FIRST YEAR CURRICULUM
AND SYLLABUS
(REGULATIONS 2019)

FOR

UNDER GRADUATE PROGRAMMES

CHOICE BASED CREDIT SYSTEM

(Applicable to the students admitted from the Academic Year 2019-20 onwards)

B.E. – AUTOMOBILE ENGINEERING
B.E. – CIVIL ENGINEERING
B.E. – COMPUTER SCIENCE AND ENGINEERING
B.E. – ELECTRONICS AND COMMUNICATION ENGINEERING
B.E. – ELECTRICAL AND ELECTRONICS ENGINEERING
B.E. – ELECTRONICS AND INSTRUMENTATION ENGINEERING
B.E. – MECHANICAL ENGINEERING
B.Tech. – INFORMATION TECHNOLOGY

EASWARI ENGINEERING COLLEGE
(AUTONOMOUS INSTITUTION)

Bharathi Salai, Ramapuram, Chennai – 600 089
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• LIST OF SECOND SEMESTER SUBJECTS
• SYLLABUS OF SECOND SEMESTER SUBJECTS
## FIRST SEMESTER CURRICULUM

### Common for all Branches

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# II SEMESTER - CIVIL ENGINEERING

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### List of Courses Offered in First Semester

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- **Humanities and Sciences**
- **Basic Science Courses**
- **Engineering Science Courses**
SYLLABUS OF FIRST SEMESTER SUBJECTS
OBJECTIVE:

- To develop the basic writing skills of the First year Engineering students.
- To help learners develop their listening skills, which will, enable them to listen to lectures and enhance their ability to comprehend by asking questions and seeking clarification.
- To help learners develop their speaking skills and help them to speak fluently.
- To inculcate reading habit and to develop effective reading skills.
- To help students improve their active and passive vocabulary.

UNIT I

9 Hours
Short comprehension passages – skimming, scanning, predicting and inference of the passage – Tips for effective writing
Hints development – Purpose of a good conversation – Tips for improving Conversation – Active and Passive listening –
Types of listening – Barriers to listening – listening for specific purposes – Listening to lectures and note taking - Parts of

UNIT II

9 Hours
Longer Comprehension passages - Questions – multiple choice –short questions – open-ended questions – Sentence
structure - Types of paragraph – Short narrative paragraphs– Comparison and contrast – argumentative paragraph –
analytical paragraph – Techniques for writing precisely - Introducing your friend – Exchange information – Expressing
opinion/ agreeing /disagreeing - Telephonic conversation - If Clause – Subject verb agreement – degrees of comparison –
Pronouns - adverbs.

UNIT III

9 Hours
Short texts – Cloze passage guessing from context – Note making – Use of reference words – Discourse markers –
Connectives – Jumbled sentences –Product description–Process description - Prepositions - Direct/Indirect speech –
Connotations – One word substitution – Idiomatic expressions.

UNIT IV

9 Hours
Different types of texts – Newspapers/ magazines/short stories - Inference – Tips for effective writing – Letter writing —
Letter to the Editor - Speaking about oneself/ hometown – Review of books – listening to native speakers – American
accent and neutral accent - Countable/Uncountable nouns – Articles – Synonyms and Antonyms – Phrasal verbs.

UNIT V

9 Hours
Reading for specific purpose – Short essays – developing an outline –Group discussion – Giving advice – Modal verbs –
Instructions and Recommendations - Collocations.

TOTAL: 45 HOURS

OUTCOME:

1. Listen, Understand and Respond to others in different situations.
2. Speak correctly and fluently in different situations using appropriate communication strategies.
3. Read and Comprehend a range of texts adopting different reading skills.
4. Write with clarity in simple, apt and flawless language with coherence and cohesion.
5. Use their communicative competency with purpose and clarity in the context of Science and Technology.

TEXTBOOKS
REFERENCE BOOKS

WEBSITES:
https://www.usingenglish.com
http://grammarbook.com

JOURNALS:
National Council for Teachers of English
https://www2.ncte.org/resources/journals/college-english/

EXTENSIVE READER:
Spencer Johnson, Who Moved My Cheese, Putnam Adult, 1998

UNIT I: MATRICES

UNIT II: DIFFERENTIAL CALCULUS
Limit of a function - Continuity - Derivatives – Differentiation Rules – Mean Value Theorem – Interval of increasing and decreasing functions – Maxima and Minima - Interval of concavity and convexity –Taylor’s Series for one variable.

UNIT III: MULTIVARIABLE CALCULUS

UNIT IV: INTEGRAL CALCULUS

UNIT V: MULTIPLE INTEGRATION
Double integrals – Change the order of integration in double integrals - Change of variables (Cartesian to polar) - Applications: areas and volumes - Triple integrals (Cartesian, Cylindrical and Spherical coordinates).

TOTAL: 60 HOURS

COURSE OUTCOMES:
The Course aims to equip the students with standard concepts and tools at an intermediate to advanced level that will serve them well towards tackling more advanced level of mathematics and applications that they would find useful in their
The students will learn:

- To express large amounts of data and functions in an organized and concise form apart from diagonalizing matrices.
- To solve maxima and minima problems using differentiation.
- Apply functions of several variables to solve problems in engineering and technology.
- To evaluate integrals by using Fundamental Theorem of Calculus.
- Apply integration to compute multiple integrals, area, volume, integrals in polar coordinates, in addition to change the order and change of variables.

**TEXT BOOKS:**


**REFERENCE BOOKS:**


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191PYB101T  ENGINEERING PHYSICS  
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(Common to all branches of Engineering and Technology)

**OBJECTIVES:**

To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

**UNIT I : PROPERTIES OF MATTER**

- Stress - Strain relationship, Hooke’s law, Elastic moduli, Stress - Strain diagram for various engineering materials, Ductile and Brittle materials - Torsional pendulum – Beam, Expression for bending moment - Cantilever, Uniform and Non-uniform bending, Theory and Experimental determination of Young’s modulus.

