alloys, aluminium alloys etc., lead, zinc, tin etc., earth, rock, timber and marbles,
English bond and Flemish bond - odd and even courses for one, one and half, two and two and half brick walls in thickness at the junction of a corner.

UNIT V: Doors, Windows, Ventilators And Roofs
Panelled door, panelled and glazed door, glazed windows, panelled windows, swing ventilators, fixed ventilators, coupled roof, collar roofs.
King Post truss, Queen Post truss
Sloped and flat roof and buildings: drawing plans, Elevations and Cross Sections of given sloped and flat roof buildings.
UNIT VI: Planning And Designing Of Buildings.
Draw the Plan, Elevation and Sections of a Residential and Public buildings from the given line diagram.

Text Books:
1. Planning, designing and Scheduling, Gurucharan Singh and Jagadish Singh
2. Building planning and drawing by M. Chakravarthi.
3. ‘A’ Series & ‘B’ Series of JNTU Engineering College, Anantapur,

References:
3. Civil Engineering drawing and House planning, B. P. Verma, Khanna publishers, New Delhi.

INTERNAL EXAMINATION PATTERN:
The total internal marks (30) are distributed in two components as follows:
1. Descriptive (subjective type) Weightage 60% examination:18 marks
2. Drawing Assignment : 12 marks

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%.
Course Learning Objectives:

• To give concepts of Principal stresses and strains developed in cross section of the beams on the cross section and stresses on any inclined plane. To impart concepts of failures in the material considering different theories.

• To give concepts of torsion and governing torsion equation, and there by calculate the power transmitted by shafts and springs and design the cross section when subjected to loading using different theories of failures.

• To classify columns and calculation of load carrying capacity and to assess stresses due to axial and lateral loads for different edge conditions and to calculate combined effect of direct and bending stresses on different engineering structures.

• Introduce the concept of unsymmetrical bending in beams Location of neutral axis

• Impart concepts for determination of Forces in members of plane pin-jointed perfect trusses by different methods

Course Outcomes:

Upon successful completion of this course,

• The student will be able to understand the basic concepts of Principal stresses developed in a member when it is subjected to stresses along different axes and design the sections.

• The student can asses stresses in different engineering applications like shafts, springs, columns and struts subjected to different loading conditions.

• The student will be able to assess forces in different types of trusses used in construction.

SYLLABUS:

UNIT- I Principal Stresses And Strains And Theories Of Failures: 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.


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.


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

UNIT – IV 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 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. Strength of materials by R. K Rajput, S.Chand and Co.

References:
Course Learning Objectives:

- To study about uniform and non uniform flows in open channel and also to learn about the characteristics of hydraulic jump
- To introduce dimensional analysis for fluid flow problems
- To understand the working principles of various types of hydraulic machines and Pumps.

Course Outcomes:

Upon successful completion of this course the students will be able to:

- Solve uniform and non uniform open channel flow problems.
- Apply the principals of dimensional analysis and similitude in hydraulic model testing.
- Understand the working principles of various hydraulic machineries and pumps.

Syllabus:

UNIT – I UNIFORM FLOW IN OPEN CHANNELS:
Types of channels –Types of flows - Velocity distribution – Energy and momentum correction factors – Chezy’s, and Manning’s formulae for uniform flow – Most Economical sections, Critical flow: Specific energy-critical depth – computation of critical depth


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.


RECIPROCATING PUMPS: Introduction, classification, components, working, discharge, indicator diagram, work done and slip.

Text Books:

References:
1. Fluid Flow in Pipes and Channels, G.L. Asawa, CBS
Course Learning Objectives:

- To learn the concepts of Concrete production and its behaviour in various environments.
- To learn the test procedures for the determination of properties of concrete.
- To understand durability properties of concrete in various environments.

Course Outcomes:

Upon successful completion of this course, student will be able to

- understand the basic concepts of concrete.
- realize the importance of quality of concrete.
- familiarize the basic ingredients of concrete and their role in the production of concrete and its behaviour in the field.
- test the fresh concrete properties and the hardened concrete properties.
- evaluate the ingredients of concrete through lab test results. design the concrete mix by BIS method.
- familiarize the basic concepts of special concrete and their production and applications. understand the behaviour of concrete in various environments.