**UNIT II : SOUND WAVES AND VIBRATIONS**

- Propagation, Intensity, Loudness of sound waves – Determination of absorption coefficient, Reverberation, Sabine’s formula for reverberation time - Factors affecting acoustics of buildings and their remedies - Acoustic Quieting: Aspects, Methods, Quieting for Specific observers, Mufflers, Soundproofing - Ultrasonic waves and properties, Methods of Ultrasonic production, Applications of Ultrasonic in engineering and medicine.

**UNIT III : THERMAL PHYSICS**

UNIT IV : QUANTUM MECHANICS
Inadequacies of Classical Mechanics – Black body radiation- Planck’s theory of radiation - Dual nature of electromagnetic radiation – De Broglie hypothesis for matter waves – Heisenberg’s uncertainty principle – Schrodinger’s time dependent and independent wave equation, significance of wave function - Born interpretation - Particle confinement in 1D box.

UNIT V : APPLIED OPTICS
Spontaneous and Stimulated emission - Einstein co-efficients (derivation) – Spatial and Temporal coherence – Schawlow-Townes condition for population inversion (Qualitative study) - Types of lasers – Nd:YAG, Semiconductor - Applications of Laser in science, engineering and medicine.
Principle and propagation of light in optical fibre, Derivation for Numerical aperture and Acceptance angle - Types and losses of optical fibre - Fibre Optical Communication (Block diagram) - Active and Passive sensors - Medical endoscope.

TOTAL: 45 HOURS

OUTCOMES:
At the end of this course,
- The students will gain knowledge on the basics of properties of matter and its applications,
- The students will acquire knowledge on the concepts of sound waves and vibrations.
- The students will have adequate knowledge on the concepts of thermal properties of materials and their applications in expansion joints and solar water heaters,
- The students will get knowledge on advanced physics concepts of quantum theory,
- The students will acquire knowledge on the concepts of optical devices and their applications in fibre optics.

TEXT BOOKS

REFERENCES

OBJECTIVES:
- To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
- To get the basic idea about the polymers and applications of polymers and polymer reinforced composites.
- It deals with the information about the types of fuels, calorific value calculations and manufacture of solid, liquid and gaseous fuels.
- It enable the students to gain information about Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells
- To impart knowledge about the nanomaterials synthesis, properties and applications

UNIT I - Water Treatment and Technology

UNIT II – Polymers and Reinforced plastics

UNIT III- Fuels and combustion

UNIT IV – Energy Sources and Storage Devices
Energy – Types – Non-renewable energy - Nuclear energy –fission and fusion reactions - differences between nuclear fission and fusion - nuclear chain reactions - light water nuclear reactor for power generation – breeder reactor – renewable energy - solar energy conversion - solar cells - wind energy
Electrochemical cells – reversible and irreversible cells –Cell construction and representation - Batteries -types of batteries – characteristics – construction and working of primary battery (dry cell) - secondary battery (lead acid battery and lithium-ion-battery) - fuel cells (H₂-O₂)

UNIT V – Concepts of Nano chemistry and Green chemistry
Green chemistry introduction - Principles - Applications

OUTCOMES:
- The knowledge gained on water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
- The knowledge gained on water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
- Students can get knowledge about various fuels and its applications based on its calorific value.
- It provides the students to understand about conventional and non-conventional energy sources and its applications
- It provides the students to gain knowledge about the recent trends in nano materials.
Text Books:

Reference Books:

191GES101T ENGINEERING GRAPHICS  L T P R C
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(Common to all branches of Engineering and Technology)

OBJECTIVES:
- To develop students, graphic skills for communication of concepts, ideas and design of engineering products.
- To expose them to existing National standards related to technical drawings.
- To Familiarize with basic geometrical constructions and orthographic projections.
- To make the students to draw the different projections of the solids.
- *To view the true shape and apparent shape of the sectioned solids and their developments.
- To get an idea about 3D views through isometric projections.

UNIT 0 : CONCEPTS AND CONVENTIONS USED
Principles of Engineering graphics and their significance - Use Of drawing Instruments-BIS conventions and specifications-Size, Layout and folding of drawing sheets-Lettering and Dimensioning.

UNIT I: PLANE CURVES, PROJECTION OF POINTS

UNIT II: PROJECTION OF LINES AND PLANES
Projection of straight lines inclined to both the principal planes by rotating line method. Projection of simple planes inclined to both the principal planes by rotating object method.

UNIT III: PROJECTION OF SOLIDS
Projection of simple solids like Prism, Pyramid, Cylinder & Cone when the axis is inclined to one of the principal planes by rotating object method.

UNIT IV: SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES
Sectioning of simple solids (Prism, Pyramid, Cylinder & Cone) in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section. Development of surfaces of right regular and sectioned solids.

UNIT V: ISOMETRIC AND ORTHOGRAPHIC PROJECTIONS
Principles of Isometric projections-Isometric scale- Isometric Views of simple and truncated solids – combination of two solid objects in simple vertical positions. Conversion of Isometric views to Orthographic views of the objects.

UNIT VI: COMPUTER AIDED DRAFTING : (Demonstration Only, Not for Exam)
The Concepts of Computer Aided Drafting for Engineering drawing, Computer graphics & Geometrical modeling (2D Orthographic Views) and 3D drafting (Isometric Views) using AutoCAD.
OUTCOMES:
On successful completion of this course, the student will be able to
- Familiarize with the fundamentals and standards of Engineering graphics
- Perform basic geometrical constructions and principles of orthographic projections.
- Project orthographic projections of lines and plane surfaces.
- Draw projections of solids and development of surfaces.
- Visualize and to project isometric views and conversion of Isometric views to Orthographic views.
- Understand the basics of AUTO CAD and fundamentals of perspective projections.

TEXT BOOKS:

REFERENCES:

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191GES102T  PROBLEM SOLVING THROUGH PYTHON PROGRAMMING

( Common to all branches of Engineering and Technology)

OBJECTIVES:
The course on Python Programming is intended to enhance the computational and logical thinking of students. Upon completion of the course, the students would be able to master the principles of Python programming and demonstrate significant experience in problem solving.

UNIT I: ALGORITHMIC PROBLEM SOLVING
Algorithms, building blocks of algorithms (statements, control flow, functions), notation (pseudo code, flow chart, programming language), algorithmic problem solving, simple strategies for developing algorithms (iteration, recursion). Case study: Towers of Hanoi, insertion sort, guess an integer number in a range.

UNIT II: CONTROL FLOW STATEMENTS
Python interpreter, interactive mode and script mode; variables, expressions, statements; values and data types; Operators and Precedence of operators, comments; Conditionals: conditional, alternative, chained conditional, nested conditional; Iterations: while, for, break, continue.
UNIT III : FUNCTIONS AND STRINGS
Modules and functions: function definition and use, flow of execution, parameters and arguments; Fruitful functions: return values, composition, recursion; Strings: string slices, immutability, Looping and counting, String methods.

UNIT IV : LIST, TUPLE AND DICTIONARIES
Lists: list operations, list slices, list methods, traversing, mutability, aliasing, list arguments, list comprehension; Tuples: tuple assignment, tuple as return value; Dictionaries: operations and functions, Looping and dictionaries, histogram.

UNIT V : FILES, EXCEPTIONS
Files: text files, reading and writing files, format operator, filenames and paths; Exceptions: handling exceptions, multiple exception blocks, finally block; Case study: tkinter.

TOTAL: 45 HOURS

COURSE OUTCOMES:
Upon completion of the course, the students would be able to
- Design solutions to simple computational problems
- Read, write and execute Python programs.
- Decompose a Python program into functions
- Implement compound data using Python lists, tuples, and dictionaries.
- Read and write data from/to files in Python Programs.
- Understand the GUI concepts and implement in Python.

TEXT BOOKS:

REFERENCES:

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OBJECTIVE
The purpose of this course is to develop scientific temper in experimental techniques and to reinforce the physics concepts among the engineering students.

INSTRUCTIONAL OBJECTIVES
1. To gain knowledge in the scientific methods and learn the process of measuring different Physical variables
2. Develop the skills in arranging and handling different measuring instruments
3. Get familiar on experimental errors in various physical measurements and to plan/ suggest on how the contributions could be made of the same order, so as to minimize the errors.

ANY FIVE EXPERIMENTS
7. Determination of the Band gap of a semiconductor.
8. Ultrasonic Interferometer - Velocity of sound and Compressibility of liquid.

TOTAL: 30 HOURS

TEXT BOOKS
3. Physics Laboratory Manual, Faculty Members, Department of Physics, Easwari Engineering College, Chennai.

REFERENCES

(B) CHEMISTRY LABORATORY

OBJECTIVES:
- To make the student to acquire practical skills in the determination of water quality parameters.
- To acquaint the students with the determination of molecular weight of polymer by using viscometer.

Any Five Experiments
1. Determination of chloride content of water sample by Argentometric method
2. Determination of strength of given HCl using pH meter
3. Determination of strength of acid in a mixture using conductivity meter.
4. Determination of permanent, total and temporary hardness of water sample.
5. Estimation of Fe$^{2+}$ by Potentiometric titration
6. Determination of molecular weight of PVA using Ostwald viscometer
7. Determination of alkalinity in water sample
8. Estimation of Iron content in water sample using spectrophotometer (1,10 – Phenanthroline/thiocyanate method)
9. Conductometric titrations of strong acid Vs strong base
10. Determination of DO Content of water sample by Wrinkles method
11. Determination of BOD and COD in water sample

TOTAL: 30 HOURS

OUTCOMES:
- The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

REFERENCES:

OBJECTIVE:
The course on Python programming laboratory is used to write, test and debug simple Python programs. Upon completion of the course, the students would be able to master the concepts of data types, loops, functions, list, tuples, dictionary, files and GUI.

LIST OF PROGRAMS:
1. LCM of two numbers.
2. Sum of squares of first n natural numbers
3. Fibonacci series.
4. Armstrong number
5. Sum of Digits in a Number.
6. First n prime number.
7. Factorial of a number using recursion
8. Count the number of vowels in a string
10. Simple calculator
11. Linear search
12. Selection sort
13. Insertion sort
15. Mini Project (any ONE): Design GUI for
- Airline reservation system
- Feedback system
- Employee management system
- Student management system
- Banking system

TOTAL: 60 HOURS

COURSE OUTCOMES:
Upon completion of the course, the students would be able to
- Write, test, and debug simple Python programs.
- Implement Python programs with conditionals and loops.
- Use functions for structuring Python programs.
- Represent compound data using Python lists, tuples, dictionaries.
- Read and write data from/to files in Python
- Design GUI applications.

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## LIST OF COURSES OFFERED IN SECOND SEMESTER

<table>
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### HUMANITIES AND SCIENCES

### BASIC SCIENCE COURSES

### ENGINEERING SCIENCE COURSES

### CORE ENGINEERING COURSES

### MANDATORY COURSES
SYLLABUS OF SECOND SEMESTER SUBJECTS
OBJECTIVES:
- To strengthen their listening skills which help them comprehend lectures and talks in their areas of specialization.
- To develop their speaking skills to make technical presentations, participate in Group Discussions.
- To develop strategies and skills to enhance their ability to read and comprehend engineering and technology texts.
- To foster their ability to write convincing job applications.
- To equip with appropriate skills for writing effective reports.