SYLLABUS:


Aggregates: Classification of aggregate – Particle shape & texture – Bond, strength & other mechanical properties of aggregates – Specific gravity, Bulk density, porosity, adsorption & moisture content of aggregate – Bulking of sand –Deleterious substance in aggregate – Soundness of aggregate – Alkali aggregate reaction – Thermal properties – Sieve analysis – Fineness modulus – Grading curves – Grading of fine & coarse Aggregates – Gap graded and well graded aggregate as per relevant IS code – Maximum aggregate size. Quality of mixing water,


Text Books:
1. Concrete Technology, M. S. Shetty. – S. Chand & Company
2. Concrete Technology, A. R. Santha Kumar, Oxford University Press, New Delhi

References:
Course Learning Objectives:

- To give preliminary concepts of assessment of bending moment and shear force in Propped cantilevers, fixed beams and continuous beams due to various loading conditions.
- To impart concepts of Bending Moment and Shear force for beams with different boundary and loading conditions
- The procedure for development of slope deflection equations and to solve application to continuous beams with and without settlement of supports.
- The concepts of moving loads and influence lines are imparted for assessment of maximum SF and BM at a given section when loads of varying spans rolling loads of Pratt and Warren trusses.

Course Outcomes:

Upon successful completion of this course the student will be able to,

- Distinguish between the determinate and indeterminate structures.
- Identify the behaviour of structures due to the expected loads, including the moving loads, acting on the structure.
- Estimate the bending moment and shear forces in beams for different fixity conditions.
- Analyze the continuous beams using various methods - three moment method, slope deflection method, energy theorems.
- Draw the influence line diagrams for various types of moving loads on beams/bridges.
- Analyze the loads in Pratt and Warren trusses when loads of different types and spans are passing over the truss.

Syllabus:

**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 including 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 And Influence Lines: Introduction maximum SF and BM at a
given section and absolute maximum S.F. and B.M due to single concentrated load, U. D
load longer than the span, U. D load shorter than the span, two point loads with fixed distance
between them and several point loads-Equivalent uniformly distributed load-Focal length.

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 sections, 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.

Text Books:
2. Analysis of Structures by T.S. Thandavamoorthy, Oxford University Press, New Delhi
    Publishers, New Delhi

References:
5. Structural Analysis I Analysis of Statically Determinate Structures, P. N. Chandramouli,
    Yesdee Publishing Pvt Limited, Chennai
Course Learning Objectives:
The objectives of this course are:

- To impart different concepts in the field of Highway Engineering.
- To acquire design principles of Highway Geometrics and Pavements
- To learn various highway construction and maintenance procedures

Course Outcomes:
Upon the successful completion of this course, the students will be able to:

- Plan highway network for a given area.
- Determine Highway alignment and design highway geometrics
- Design Intersections and prepare traffic management plans
- Judge suitability of pavement materials and design flexible and rigid pavements
- Construct and maintain highways

SYLLABUS:

UNIT I
Highway Planning and Alignment: Highway development in India; Classification of Roads; Road Network Patterns; Necessity for Highway Planning; Different Road Development Plans – First, second, third road development plans, road development vision 2021, Rural Road Development Plan – Vision 2025; Planning Surveys; Highway Alignment- Factors affecting Alignment- Engineering Surveys – Drawings and Reports.


UNIT – III Traffic Engineering: Basic Parameters of Traffic-Volume, Speed and Density- Traffic Volume Studies; Speed studies –spot speed and speed & delay studies; Parking Studies; Road Accidents-Causes and Preventive measures - Condition Diagram and Collision Diagrams; PCU Factors, Capacity of Highways – Factors Affecting; LOS Concepts; Road
Traffic Signs; Road markings; Types of Intersections; At-Grade Intersections – Design of Plain, Flared, Rotary and Channelized Intersections; Design of Traffic Signals – Webster Method – IRC Method.