UNIT I
Communication – Process of Communication – Different forms of communication – Communication flow - Barriers of communication - Purpose and Function expressions – Extended definitions – Cause and Effect expressions - Compound nouns- Homonyms/homophones

UNIT II

UNIT III
Etiquette of Group discussion – discussing GD topics - reading journals and paraphrasing – Report Writing – Accident report/– Industrial visit report – Words often Misspelt – Describing a process using sequence words – Words used as different parts of speech

UNIT IV

UNIT V
Writing Statements of Purpose-format, Sample – Modifiers, Redundancies-Direct indirect speech-Project Proposal – Minutes of Meeting - Verbal Analogies – Case studies relating to Goal Setting- Writing articles

OUTCOME:
1. Learners can draft effective formal letters and emails.
2. Listen and comprehend different technical/non-technical excerpts critically and infer the implied meaning.
3. Write ungrammatically and help in organizing ideas logically on a topic using a wide range of vocabulary.
4. Read different genres of texts and evaluate them for content and structure.
5. Be proactive in using the language confidently and effectively for personal and professional growth.

TEXTBOOKS

REFERENCE BOOKS
OBJECTIVES:

- The objective of this course is to familiarize the prospective engineers with techniques in ordinary differential equations, complex variables and complex integration.
- The Study of Laplace transform help to solve the differential equations that occur in various branches of engineering disciplines.
- Vector calculus can be widely used for modelling the various laws of physics.
- The various methods of complex analysis can be used for efficiently solving the problems that occur in various branches of engineering disciplines.

UNIT 1: ORDINARY DIFFERENTIAL EQUATIONS (12)

UNIT 2: LAPLACE TRANSFORMS (12)
Existence conditions – Transforms of elementary functions – Transform of unit step function and unit impulse function – Basic properties – Shifting theorems - Transforms of derivatives and integrals – Transform of periodic functions - Inverse transforms: Convolution theorem (Statement only) and Partial Fractions - Application to solution of linear second order ordinary differential equations with constant coefficients.

UNIT 3: VECTOR CALCULUS (12)
Gradient and directional derivative – Divergence and curl – Irrotational and Solenoidal vector fields – Line integral – Surface integral - Area of a curved surface - Green’s, Gauss divergence and Stokes’ theorems in evaluating line, surface and volume integrals (Planar, Cylindrical and Spherical Surfaces).
UNIT 4 : COMPLEX VARIABLES
Analytic functions – Necessary and sufficient conditions for analyticity in Cartesian form - Properties – Harmonic conjugates – Construction of analytic function – Conformal mapping – Mapping by function
\[ w = z + c, \ c z, \ \frac{1}{z}, \ z^3 \ - \text{Bilinear transformation.} \]

UNIT 5 : COMPLEX INTEGRATION

TOTAL: 60 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:

COURSE OUTCOMES:
The Course aims to equip the students to deal with advanced level of mathematics and applications that would be essential for their disciplines. The students will learn:
1. The effective mathematical tools to obtain the solutions of first and second order differential equations that model physical processes.
2. Gradient, divergence and curl of a vector point function and related identities. Evaluation of line, surface and volume integrals using Gauss, Stokes and Green’s theorems and their verification.
3. The tools of differentiation and integration of functions of a complex variable that are used in various techniques dealing engineering problems.
4. Analytic functions, conformal mapping and complex integration.
5. Laplace transform and inverse transform of simple functions, properties, various related theorems and application to solve the differential equations with constant coefficients.

191PYB201T PHYSICS FOR ELECTRONICS ENGINEERING
L T P R C
3 0 0 0 3
(Common to first year ECE, EEE and EIE)

OBJECTIVES
To enrich the understanding of various types of materials and their applications in electronics, communication, electrical and instrumentation engineering.
UNIT I  CONDUCTING MATERIALS  9

UNIT II  SEMICONDUCTING MATERIALS  9
Direct and indirect semiconductors - Intrinsic Semiconductors – Carriers concentration in intrinsic semiconductors (derivation) – extrinsic semiconductors (Qualitative study) - variation of Fermi level with temperature and impurity concentration in n and p type semiconductors – Carrier transport: Velocity-electric field relations – drift and diffusion transport – Hall effect and devices – Zener and avalanche breakdown in p-n junctions - Ohmic contacts – tunnel diode - Schottky diode – MOS capacitor - Power transistor.

UNIT III  MAGNETIC AND SUPERCONDUCTING MATERIALS  9

UNIT IV  DIELECTRIC MATERIALS  9

UNIT V  ADVANCED ENGINEERING MATERIALS  9

TOTAL: 45 PERIODS

OUTCOMES
At the end of the course, the students will able to
• gain knowledge on classical and quantum electron theories, and energy band structures,
• acquire knowledge on basics of semiconductor physics and its applications in various devices,
• get knowledge on magnetic and dielectric properties of materials,
• have the necessary understanding on the functioning of advanced materials

TEXTBOOKS

REFERENCES
OBJECTIVES
To enrich the understanding of various types of materials and their applications in Engineering and Technology.

UNIT I CONDUCTING MATERIALS

UNIT II SEMICONDUCTING MATERIALS
Direct and Indirect band gap semiconductors, Intrinsic Semiconductors - Carriers concentration in Intrinsic Semiconductor (derivation) - Extrinsic Semiconductors (Qualitative study) - Variation of Fermi level with temperature and impurity concentration in n and p type – Carrier transport: Velocity, Electric field relations, Drift and Diffusion transport – Hall effect and Devices – Zener and Avalanche Breakdown in p-n junctions - Ohmic contacts – Tunnel diode - Schottky diode. MOS capacitor - Power transistor.

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS
Magnetism in materials – Magnetic field and Induction – Magnetization - Magnetic permeability and susceptibility – types of Magnetic materials – Ferromagnetism, origin and exchange interaction, Saturation magnetization, Curie temperature, Domain theory - Hard and Soft magnetic materials – Applications in Transducer, Hard disc, Magneto optical recording. Superconductivity: Type I and Type II superconductors, BCS theory of Superconductivity (Qualitative), High $T_c$ Superconductors, Applications in SQUID, Cryotron and Magnetic levitation.

UNIT IV OPTICAL AND MODERN ENGINEERING MATERIALS

UNIT V NANO MATERIALS
Background, Definition and Basic concepts of Nanotechnology, Size dependent property, Quantum size effect - Quantum dot, Wire and Well – Bucky balls - Graphene – Carbon nanotubes, Types, Applications- Potential uses of nanomaterials, carbon nano tube computers, nano sensors, actuators - Medical applications of Nanomaterials, NEMS.

OUTCOMES:
At the end of this course,
- the students will acquire knowledge on basics of semiconductor physics and its applications in various devices
- the students will get knowledge on magnetic properties of materials and their applications in data storage devices,
- the students will have the necessary understanding on the functioning of optical materials for optoelectronics,
- the students will understand the basics of carbon structures and their applications in electronics.

TEXTBOOKS:
3. V.Rajendran, **Materials Science**, McGraw Hill Education (India) Private Ltd., 2017

**REFERENCES:**


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**OBJECTIVES**

To disseminate to the students, the concepts of phases in solid solutions, electrical and thermal properties of solids, materials science, theories of solid state physics in the development of materials and its properties and facilitate students to apply in their area of specialization.

**UNIT I  PHASE EQUILIBRIA IN MATERIALS**


**UNIT II  CONDUCTING MATERIALS**


**UNIT III  SEMICONDUCTING MATERIALS**

Direct and indirect semiconductors - Carriers concentration in intrinsic semiconductor – Extrinsic semiconductors (Qualitative study) - variation of Fermi level with temperature and impurity concentration in n and p types – Carrier transport: Velocity-electric field relations – drift and diffusion transport – Hall Effect and determination of Hall Coefficient.

**UNIT IV  MAGNETIC AND SUPERCONDUCTING MATERIALS**


Superconductivity: properties – Type I and Type II superconductors – BCS theory of superconductivity (Qualitative) - High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.

**UNIT V  ADVANCED ENGINEERING MATERIALS**

Polymer matrix composites (PMC): classification, role of matrix and reinforcement, fillers, processing of fiber reinforced PMCs, applications – Metallic glasses: types, glass forming ability of alloys, melt spinning process, applications - Shape memory alloys: phases, shape memory effect, pseudo elastic effect, Ni:Ti alloy, applications – nano materials: Bucky balls - Graphene – Carbon nanotubes, types, applications – High Entropy Alloys (HEA) and Super alloys (SA).

**TOTAL: 45 HOURS**
OUTCOMES:
At the end of this course,

- The students will have knowledge on various phase diagrams and their applications,
- The students will gain knowledge on magnetic, dielectric and superconducting properties of materials,
- The students will understand the basics of polymers, composites and nano materials, and
- The students will have knowledge on advanced materials.

TEXT BOOKS:

REFERENCE BOOKS:

OBJECTIVES:
1. To understand the Basic Fundamentals in Electrical Circuits.
2. To study the construction, Principle of operation and performance of DC and AC Machines
3. To understand the principles of PN Junction diode and BJT
4. To Study the protection and safety measures in Electricity

UNIT I FUNDAMENTALS OF ELECTRICITY AND CIRCUITS:

UNIT-II MEASURING INSTRUMENTS:

UNIT III ELECTRICAL MACHINES:
UNIT IV BASIC ELECTRONICS AND COMMUNICATION:

UNIT V PROTECTION, SAFETY AND INDIAN ELECTRICITY SCENARIO:

TOTAL : 45 HOURS

OUTCOMES:
1. Demonstrate knowledge on basics of electrical circuits, Construction and working principle of various electrical machines.
2. Analyze the behaviour and performance of electrical circuits and machines.
3. Apply knowledge on CRO and function generator.
4. Describe electrical hazards and safety equipment.
5. Analyze and apply various grounding and bonding techniques.
6. Select appropriate safety method for low, medium and high voltage equipment.
7. Participate in a safety team.
8. Carry out proper maintenance of electrical equipment by understanding various standards.

TEXT BOOKS:

References:

191GES202T ENGINEERING MECHANICS L T P R C 3 2 0 0 4

(Common to first year Mechanical, Civil and Automobile Engineering)

OBJECTIVES:
• To apply the fundamental concepts in determining the effect of forces on a particle and rigid body.
• To determine the geometry dependant properties of solids and sections
• To apply the principles of kinetics and kinematics in dynamics
• To understand the concepts of static friction.
• To know the basics of solid mechanics.

UNIT I STATICS OF PARTICLES

UNIT II EQUILIBRIUM OF RIGID BODIES

UNIT III PROPERTIES OF SURFACES AND SOLIDS

UNIT IV DYNAMICS OF PARTICLES AND FRICTION

UNIT V STRESS, STRAIN AND DEFORMATION OF SOLIDS
Stresses - Strain - Hooke’s law-Relationship among elastic constants- Factor of safety-Thermal stresses- Compound bars- Strain energy due to axial force, impact and suddenly applied load.

TOTAL = 60 HOURS

OUTCOMES:
On successful completion of this course, the student will be able to
• analyse the particle and rigid body in equilibrium
• evaluate the properties of surfaces and solids
• calculate dynamic forces exerted in rigid body
• determine the friction and the effects by the laws of friction
• understand the properties of deformable solids

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
- To impart basic knowledge on Civil and Mechanical Engineering.
- To familiarize the materials used in Civil Engineering.
- To provide the exposure on the fundamental elements of civil engineering structures.
- To enable the students to distinguish the components and working principle of power plant units and IC engines.
- To provide the basic knowledge on working of Refrigeration and Air conditioning systems.