UNIT – V, Design Of Pavements: Types of pavements; Functions and requirements of different components of pavements; Design Factors


TEXT BOOKS:

REFERENCES:
2. Principles of Transportation Engineering, Partha Chakroborothy and Animesh Das, PHI Learning Private Limited, Delhi
7. Highway Engineering, Srinivasa Kumar R, Universities Press, Hyderabad
II Year - II Semester

FLUID MECHANICS AND HYDRAULIC MACHINERY LAB

List of Experiments
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.

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List of Experiments

2. Theodolite Survey: Finding the distance between two inaccessible points.
5. One Exercise on Curve setting.
6. One Exercise on contours.
7. Total Station: Introduction to total station and practicing setting up, levelling up and elimination of parallax error.
8. Total Station: Determination of area using total station.
9. Total Station: Traversing
10. Total Station: Contouring
11. Total Station: Determination of Remote height.
12. Total Station: distance between two inaccessible points.

Note: Any 10 field work assignments must be completed.
Course Objectives:

• The Learning objectives of this paper is to understand the concept and nature of Managerial Economics and its relationship with other disciplines and also to understand the Concept of Demand and Demand forecasting, Production function, Input Output relationship, Cost-Output relationship and Cost-Volume-Profit Analysis.
• To understand the nature of markets, Methods of Pricing in the different market structures and to know the different forms of Business organization and the concept of Business Cycles.
• To learn different Accounting Systems, preparation of Financial Statement and uses of different tools for performance evaluation. Finally, it is also to understand the concept of Capital, Capital Budgeting and the techniques used to evaluate Capital Budgeting proposals.

UNIT-I
Introduction to Managerial Economics and demand Analysis:
Definition of Managerial Economics –Scope of Managerial Economics and its relationship with other subjects –Concept of Demand, Types of Demand, Determinants of Demand-Demand schedule, Demand curve, Law of Demand and its limitations- Elasticity of Demand, Types of Elasticity of Demand and Measurement- Demand forecasting and Methods of forecasting, Concept of Supply and Law of Supply.

UNIT – II:
Production and Cost Analysis:
Concept of Production function- Cobb-Douglas Production function- Leontief production function - Law of Variable proportions-Isoquants and Isocosts and choice of least cost factor combination-Concepts of Returns to scale and Economies of scale-Different cost concepts: opportunity costs, explicit and implicit costs- Fixed costs, Variable Costs and Total costs – Cost –Volume-Profit analysis-Determination of Breakeven point(simple problems)-Managerial significance and limitations of Breakeven point.

UNIT – III:
Introduction to Markets, Theories of the Firm & Pricing Policies:
Market Structures: Perfect Competition, Monopoly, Monopolistic competition and Oligopoly – Features – Price and Output Determination – Managerial Theories of firm: Marris and Williamson’s models – other Methods of Pricing: Average cost pricing, Limit Pricing, Market Skimming Pricing, Internet Pricing: (Flat Rate Pricing, Usage sensitive pricing) and Priority Pricing.
UNIT – IV:
Types of Business Organization and Business Cycles:

UNIT – V:
Introduction to Accounting & Financing Analysis:
Introduction to Double Entry Systems – Preparation of Financial Statements-Analysis and Interpretation of Financial Statements-Ratio Analysis – Preparation of Funds flow and cash flow statements (Simple Problems)
UNIT – VI:

Capital and Capital Budgeting: Capital Budgeting: Meaning of Capital-Capitalization-Meaning of Capital Budgeting-Time value of money- Methods of appraising Project profitability: Traditional Methods(pay back period, accounting rate of return) and modern methods(Discounted cash flow method, Net Present Value method, Internal Rate of Return Method and Profitability Index)

Course Outcome:

*The Learner is equipped with the knowledge of estimating the Demand and demand elasticities for a product and the knowledge of understanding of the Input-Output-Cost relationships and estimation of the least cost combination of inputs.

* One is also ready to understand the nature of different markets and Price Output determination under various market conditions and also to have the knowledge of different Business Units.

*The Learner is able to prepare Financial Statements and the usage of various Accounting tools for Analysis and to evaluate various investment project proposals with the help of capital budgeting techniques for decision making.

TEXT BOOKS


References:

2. V. Maheswari: Managerial Economics, Sultan Chand.2014