UNIT I SCOPE OF CIVIL AND MECHANICAL ENGINEERING
Overview of Civil Engineering - Civil Engineering contributions to the welfare of Society – Specialized sub disciplines in Civil Engineering – Structural, Construction, Geotechnical, Environmental, Transportation and Water Resources Engineering.

UNIT II SURVEYING AND CIVIL ENGINEERING MATERIALS
Surveying: Objects – classification – principles – measurements of distances – Application of surveying using GPS – Principles of remote sensing and GIS.

UNIT III BUILDING COMPONENTS

UNIT IV INTERNAL COMBUSTION ENGINES AND POWER PLANTS
Classification of Power Plants - Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Working principle of steam, Gas, Diesel, Hydro - electric and Nuclear Power plants — working principle of Boilers, Turbines, Reciprocating Pumps (single acting and double acting) and Centrifugal Pumps

UNIT V REFRIGERATION AND AIR CONDITIONING SYSTEM

TOTAL: 45 HOURS

OUTCOMES:
On successful completion of this course, the student will be able to
- Appreciate the Civil and Mechanical Engineering components of Projects.
- Explain the usage and proper selection of construction materials and usage of modern surveying instruments.
- Identify the components used in power plant cycle.
- Demonstrate working principles of petrol and diesel engine.
- Elaborate the components of refrigeration and Air conditioning cycle.

TEXTBOOKS:
OBJECTIVES:
To provide exposure to the students with the concepts involved in product realization by carrying out manufacturing shop exercises. Hands-on practice with manufacturing shop exercises and assembly leading to realization of a new product in a group.

GROUP A (CIVIL & MECHANICAL)

CIVIL & MECHANICAL ENGINEERING PRACTICE 30 HOURS

I  CIVIL ENGINEERING PRACTICE
A. Plumbing Works:
   1. Pipeline joints, its location and functions: Valves, Taps, Couplings, Unions,Reducers, Elbows in household fittings.
   2. Connection of two Galvanized Iron pipes
   3. Connection of PVC pipes
   4. Basic pipe connections involving the fitting like Valves, Taps and Bends
B. Carpentry works:
   2. Cross Lap joint
   3. Mortise and Tenant joint

II  MECHANICAL ENGINEERING PRACTICE
A. Welding:
   1. Arc welding of Butt joints, Tap joints and Tee joints.
   2. Gas welding practice
B. Basic machining:
   1. Simple Turning and Taper turning
   2. Drilling practice
C. Sheet metal work:
   1. Rectangular tray making
   2. Funnel making

GROUP B (ELECTRICAL & ELECTRONICS)

III  ELECTRICAL ENGINEERING PRACTICE 30 HOURS
1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
3. Stair case wiring
5. Measurement of energy using single phase energy meter.
IV ELECTRONICS ENGINEERING PRACTICE

1. Electronic components and equipments – Resistor, colour coding measurement of AC signal parameter (peak-peak, RMS period, frequency) using CR.
2. Logic gates AND, OR, EX-OR and NOT.
4. Soldering practice – Components Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

OUTCOMES:
On successful completion of this course, the student will be able to
- Fabricate carpentry components and pipe connections including plumbing works.
- Use welding equipments to join the structures.
- Carry out the basic machining operations
- Make the models using sheet metal works
- Carry out basic home electrical works and Understand works of Home Appliances
- Measure the electrical quantities
- Elaborate on the Electronic components, Logic gates and soldering practice.

Total: 60 Hours

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OBJECTIVES:
1. To input fundamental concepts on electric circuits
2. To apply network theorems in DC and AC circuits.
3. To impart knowledge on sinusoidal steady state analysis of RLC circuits.
4. To introduce the phenomenon of resonance in coupled circuits.
5. To educate on obtaining the transient response of circuits.

UNIT I  FUNDAMENTAL CONCEPTS
Circuit elements, Series and parallel combination of Circuit elements - Energy Sources - Source Transformation- Star-Delta connection - Kirchhoff’s laws - Current division - Voltage division - Nodal and mesh analysis in DC and AC electric circuits.

UNIT II  APPLICATION OF NETWORK THEOREMS IN DC & AC CIRCUITS

UNIT III  SINUSOIDAL STEADY STATE ANALYSIS OF RLC CIRCUITS
Sinusoidal steady state analysis of RLC circuits with phasor diagram: Series and parallel AC circuits- Series and Parallel Combinations of RL, RC and RLC Circuits.

UNIT IV  RESONANCE AND COUPLED CIRCUITS

UNIT V  TRANSIENT RESPONSE ANALYSIS
L and C elements - Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. sinusoidal input.

Total : 45 HOURS

OUTCOMES:
Students will be able to
- understand and apply fundamental concepts on electric circuits analyze electrical circuits
- apply network theorems in DC and AC circuits.
- gain knowledge on sinusoidal steady state analysis of RLC circuits and apply.
- understand the phenomenon of resonance in coupled circuits.
- get the transient response of circuits DC input and A.C. sinusoidal input.

TEXT BOOKS:

REFERENCES:
List of experiments:

1. Verification of Ohm’s law and Kirchhoff’s laws.
2. Verification of Mesh and Nodal Analysis.
3. Verification of Superposition theorem.
4. Verification of Thevenin’s theorem.
5. Verification of Norton’s Theorem.
6. Verification of Maximum power transfer Theorem.
7. Verification of Reciprocity theorem.
10. Transient Response of RC circuits.

All the above experiments should be carried out both experimentally and using MATLAB.

Total hours: 60

Outcome:
Students will be able to:
- apply circuit theorems in electric circuits.
- simulate electric circuits using MATLAB.

Unit III Materials For Floors And Roofs 9 Hours

Unit IV Timber And Other Materials 9 Hours

Unit V Modern Materials 9 Hours

OUTCOMES:
After successful completion of this course, the students should be able to
- Identify and suggest the suitable building material for construction of buildings
- Understand the tests on cement and aggregates
- Understand the properties of ingredients of concrete
- Understand the types of materials for floors and roofs
- Understand the appropriate usage of modern materials

TEXT BOOKS:

REFERENCES:
5. IS1542-1992: Indian standard specification for sand for plaster, 2009
LIST OF EXPERIMENTS
1. Principles of planning, orientation and complete joinery details (Paneled and Glazed Doors and Windows)
2. Buildings with load bearing walls
3. Buildings with sloping roof
4. R.C.C. framed structures.
5. Industrial buildings – North light roof structures

TOTAL: 45 HOURS

OUTCOMES:
- The students will be able to draft the plan, elevation and sectional views of buildings, industrial structures, and framed buildings using computer software.

TEXTBOOKS:

REFERENCES:

191CSC201T PROGRAMMING IN C

OBJECTIVES:
- Learn to think logically and write pseudo code or draw flow charts for problems.
- Be exposed to the syntax of C.
- To develop C Programs using basic programming constructs.
- Learn to use arrays and strings in C.
- To develop applications in C using functions, pointers and structures
- To do input/output and file handling in C

UNIT I - C PROGRAMMING BASICS

UNIT II - ARRAYS AND STRINGS

UNIT III - FUNCTIONS AND POINTERS

UNIT IV- STRUCTURES AND UNIONS
Structures: Introduction - Need for structure data type –definition and declaration – Structure within structure – Structures and functions and Union: Definition and Declaration – Accessing the members of union - Programs using Structures and Unions – Scope of variables - Storage classes - Preprocessor directives.

UNIT V- FILE HANDLING
Introduction – Using files in C - File operation: Read data from files, writing data to files, detecting the end of file, Functions for selecting a record randomly – File pointer – Error handling - Types of file processing: Sequential access, Random access- Dynamic memory allocation.

TOTAL: 45 HOURS

OUTCOMES:
Upon completion of the course, the students will be able to

- Develop simple applications in C using basic constructs
- Design and implement applications using arrays and strings
- Develop and implement applications in C using functions and pointers.
- Develop applications in C using structures.
- Design applications using sequential and random access file processing.

TEXT BOOKS:

REFERENCES:
3. Paul Deitel and Harvey Deitel, —C How to Program, Seventh edition, Pearson Publication

OBJECTIVES:
- To develop programs in C using basic constructs.
- To develop applications in C using strings, pointers, functions, structures.
- To develop applications in C using file processing.

LIST OF EXPERIMENTS:
1. Programs using only I/O functions.
2. Programs to study operators and data types.
3. Programs based on control structures (IF, SWITCH CASE).
4. Programs using FOR and WHILE loops.
5. Programs using single dimensional arrays.
6. Programs using multi dimensional arrays.
7. Programs on Sorting and Searching using arrays.
8. Programs based on String manipulations.
9. Programs based on User Defined Functions.
10. Programs using Functions with Parameters.
11. Programs using Storage Classes.
12. Programs to introduce Pointers.
13. Programs using Structures and Union.
15. Programs based on Files.

MINI PROJECT:
1. Create a — Railway reservation system / Airline reservation system with the following modules
   - Booking
   - Availability checking
   - Cancellation
   - Prepare chart

OUTCOMES:
Upon completion of the course, the students will be able to:
- Develop C programs for simple applications making use of basic constructs, arrays and strings.
- Develop C programs involving functions, recursion, pointers, and structures.
- Design applications using sequential and random access file processing.

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191ECC201T  ELECTRIC CIRCUITS AND ELECTRONIC DEVICES
            L  T  P  R  C
            3  2  0  0  4

UNIT I : BASIC CIRCUIT ANALYSIS        12 HOURS
Kirchhoff’s laws– Mesh current and node voltage analysis for D.C and A.C. circuits - Network Theorems and applications:
   Thevenin’s theorem, Norton’s theorem, Superposition theorem, Reciprocity Theorem and Maximum power transfer
   theorem – Source transformation - Star-delta conversion.

UNIT II : TRANSIENT ANALYSIS AND RESONANCE   12 HOURS
Transient response of RC, RL and RLC circuits to excitation by Step Signal, Impulse Signal, Sinusoidal signal and
   exponential sources
Parallel and series resonances – Bandwidth - Q factor - Selectivity – Mutual inductance – Coefficient of Coupling - Single
   tuned and Double tuned coupled circuits.

UNIT III : SEMICONDUCTOR DIODES           12 HOURS
PN junction diode, Current equations, Energy Band diagram, Diffusion and drift current densities, Transition and Diffusion
   Capacitances, Switching Characteristics - Zener diode and its characteristics – Avalanche and Zener Breakdown
   mechanisms.

UNIT IV : TRANSISTORS                      12 HOURS
Principle and operation of PNP and NPN transistors – Early effect-Current equations – Input and Output characteristics of
   CE, CB, CC configurations – Hybrid-π model - h-parameter model, Ebers Moll Model – JFETs – Drain and Transfer
   characteristics - Current equations- MOSFET – Enhancement and depletion types - Characteristics – Comparison of BJT
   with JFET – Comparison of JFET with MOSFET.
UNIT V : SPECIAL SEMICONDUCTOR DEVICES

Metal-Semiconductor Junction MESFET- FINFET, PINFET, CNTFET, DUAL GATE MOSFET, Tunnel diodes – Schottky barrier diode- Varactor diode – UJT, SCR, Diac and Triac – Gallium Arsenide device- LED, Laser diode, Photodiode, Photo transistor, Opto Coupler, Solar cell, CCD.

TOTAL 60 HOURS

OUTCOMES:

At the end of the course, the student should be able to:

- analyze the A.C and D.C. electric circuits and apply the circuit theorems
- understand the concepts of transient analysis of RL, EC and RLC circuits
- explain the concepts of resonance and tuned coupled circuits
- explain the characteristics of diode, BJT and MOSFET
- describe the operation of metal-semiconductor junction devices, power control devices and opto-electronic devices.

TEXT BOOKS:


REFERENCES:


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191ECC211L CIRCUITS AND DEVICES LABORATORY L T P R C 0 0 3 1 2

OBJECTIVES:

- To gain hands on experience in KVL, KCL, Thevenin, Norton, Super Position, Maximum Power Transfer and Reciprocity Theorems
- To understand the concept of Resonance circuits
- To learn the characteristics of basic electronic devices such as Diode, BJT, JFET, SCR, DIAC, TRIAC, UJT, and Photo Devices
- To gain hands on experience in Electron Devices using simulation software

LIST OF EXPERIMENTS :

1. Verifications of KVL and KCL
2. Verifications of Thevenin and Norton Theorem
3. Verifications of Super Position Theorem
4. Verifications of Maximum Power Transfer Theorem
5. Verifications of Reciprocity theorem
6. Determination of Resonance Frequency of Series and Parallel RLC Circuits
7. V-I Characteristics of PN Junction Diode and Zener Diode
8. Common Emitter input-output Characteristics
9. Common Base input-output Characteristics
10. Drain and Transfer characteristics of JFET
11. V-I characteristics of Thyristors (SCR/DIAC/TRIAC)
12. V-I characteristics of UJT
13. V-I characteristics of Photo Diode and Photo Transistor
14. Simulation of V-I characteristics of Electron Devices using PSPICE/Multisim

TOTAL: 60 HOURS

OUTCOMES:
At the end of the course, the student should be able to:
- Verify KVL, KCL, Thevinin, Norton, Super Position, Maximum Power Transfer and Reciprocity Theorems
- Design Resonance circuits
- Analyze the characteristics of basic electronic devices
- Synthesis the characteristics of Electron Devices using simulation software
- Identify and apply electron devices for specific applications

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191EEC201T  CIRCUIT THEORY  L T P R C
3 1 0 0 4

OBJECTIVES:
- To introduce electric circuits and its analysis
- To impart knowledge on solving circuits using network theorems
- To introduce the phenomenon of resonance in coupled circuits.
- To educate on obtaining the transient response of circuits.
- To Phasor diagrams and analysis of three phase circuits

UNIT I  FUNDAMENTALS IN ELECTRICITY AND BASIC CIRCUITS ANALYSIS

UNIT II  NETWORK TOPOLOGY, REDUCTION AND THEOREMS FOR DC AND AC CIRCUITS
Network reduction: voltage and current division, source transformation – star delta conversion. Thevenin’s and Norton’s Theorem – Superposition Theorem – Maximum power transfer theorem –Reciprocity Theorem. – Characterization of two port networks in terms of Z, Y and h parameters.

UNIT III RESONANCE AND COUPLED CIRCUITS

UNIT IV TRANSIENT RESPONSE ANALYSIS
L and C elements- Phasor representation of Purely Resistive(R), Purely Inductive(L), Purely Capactive (C) - RL, RC, RLC circuits -Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. withSinusoidal input.
UNIT V THREE PHASE CIRCUITS
Three phase balanced / unbalanced voltage sources – analysis of three phase 3-wire and 4-wire Circuits with star and delta connected loads, balanced & Unbalanced – Phasor diagram of voltage and current - Power and power factor measurements in three phase circuits- Harmonics and filters.

TOTAL : 60 HOURS

OUTCOMES:
- Ability to analyse electrical circuits
- Ability to apply circuit theorems
- Ability to analyse AC and DC Circuits

TEXT BOOKS:

REFERENCES:

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OBJECTIVES:

- To appreciate and acquire knowledge about nature, environmental education and biodiversity.
- To understand the interrelationship between living organism and environment, environment functions and its value.
- To assess the environmental pollution and its impact on the human world.
- To find and implement scientific, economic and political solutions to environmental problems.
- To gain knowledge about waste management and resource recovery for protecting the environment.

UNIT I - ENVIRONMENT AND BIODIVERSITY

Definition and scope of an environment – structure of an ecosystem – biotic and abiotic components – ecological succession – food chain, food web – Introduction to biodiversity definition, types – biogeographical classification of India, India as a mega-diversity nation – values of biodiversity– endangered and endemic species of India hot-spots of biodiversity – threats to biodiversity – conservation of biodiversity

UNIT II – NATURAL RESOURCES AND ITS CONSERVATION

Forest resources - Uses and over exploitation, Deforestation, causes and its effects - Water Resources – Uses and over utilization - Water conservation- Dams, benefits and their effects, Rain Water Harvesting, Watershed Management – Mineral resources - Uses and exploitation, Food resources- World food problems - Effects of modern agriculture – Energy resources - Ocean energy, Geothermal energy, Biomass energy

UNIT III - ENVIRONMENTAL DEGRADATION

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Noise pollution (e) Thermal pollution – role of an individual in prevention of pollution – pollution case studies – disaster management: cyclone, flood, drought, earthquake and landslides - case studies

UNIT IV –SOCIAL ISSUES

Population and Sustainability: Population explosion - Sustainable development – Equitable use of resources for sustainable lifestyles-urban problems related to energy - Role of information technology in environment and human health.


UNIT V – WASTE MANAGEMENT AND RESOURCE RECOVERY


OUTCOMES:

- Environmental education initiates an awareness, deeper understanding and sensitivity to the environment and environmental challenges.
- Acquired knowledge about the principles of nature, environment and their protection
- Created an involvement to the public to implement environmental laws effectively.
- Environmental education allows an individual to explore and think about the modern lifestyle has lead to serious environmental disasters and should develop the skills to make responsible decisions.
- Acquired skills to behave ecofriendly.
TEXT BOOKS:

REFERENCE BOOKS: