## Scheme and Course Content for I and II Semester
(COMMON TO ALL BRANCHES)

### Scheme of Teaching and Examination

### I Semester B.E.

<table>
<thead>
<tr>
<th>Sl. No.</th>
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Total

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### Physics Group

Syllabus of I & II Semester B.E. B.Tech
## Scheme and Course Content for I and II Semester
(Common to all branches)

### Scheme of Teaching and Examination

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# Scheme and Course Content for I and II Semester

## (Common to All Branches)

## Scheme of Teaching and Examination

### II Semester B.E.

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**Total**: 36 hours 500 credits 500 credits 24 credits

*These subjects are offered only for CSE students*
## SCHEME AND COURSE CONTENT FOR I AND II SEMESTER
(COMMON TO ALL BRANCHES)

### SCHEME OF TEACHING AND EXAMINATION

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ENGINEERING MATHEMATICS-I

Subject code : 14MA101  
Credits : 04  
Hrs/Week : 04  
Total Hours : 52

Prerequisites
Differential calculus, integral calculus and two dimensional geometry.

Course learning Objectives:
1. To build a strong foundation in the mathematical tools of differential and integral calculus which are useful in the solution of engineering problems.
2. To make the student to solve engineering problems by building mathematical models.
3. To introduce the student to the concept of infinite series and nature of convergence and divergence.
4. Introducing basics of Linear algebra which is useful to understand their technical subjects.

UNIT - I
Linear algebra: Rank of a matrix, elementary row transformation of a matrix, Gauss elimination method, Gauss seidel method, Linear transformation and diagonalization of a square matrix, quadratic forms, reduction to canonical form by orthogonal transformation, Eigen values, Eigen vectors of square matrices, Rayleigh’s power method to find the largest eigen value and the corresponding eigen vector.  
10 Hrs

UNIT - II
Infinite Series:
Convergence and divergence of infinite series, Comparison test, Ratio test, Cauchy’s root test, Cauchy’s integral test, nth derivatives of some standard functions, Leibnitz’s theorem (statement only), illustrative examples. Taylor’s theorem for a function of single variable (Without proof), Expansion of functions into Taylor and Maclaurin’s series.  
10 Hrs

UNIT - III
Partial Differentiation:
Euler’s theorem. Total differentiation. Differentiation of composite and implicit functions, Jacobians, Errors and approximations. Taylor’s theorem for a function of two variables, Maxima and Minima for a function of two variables- Lagrange’s method of undetermined multipliers(with one subsidiary condition).  
10 Hrs
UNIT – IV

Differential calculus:
Polar curves, Angle between the radius vector and the tangent. Derivatives of arcs- radius of curvature -Cartesian, parametric, polar forms. Rolle’s Theorem (Without proof) Lagrange’s and Cauchy’s Mean Value Theorems. 10 Hrs

UNIT – V

Integral Calculus:
Reduction formulae for the integrals of functions \( \sin^n x \cdot \cos^n x \), \( \sin^m x \cos^n x \). Evaluation of these integrals with standard limits-problems. Tracing of standard curves in Cartesian form, parametric form and polar form. Applications to find area and length of given curves, volumes and surface areas of solids of revolution. 12 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
ENGINEERING PHYSICS
I/II Semester B.E

Subject Code : 14PH102  Credits : 04
Hrs/week : 04  Total Hours : 52

UNIT - I

Dielectric Properties of Material Electrical polarization: Dielectrics, dipoles, electric polarization in polar and nonpolar molecules, Mechanisms of electrical polarization, dielectric flux (D=\sum_0 \sum_f E and \sum_r =Co/Cmat – no derivation), Electric susceptibility (relation between P, \sum and E - no derivation), Internal fields in liquids and solids (theory based on one dimensional atomic array), Dielectric constant for isotropic solids (Clausius-Mossotti Relation), temperature dependence of Dielectric constant.

Dielectrics in a.c field : Frequency dependence of dielectric constant, Dielectric loss (derivation), dielectric breakdown, Types of dielectric materials, Piezo and ferroelectric materials and applications. 10 Hrs

UNIT - II

Physics of Conductors, semiconductors and superconductors
Conductors: Electrical conductivity in metals (Lorentz and Drude theory), drift velocity, mean free path, relaxation time, mobility, expression and explanation of electrical conductivity (derivation), effect of temperature and impurity on electrical resistivity of metals
Semiconductors: Band theory of solids, classification of solids, Fermi level in a semiconductor and its behavior with temperature, Fermi energy, fermi factor, Fermi-Dirac distribution (qualitative explanation), Expression for conductivity in terms of mobility, Hall effect-theory with derivation for carrier concentration and Hall coefficient.
Superconductor: Introduction to superconductors (temp dependence) and their properties (Meissner effect, critical field and magnetic flux), BCS theory, Type I and type II superconductors. Applications (qualitative). 12 Hrs

UNIT - III

Applied Optics
**Optical Fibers:** Propagation mechanism in optical fibers, Acceptance angle, condition for propagation, numerical aperture, type of optical fibers and modes of propagation, attenuation, Optical sensors.  

10 Hrs

**UNIT - IV**

**Crystal structure, X-rays and Ultrasonics**
Space lattice, unit cell, primitive cell and parameters, seven crystal systems. bravais crystal system. Directions and planes in a crystal, Miller indices, Expression for interplanar spacing, Coordination number and atomic packing factor. Crystal structures of CsCl, ZnS and Diamond.

X rays: Properties, origin of X rays (continuous and characteristics), Bragg’s law, crystal structure determination, radiography method of testing materials.

Ultrasonics: Methods of Production (Mentioning), properties, Measurement of ultrasonic velocity and elastic constants of the medium, Nondestructive testing by pulse echo method.  

10 Hrs

**UNIT - V**

**Quantum Physics and Nano Science**

**Quantum Physics:** Introduction, wave – particle dualism, the wave equation, Time independent Schrodinger’s wave equation (derivation in complex notation) in one dimension. Linearity and super position expectation values and operators, Applications of Schrodinger’s equation: Particle in one – dimensional potential well of infinite height, Energy values.

**Nano Science:** Brief introduction to nano science, self assembly, self organization, Scaling laws in miniaturization (with examples in mechanical, electrical and electrostatic system),

**Fabrication processes:** Top-down approach: Milling and Lithography. Bottom-up approach: Physical vapor phase deposition and sputtering. Carbon nanotubes and wires. 10 Hrs

**TEXT BOOKS:**

5. Modern Physics, “B.L. Theraja” for X rays

**REFERENCE BOOKS:**
2. B.B. Laud, ”Laser and Non-Linear optics” Wiley Eastern Ltd.
6. Mark Ratner and Daniel Ratner “Nano technology-A gentle introduction”

**Scheme:**
1) SEE to be conducted out of 100 marks and will be reduced to 50 marks
2) Two Questions (Preferably with a problem in the sub-division) are to be set from each Unit, carrying 20 marks each.
3) Students have to answer any one full question from each Unit.

****
ELEMENTS OF CIVIL ENGINEERING &
ENGINEERING MECHANICS

Subject Code: 14CV103        Credits : 04
Hrs/ Week  : 04      Total Hours : 52

Objectives:
1. To make the students aware of scope & importance of Civil Engineering.
2. To improve the logical thinking and analytical skills.
3. To build a strong foundation in engineering mechanics to serve as a basis for mechanics of solids & design of structural elements.

Expected outcome:
At the end of the course students shall be able to
1. Solve problems in mechanics using the basic principles.
2. Apply the methods learnt in mechanics in solving practical engineering problems.

UNIT - I
Scope and importance of different fields of Civil Engineering.
Introduction to Engineering Mechanics: Basic idealizations - Definition of force, Characteristics of a force, Force systems and classification; Axioms of Mechanics. Concept of free body diagram. Resolution of forces, Composition of forces - Definition of Resultant; Resultant of coplanar concurrent force system.  

UNIT - II
Moment of a force, couple, characteristics of couple, Equivalent force - couple system; Varignon’s theorem, Resultant of coplanar - non-concurrent force system. Equilibrium of forces - Definition of Equilibrant; Conditions of static equilibrium for different force systems. Equilibrium of coplanar concurrent force system. 

UNIT - III

UNIT - IV
Centroid of plane figures; Locating the centroid of rectangular, triangular, semicircular, quarter of a circular area and sector of a circular areas
using method of integration, Centroid of simple built up sections. Moment of inertia of an area, polar moment of inertia, Radius of gyration, Perpendicular axis theorem and Parallel axis theorem; Moment of Inertia of rectangular, triangular, semicircular and quarter of a circular area from the method of integration; Moment of inertia of composite areas.

10 Hrs

UNIT - V
Kinetics of rigid bodies, Dynamic equilibrium, D’Alembert’s principle, Work-energy and Impulse momentum principle, Impact of elastic bodies (direct central impact).

12 Hrs

TEXT BOOKS:

REFERENCE BOOKS:
ELEMENTS OF MECHANICAL ENGINEERING

Subject Code : 14ME104  No.of Credits : 04
Hrs/Week : 04  Total Hours : 52

UNIT - I

Mechatronics
Introduction - definition of Mechatronics, Systems of Mechatronics,-Measurement systems and control systems - Open loop and closed loop control system (with simple block diagrams), their advantages and disadvantages, Introduction to Microprocessor based controllers.

Sources of Energy
Conventional and non-conventional sources of energy (Brief description of each)

Boilers
Steam formation, Steam properties - Specific volume, enthalpy and Internal energy of steam, States of steam (Simple numerical problems)
Steam boilers: Definition and function of boilers, Classification of boilers, details of Cochran boiler, Babcock & Wilcox boiler,
Functions of following boiler mountings:
1. Pressure gauge,
2. Safety valves,
3. Feed check valve

Functions of following boiler accessories:
1. Economizer
2. Air preheater
3. Super heater

UNIT - II

Prime Movers
Hydraulic turbines (open cycle and closed cycle) - Classification of turbines, Principle of operation of Pelton wheel, Francis Turbine and Kaplan turbine (No numerical problems).
Internal Combustion Engines: Classification, I. C. engine parts, working principle of two stroke and four stroke petrol and diesel engines, Simple numerical problems involving calculation of indicated power, Brake power, indicated thermal efficiency, Brake thermal efficiency and mechanical efficiency.  

10 Hrs

UNIT - III
Refrigeration and Air conditioning
Pumps and compressors: Classification of pumps and compressors, working principle of centrifugal liquid pump and reciprocating air compressors.

6 Hrs

Lubrication and Bearings
Purpose of lubrication - Function of a lubricant, Types of lubricants, Properties of a good lubricant - Methods of lubrication and its application, Journal bearings, Ball and Roller bearings and their applications.  

3 Hrs

UNIT - IV
Machine Tools
Lathe: Principle of working of a Center lathe, major parts of lathe. Lathe operations: Cylindrical turning, facing, Taper turning by swiveling of compound rest.
Milling Machine: Introduction, Methods of milling operation - Brief description of horizontal type and vertical type milling machines, Types of milling operations.

12 Hrs
UNIT - V

Power Transmission
Belt drives - applications, open and cross belt drives, velocity ratio, ratio of tensions, simple problems involving calculation of speed ratio, belt tensions and power transmitted.
Gear drives - Velocity ratio, gear ratio, pitch and module of spur, helical, bevel and worm gears. Simple and compound spur gear trains. Simple problems on gear drive (Spur gears only). 6 Hrs

Joining Processes: Welding, Brazing and Soldering 3 Hrs

TEXT BOOKS:

REFERENCE BOOKS:

Scheme of Examination
1. Question paper consists of 5 units with two questions in each unit.
2. Students are expected to answer FIVE full questions choosing ONE question from each unit.
3. Each question carries 20 marks.
BASIC ELECTRICAL ENGINEERING

Subject code : 14EE105  Credits :  04
Hrs/Week : 04  Total Hours : 52

I/II semester B.E. Common to all branches

Objective of the course: To familiarize the student with the basic concepts in Electrical Engineering. Student will learn solving simple DC circuits with more than one source, single phase AC series, parallel circuits. They will also know at the end of the course the basic principle of operation of electrical machines like Transformers, Induction motors, DC machines and Synchronous machines. In addition, they will also understand the basic concepts of electrical measurements, wiring, appliances and electrical earthing.

Prerequisite: Knowledge of Electrostatics, Definitions of electric potential, current, resistance, power and Energy. Series, parallel resistance network reduction, magnetism and simple magnetic circuits.

Expectations: At the end of the course, the student is capable to solve simple problems in DC and AC circuits and is aware of the working principle of different electrical machines.

UNIT - I

DC Circuits:
Introduction to DC circuit-Review of basic circuit elements and variables, Ohm’s law and simple reduction of series, parallel and star- delta connection of resistors, formulation of network equations using KCL & KVL (with a maximum of 3 mesh, 3 node equations) for circuits with two sources

6 Hrs

Electromagnetism:
Faraday’s law, Lenz’s law, Fleming’s rules, statically-induced and dynamically induced EMF, concept of self and mutual inductance, energy stored in magnetic field, lifting power of magnet.

5 Hrs

UNIT - II

Single-phase AC Circuits
Generation of sinusoidal AC voltage, concept of average and RMS values, form factor, peak factor, voltage, current, power and power factor and energy analysis using phasor diagrams and j operator for
circuits with R, L, C, RL, RC, RLC in series, parallel configurations, simple problems (excluding series-parallel combination)  10 Hrs

UNIT - III
Three-phase AC Circuits
Necessity and advantages of three-phase systems, star-delta connections, relationship between line and phase voltages, expression for three-phase power, measurement of three-phase power using two wattmeters.  4 Hrs

Transformers:
Principle of operation of single phase transformer, EMF equation, power losses, definition of efficiency and voltage regulation (exclude OC/SC tests, equivalent circuits and phasor diagrams), simple problems on EMF equation, Principle of operation of autotransformer.  4 Hrs

Measuring Instruments
Principle of operation of Ammeters, voltmeters, dynamometer type wattmeter, Construction and principle of operation of single-phase energy meter  3 Hrs

UNIT - IV
DC Machines
Working principle of DC machines-generator and motor, EMF equation of generator and simple problems, back EMF and torque equations of DC motors, simple problems, types of DC motors, characteristics and applications, necessity of starter  7 Hrs

Synchronous Generators
Principle of operation of alternator, brief discussion on the features of excitation, EMF Equation(derivation of pitch and distribution factors excluded), voltage regulation.  3 Hrs

UNIT - V
Induction motors
Concept of rotating magnetic field, Principle of operation of 3-phase induction motor, Slip and frequency of rotor currents (problems on slip and rotor frequency only), Characteristics (no derivation), application of induction motors, Need for a starter. Principle of Operation of single-phase induction motor, method of starting,  6 Hrs

Domestic Appliances
Wiring diagram of connecting domestic appliances to mains,
specification of wires, Principle of working of fluorescent lamp, Applications and features of Sodium vapor lamp, CFL. Two-way and three-way control of lamps, necessity and types of earthing, specification of switches, fuses, selection of range, concept of overloading and protection of appliances, MCB (limit switch). UPS- Block schematic approach.

**TEXT BOOKS:**

**REFERENCE BOOKS:**
1. V. K. Mehta, Principles of Electrical Engineering and electronics, 2000

**ENGINEERING SKILL DEVELOPMENT LAB**

<table>
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<tr>
<th>Subject Code</th>
<th>14ME106</th>
<th>Credit : 01</th>
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<tbody>
<tr>
<td>Hours per week</td>
<td>03</td>
<td>Total Hours: 26</td>
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**PART- A**

1. **Fitting Shop:**

Study and use of engineering steel rule, height gauge, caliper, micrometer, files, chisels, hacksaw, hammers, drill bit, taps etc. Models: Preparation of fitting models by making use of filing, sawing, chipping, drilling and tapping.

2. **Sheet metal and soldering:**

Study the use of sheet metal work and soldering tools. Study the development of surfaces of simple solids like prism, cylinder and cone. Models: Preparation of sheet metal model of prism (square and rectangle), cylinder and frustum of cone.
PART- B

3. **Carpentry Shop:**
   Study and use of wood working tools, joints etc.
   Models: Preparation of any one carpentry joints like mortise or tennon joint.

4. **Automobile Shop:**
   Study the use and function of various automobile parts.

5. **Machine Shop:**
   Study the operation of Lathe, milling, grinding and CNC machine.

6. **Electrical wiring lab:**
   Identification and study the use of different types of wiring tools, switches, fuse, sockets and plugs etc.
   Demonstration of simple electrical device like fan, washing machine, pump starter etc.
   Experiments: Preparation of simple wiring circuit.

**References:**

**Scheme of examination for Workshop Practice.**

**PART- A**

1. Fitting model 30 Marks
2. Sheet metal model 10 Marks

**PART- B**

3. Viva- voce 10 Marks

**TOTAL 50 Marks**
CONSTITUTION OF INDIA AND PROFESSIONAL ETHICS (CIPE)

Sub Code : 14HU107          Credits : 01
Hours/Week : 02             Total Hours : 24

Purpose: ‘Constitution of India and Professional Ethics’ is the paper introduced by the University as per the recommendations of the Ministry of Human Resource Development (MHRD). It is evident from the contents of the first half of the paper – Constitution of India - that the educationist found the necessity and the urgency of imparting basic knowledge about the constitution to the students by making it as a part of the curriculum and to develop a social, political, economic, cultural awareness and to educate the students about their obligations, responsibilities, privileges and rights, duties and also the role that they have to play in deciding the administrative machinery of the country. It also considers inculcating the national and patriotic spirit among the students as responsible citizens of the country.

The second half – the Professional Ethics – aims at educating and imparting the ethical values of business and also the responsibility and obligations of the professionals to the society and the nation. It educates the young engineering students about the scope and aims of engineering ethics, their responsibilities, virtues and traits of right behaviour such as honesty, integrity and reliability, the risk and liability in engineering profession.

I set myself to follow the lesson plan as given below and interact with my students on the topics pertaining to the area to the best of my capabilities and satisfaction.

UNIT - I

CHAPTER 1:
Introduction, Historical Background (evolution – in brief),
Preamble to the Constitution of India: Importance and parts of the preamble - Citizenship – A brief account on constitution provisions and procedures of citizenship.

CHAPTER 2: Importance, Scope and extent of – limitations (restrictions) of different kinds of Fundamental Rights in brief as given under Part III 8 Hrs

UNIT - II

CHAPTER 4: Significance of Fundamental Duties under Part – IVA; Article – 51A.

CHAPTER 5: President of India, qualifications, manner of election, impeachment, powers and functions.
Vice-President: Powers & functions.

CHAPTER 6: Prime Minister – manner of selection/appointment, role of Prime Minister under the constitution - Council of ministers and their role - Parliament – composition, powers and functions.

CHAPTER 7: The Supreme Court of India – powers and functions, appointment of Judges, Qualifications and Impeachment. 6 Hrs

UNIT - III

CHAPTER 8: Governor – manner of appointment – powers and functions.

CHAPTER 9: Chief Minister – role of Chief Minister – Council of Ministers – State Legislature – composition, powers and functions

CHAPTER 10: High Courts – qualifications of Judges, powers, functions and Impeachment.


CHAPTER 12: Emergency: Grounds for proclaiming emergency, kinds & effect of emergency

CHAPTER 13: Major constitutional amendments – importance of amendments (Amendments – 24, 42, 44,77 & 86) 6 Hrs

UNIT - IV

CHAPTER 14: Scope and Aims of Engineering Ethics

CHAPTER 15: Responsibility of Engineers – Impediments to Responsibilities

CHAPTER 16: Honesty, Integrity and Reliability

CHAPTER 17: Risk, Safety and Liability in Engineering 4 Hrs

TEXT BOOKS:
1. Introduction to the Constitution of India – by Durga Das Basu
2. Engineering Ethics – by Charles E. Harris, Michael S. Pritchard and Michael J. Robins
3. Ethics in Engineering – by Mike W. Martin and Ronald Schinzinger
4. Introduction to Engineering Ethics – by Roland Schinzinger and Mike W. Martin.
REFERENCE BOOKS:
1. Constitution of India – by P.M. Bakshi
2. Constitution of India – by B. N. Shukla
3. Introduction to Constitution of India – by M.V. Pylee
4. Introduction to Constitution of India – by Brij Kishore Sharma

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ENGINEERING PHYSICS LABORATORY
I/II Semester B.E

Subject Code : 14PH109       Credits : 02
Hrs/week    : 03       Total Hours : 36

1. Planck’s constant determination using photoelectric effect
2. I-V characteristics of LED
3. Grating Spectrometer-to find the wavelength of diode laser/LED
4. I-V characteristics of a Zener diode
5. Series and parallel resonance in an LCR circuit
6. Ultrasonic Interferometer
7. Hall effect
8. Energy gap of a semiconductor using diode
9. Numerical aperture / Power loss in an optical fibre
10. Photo transistor / transistor characteristics
11. Charging and discharging of a capacitor
12. Solar Cell I-V Characteristics

REFERENCE BOOKS:

Justification:
Most of the experiments included in the syllabus are having theoretical back up in Engg.Physics

Scheme:
Minimum ten experiments are to be performed and Candidate has to perform two experiments in S E Examination.
ENGINEERING CHEMISTRY

Subject Code : 14CY110  Crédits : 04
Hrs/ Week : 04  Total Hours : 52

Objectives:
- To make the students to realize the importance of Chemistry in day to day life and professional carrier.
- To expose the students to all branches of Chemistry (Inorganic, physical, organic and applied chemistry)
- To impart knowledge on chemistry and its applications in various engineering materials.

Expected outcome:
- The students are able to develop knowledge on principles of batteries, corrosion science, fuels, liquid crystals, nanochemistry, polymers, water treatment etc. and it will enable them to distinguish, differentiate, analyze and solve engineering problems.

UNIT - I

Electrochemical cells:

Battery Technology:
Batteries- Introduction, battery characteristics. Classification of batteries – primary, secondary and reserve batteries. Construction working and applications of Zn-MnO₂, Pb-acid, Nickel-Metal hydride, Lithium-MnO₂, Lithium ion batteries.
Fuel Cells - Introduction, types of fuel cells- Construction, working and uses of H₂–O₂ and Methanol-Oxygen fuel cells. 5 Hrs.
UNIT - II

Corrosion Science:

5 Hrs.

Metal Finishing:

5 Hrs.

UNIT - III

Chemical Fuels:

6 Hrs

Liquid Crystals:

3 Hrs

Nanochemistry:
Introduction, Nanoparticles, Classification (Zero dimensional, one dimensional, two dimensional and three dimensional). Synthesis of
nano materials by: microwave, combustion, chemical vapour deposition and Sol- gel methods. Preparation of ZnO nanoparticles by microwave method. 3 Hrs

UNIT - IV

Polymer science:
Synthesis, properties and applications of Teflon, PMMA, Polycarbonate and Phenol–formaldehyde resin.
Adhesives- Manufacture and applications of Epoxy resins.
Conducting polymers - definition, Mechanism of conduction in polyacetylene. Applications. 10 Hrs.

UNIT - V

Sewage and its treatment- Biological Oxygen Demand and Chemical Oxygen Demand. Numerical problems on BOD and COD. Sewage treatment. 10 Hrs

TEXT BOOKS:
REFERENCE BOOKS:
1. Chemistry for Engineering Students- by B.S. Jai Prakash; Subhash Stores, Bangalore.

COMPUTER CONCEPTS AND C PROGRAMMING

Sub Code : 14CS111  No. of Credits : 04
Hrs/Week : 04  Total Hours. : 52

UNIT - I
Introducing Computer Systems
The Computer defined, Types of Computers, the parts of a computer system, the information processing cycle, computer hardware, software

1 Hr

Interacting with Computer

2 Hrs

Processing Data
Transforming Data into Information: How computers represent data, How computers process data, factors affecting processing speed, Microprocessors, how does a program get executed.

2 Hrs

Storing Data
Types of storage devices: primary, secondary devices

1 Hr
Using Operating Systems
Operating system basics- The purpose of operating system, Types of operating system, Examples.  

UNIT - II

Algorithms and Flowcharts
Algorithms, Flowcharts, writing algorithms and drawing flowcharts for simple exercises. Programming paradigm: Sequential, procedural Object oriented programming, SDLC  

Constants, Variables, and Data Types
Characters set, C tokens, Keywords and identifiers, Constants, Variables, Data Types, and Declaration of Variables.  

Operators and Expressions
Arithmetic operators, Relational operators, Logical operators, Assignment operators, Increment and Decrement operators, conditional operator, Bitwise operators, Special Operators, Arithmetic expressions, Evaluation of expressions, Precedence of Arithmetic operators, Type conversions in expressions, Operator precedence and associativity.  

UNIT - III

Programming styles: Commenting, naming conventions and indentation  

Managing Input and Output Operations
Reading a character, Writing a Character, Formatted Input, Formatted Output  

Decision marking and Branching
Decision making with if statement, Simple if Statement, The if...else statement, Nesting of if...else statements, The else...if ladder, The switch statement, The ?: operator, The Goto statement.  

Decision making and Looping

UNIT - IV

User-defined Functions
Need for User Functions, A multi-function program, Element of User-defined Functions, Definition of Functions, Return Values and their
Types, Function Calls, Function Declaration, Category of Functions.  

**6 Hrs**

**Arrays**
One-dimensional Arrays, Declaration of one-dimensional Arrays, Initialization of one-dimensional Arrays, strings, Two-dimensional Arrays, Initializing two-dimensional Arrays, Passing arrays as parameters to functions.  

**6 Hrs**

**UNIT - V**

**Structures and Unions**
Defining a structure, Declaration and Accessing structured Variable. Copying and Comparing structured Variable, Arrays of Structures and Simple Programs on structures. Open MP overview, directives, environment variables, few examples.  

**6 Hrs**

**Pointers & File handling**
Introduction, Understanding Pointers, Accessing the address of Variables, Declaration pointer variable, pointers and arrays, Simple programs on pointer Usage, opening/closing files, reading/writing from/to sequential files.  

**6 Hrs**

**TEXT BOOKS:**

**REFERENCE BOOKS:**
1. Introduction to Computer Science, ITL Education Solutions Ltd., Pearson Education, 2004  
3. Programming Techniques through C, M.G.V. Murthy, Pearson Education
BASIC ELECTRONICS

Sub Code : 14EC112
No. of Credits : 04
Hrs/Week : 04
Total Hours : 52

UNIT - I

SEMICONDUCTOR DIODES AND APPLICATIONS: p-n junction diode, Characteristics and Parameters, Diode approximations, DC load line, Zener Diodes, Half-wave diode rectifier, Ripple factor, Full-wave diode rectifier, Other full-wave circuits, Shunt capacitor - Approximate analysis of capacitor filters, Zener diode voltage regulators, Numerical examples as applicable

10 Hrs

UNIT - II

TRANSISTORS: Bipolar Junction transistor, Transistor Voltages and currents, amplification, Common Base, Common Emitter Characteristics, DC Load line and Bias Point, Base Bias.

OTHER DEVICES: - Silicon Controlled Rectifier (S.C.R), SCR Control Circuits and S.C.R applications;

10 Hrs

UNIT - III

AMPLIFIERS & OSCILLATORS: Decibels and Half power points, Single Stage CE Amplifier. Series voltage negative feedback and Additional effects of Negative feed back (Qualitative discussions only), The Barkhausen Criterion for oscillations, BJT RC phase shift oscillator, Hartley and Colpitts oscillator ( Qualitative discussions only) Numerical problems as applicable.

10 Hrs

UNIT - IV

INTRODUCTION TO OPERATIONAL AMPLIFIERS: Ideal OPAMP, Saturable property of an OP AMP inverting and non inverting OPAMP circuits, need for OPAMP, Characteristics and applications – voltage follower, addition, subtraction, integration, differentiation; Cathode Ray Oscilloscope (CRO), applications, Numerical examples as applicable.

COMMUNICATION SYSTEMS: Block diagram, Modulation
(qualitative discussions only) Radio Systems, Superhetrodyne Receivers

UNIT - V

NUMBER SYSTEMS: Introduction, decimal system, Binary, Octal and Hexadecimal number systems, addition and subtraction, fractional number, Binary Coded Decimal numbers:

DIGITAL LOGIC:- Boolean algebra, Logic gates, Half-adder, Full-adder, Parallel Binary adder.

TEXTBOOKS:
1. (T1) Electronic Devices and Circuits: David. A. Bell; PHI, New Delhi, 2004

REFERENCE BOOKS:
1. (R1). Electronic Devices and Circuits: Jacob Millman, Christos C. Halkias TMH, 1991 Reprint 2001
3. (R3) Digital Logic and Computer Design, Morris Mano, PHI, EEE

Question Paper Pattern: Student should answer FIVE full questions out of 10 questions to be set each carrying 20 marks, selecting ONE question from each part.
ENIRONMENTAL STUDIES

Subject Code : 14CV 113  
No. of Credit:  01
Hrs/week : 02  
Total Hours : 25

Objectives of the course:

i. To raise consciousness about environmental conditions and to imibe environmentally appropriate behaviour.

ii. To equip the engineering undergraduates to identify the significance of environmental practice in their daily life and in the engineering practices.

iii. To make them conscious of understanding the environment where we live and act up on.

UNIT - I

Environment- Definition, Significance of environmental studies- current scenario, local, regional, national and global problems

Components of environment: atmosphere, hydrosphere, lithosphere and biosphere. Layers of atmosphere and its role. Parts of Earth- lithosphere and its role; hydrological cycle

Eco system- Definition, Ecology and environment, Ecosystem components: biotic and abiotic components; Ecological balance; elements of Ecosystem: biotic, abiotic; producers, consumers and decomposers.Habitat, range of life, Biome, balanced eco- system, food chain, food web and ecological pyramids

Human activities- The Anthropo System- human activities like growing food, building shelter and other activities for economy and social security. Soil erosion, water logging -definition. Organic farming- definition

6 Hrs

UNIT - II

Natural resources

Resources: Natural resources, water, minerals, Fossil fuels & energy

Water resources- Global water resources: distribution, Uses of water for irrigation, domestic and industrial purposes in India.

Quality aspects- Water Quality Parameters, Drinking water standards for turbidity, pH value, total hardness, iron, fluoride, lead, arsenic, nitrate

Mineral resources- Metallic minerals, Non-metallic minerals
Fossil fuels - coal and petroleum
Forest Wealth - Components of the forest. Key benefits of forests.
Deforestation-Environmental effects of deforestation and remedies
Sustainable Development- Definition, objectives Material cycles Carbon, Nitrogen & Sulphur cycles.

UNIT - III
Environmental pollution: Definition, Harmful effects related to public health
Water pollution: Definition, types and sources_ Agriculture-(pesticides and fertilizers), Industry, domestic and mining and Harmful effects, Water borne & Water induced diseases- definition, common diseases and their causatives.
Fluoride problem in drinking water
Land pollution: Definition, sources_ Agriculture, Housing, Industry, mining, transportation. Types of municipal Solid waste Disposal (Sanitary landfills, Composting, incineration in brief) and effects
Air Pollution Definition, Types and sources: Industry, mining, agriculture, transportation and effects
Noise pollution: Definition, sources, mining, industries, Rail-Roads, aviation, effects and control measures

UNIT - IV
EnergyDifferent types of energy- Non Renewable energy; Fossil fuels- Coal, Oil & Natural Gas- Brief description only. Nuclear energy- Nuclear power plants,
Renewable Energy: Solar energy- Photovoltaic systems for street & domestic lighting, Solar water heating-Brief description only
Wind energy- definition, merits and demerits, Hydro Power-definition, merits and demerits.
Biomass Energy- Definition, Sources of Bioenergy, Biogas, Biofuels, India’s position in renewable energy
Hydrogen as an alternative future source of energy- brief scope, fuel cells

5 Hrs
5 Hrs
4 Hrs
UNIT - V

Current environmental issues of importance
Population growth - Definition, growth rate, effects, remedies
Urbanization - Definition, environmental impacts and remedies
Global warming and climate change - concept of green house effect, sources of green house gases, effects and remedial measures of green house gases
Acid rain: Definition, Causes and Effects, Control measures.
Ozone Depletion : Definition, Causes, Effects and Control measures.
Environmental Impact Assessment- EIA definition, objectives and benefits of EIA

5 Hrs

Question paper is of objective type

TEXT BOOKS:

REFERENCE BOOKS:
ENGLISH AND COMMUNICATION SKILLS

Subject Code : 14HU114  
No. of Credits : 02  
Hrs/Week : 02  
Total Hours : 26

UNIT - I
Pronunciation, International Phonetic Alphabet (IPA): Consonants, Vowels, Diphthongs , Word-Stress & Rhythm, Weak & Strong forms, Falling& Rising tones, Awareness of different accents  
4 Hrs

Lab Class- Text book -  English Pronouncing Dictionary

UNIT - II
Professional Communication: What is communication process of communication, types of communication (verbal & non-verbal, intrapersonal, interpersonal- formal/ Informal mass and organizational communication) Greeting & Introducing, making requests, asking for & giving permission, offering help  
1 Hr

Lab Class- Text book –  
3 Hrs

UNIT - III
Language Skills
Prose-05 lessons & Poetry -05 poems; Comprehension , Reading & Writing Skills, Vocabulary, Prepositions, Conjunctions, Synonyms, Antonyms, Prefixes & Suffixes, One-word substitutes,  
6 Hrs

Lab Class-Text Book & English in Mind Modules  
1 Hrs

UNIT –IV
Telephone Skills/ Digital communication
Introduction, Types of calls, Handling Calls, Leaving message, Making requests, Making & Handling complaints, Telephone Etiquette.  
1 Hrs

Lab Class-Text Book  
3 Hrs

UNIT –V
Correspondence skills/Professional Skills
Resume, Types of letter formats, Cover-letters, Meeting, Short
Formal Speech
Personality - Term, Types, Significance, Body language
Leadership - Qualities of a successful leader, difference between leader & manager

3 Hrs

Lab Class – Text Book

1 Hrs

TEXT BOOK:
English and Communication Skills; Publishers: Oxford Publications

REFERENCE BOOKS:
3. Technical Communication – Principles + Practice – Shirley Taylor
4. Practical English usage – Michael Swan
5. Basic Business Communication – Lesikar Flatley
6. Murphy’s English Grammar – Raymond Murphy

COMPUTER AIDED ENGINEERING GRAPHICS

Subject Code : 14ME115  No. of Credits : 03
Hrs /week : 06  Total Hours : 36

UNIT - I
Orthographic Projection
Orthographic Projection: Planes of Projection, First angle projection, reference line. Conventions employed for drawing, Projection of points located in first, second, third and fourth quadrants, Projection of Lines (First angle projection only), True and apparent lengths, true and apparent inclinations.

6 Hrs

UNIT - II
Projection of Plane surfaces
Projection of plane surface: Triangle, Square, Rectangle, Pentagon and Hexagon in different positions.

6 Hrs
UNIT - II

Projection of Solids
Projection of right regular solids: Prisms, Pyramids, Cones and Cylinders in different positions.  12 Hrs

UNIT - IV

Development of Lateral surfaces of solids
Development of lateral surfaces of: Right regular Prisms, Pyramids, Cylinders and cones and their frustums.  6 Hrs

Isometric projection and Isometric view
Isometric scale, Difference between Isometric projection and isometric view: To draw Isometric views of simple solids and machine components using their orthographic projections.  6 Hrs

TEXT BOOKS:


REFERENCE BOOKS:


Scheme of Examination for Engineering Graphics:

1. Question paper consists of 4 units with two questions in each unit.
2. Students are expected to answer FIVE full questions choosing at least ONE question from each unit.
3. Each question carries 20 marks
COMPUTER CONCEPTS AND C PROGRAMMING LAB

Sub Code : 14CS116
No. of Credits : 02
Hrs/Week : 03
Total Hours : 26

Low Complexity Programs
1. Write a C program to find the roots of a quadratic equation
   \[ ax^2 + bx + c = 0 \]
2. Write a C program to find the factorial of a given number \( N \).
3. Write a C program to find the sum of all the digits and occurrence of a digit in the number.
4. Write a C program to find if a given number is prime or not.
5. Write a C program to find the GCD and LCM of given two numbers using Euclid’s method.
6. Write a C program to print the prime numbers in a given range.
7. Write a C program to print the Fibonacci series.
8. Write a C program to find if a given string is a palindrome or not.
9. Write a C program to input \( N \) real numbers in 1-D array. Compute mean, variance and Standard Deviation. Mean = \( \frac{\text{sum}}{N} \),
   Variance = \( \frac{\sum (X_i - \text{mean})^2}{N} \), STD Deviation = \( \sqrt{\text{variance}} \).
10. Write a C program to read \( N \) integers into an array \( A \) and find the sum of elements using pointers.
11. Write a C program to copy contents of one file to another file.

High Complexity Programs
1. Write a C program to perform a binary search for a given key integer in a single dimensional array of numbers in ascending order and report success or failure in the form of a suitable message.
2. Write a C program to input \( N \) integer numbers into a single dimension array, sort them in to ascending order using bubble sort technique, and then to print both the given array and the sorted array with suitable headings.
3. Write a C program to input \( N \) integer numbers into a single dimension array, sort them in to ascending order using selection sort technique, and then to print both the given array and the sorted array with suitable headings.
4. Write a C program to transpose a matrix of order M x N and find the trace of the resultant matrix.
5. Write a C program using functions to read two matrices A (M x N) and B (P x Q) and to compute the product of A and B if the matrices are compatible for multiplication using functions.
6. Write a C program using functions readmat( ), rowsum( ), colsum( ), totsum( ) and printmat( ) to read the values into a two dimensional array A, find the sum of all the elements of a row, sum of all the elements of a column, find the total sum of all the elements of the two dimensional array A and print the results.
7. Write a C program to perform a **linear search** for a given key integer in a single dimensional array of numbers and report success or failure in the form of a suitable message using functions.
8. Write a C program to enter the information like name, register number, marks in 6 subjects of N students into an array of structures, find the average & display grade based on average for each student.
   Average Grade
   80 -100 Distinction
   60-79 First Class
   40 -59 Second Class
   <40 Fail
9. Design, develop and execute a parallel program in C to add, element-wise, two one-dimensional arrays A and B of N integer elements and to store the result in another one-dimensional array named C of N integer elements.

**ENGINEERING CHEMISTRY LABORATORY**

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<th>14CY117</th>
<th>No. of Credits</th>
<th>02</th>
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<td>Hrs / Week</td>
<td>03</td>
<td>Total Hours</td>
<td>36</td>
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**PART – A**

**Volumetric analysis**

1. Determination of Total Hardness of a sample of water using disodium salt of EDTA.
2. Determination of percentage of Copper in brass using standard sodium thiosulphate solution.


5. Determination of Chemical Oxygen Demand (COD) of the given industrial waste Water sample.

6. Determination of nitrogen ammonia in a given sample of fertilizer using standard hydrochloric acid solution.

**PART – B**

**Instrumental analysis**

1. Potentiometric estimation of FAS using standard $\text{K}_2\text{Cr}_2\text{O}_7$ solution.

2. Colorimetric determination of iron.

3. Conductometric estimation of an Acid mixture using standard $\text{NaOH}$ solution.

4. Flame photometric estimation of sodium in the given sample of water.

5. Determination of pKa of a weak acid using pH meter.

6. Determination of viscosity coefficient of a given liquid using Ostwald’s viscometer.

**REFERENCE BOOKS:**


**Scheme of Examination:**

One experiment from Part-A and another from Part-B shall be set. In given batch a common experiment shall be set under Part-A and different experiments under Part-B.
ENGINEERING MATHEMATICS - II

Subject code : 14 MA201  No. of Credits : 04
Hrs/Week : 04  Total Hours : 52

Prerequisites: Differential calculus and integral calculus.

Course learning Objectives:
1. To build a strong foundation in the mathematical tools of differential and integral calculus which are useful in the solution of engineering problems
2. To make the student to solve engineering problems by building mathematical Models using differential equations.
3. To introduce the student to integral transforms which are useful for their technical subjects.

UNIT- I

10 Hrs

UNIT-II

10 Hrs

UNIT- III
Integral Calculus: Differentiation under integral sign (Integrals with constant and variable limits). Multiple Integral:- Evaluation by change of order of integration – change of variables and applications to area and volume. Beta and Gamma functions.

11 Hrs

UNIT- IV
Laplace Transforms: Definitions, Transforms of elementary functions- Transforms of
derivatives and integrals- properties. Periodic functions, Unit Step functions and Unit Impulse functions.

12 Hrs.

UNIT V

9 Hrs

TEXT BOOKS

REFERENCE BOOKS

INTRODUCTION TO OPEN SOURCE SOFTWARE
& OPEN STANDARDS

Subject Code : 14CS118 No. of Credits : 0
Hrs /week : 03 Total Hours : 39

This is non-credited mandatory subject for CSE students only.

UNIT I
Introduction of OSS, Adoption of Open Source 09 hrs
Maintainability. Drivers for Adoption - Lower cost of ownership, Quality, Innovation reuse, Technical competence; Open Source Software Assessment, Examples of Open Source Adoption in the World, Open Source Challenges.

UNIT II
History and Case Study of Open Source 09 Hrs
History of Open Source - Evolution of UNIX, GNU General Public License - Genesis of GNU, Copyright - All Rights reserved; Benefits of Open Source. Introduction, Case Study 1 - Mozilla, Case Study 2 - Linux: Linux Distribution, Development Model, Change rate, Who writes the kernel? Why companies support kernel development? Linux dominance in industry.

UNIT III 07 hrs
Introduction to Open Standards and Adoption of Open Standards
Bluetooth Special Interest group, USB Implementers forum; Testing and certification, Summary. Introduction, Drivers for adoption - Network effects, Lower costs, Impending benefits; Adoption methods and Process - Degree of association, Methods, process; Examples of Open Standards adoption in the world - SCOSTA, Web Standards; Adoption barriers, Early adopters.

UNIT IV
Evolution of Standards, Open Standards Case Study 08 Hrs
Evolution, Life Cycle, importance of Standards, Benefits of Open Standards, Open Standards Case Study 1 - Transfer Account Procedure (TAP), Open Standards Case Study 2 - Open Document Format (ODF)

UNIT V
Principles and Practices of Open Standards 06 Hrs
Major Principles of Open Standards - Openness, Consensus, Due Process, Open IPR, Open World, Open Access, Open meetings, Ongoing support, Open interfaces, Open use

Text Books and Reference URLs:
1. Introduction to Open Source Software and Open Standards (IBM ICE Publications)

Note: Evaluation is done and a grade of P (pass) or NP (not pass) is awarded
INTRODUCTION TO PHP USING IDE

Subject Code : 14CS119  
No. of Credits :  0  
Hrs/week : 03  
Total Hours : 39

This is non-credited mandatory subject for CSE students only.

UNIT I
PHP Basics  
06 hrs
Introduction to PHP, Support for database, PHP installation, Working with PHP, Why PHP? , PHP Statement terminator and case insensitivity, Embedding PHP in HTML, Comments, Variables, Assigning value to a variable, constants, Managing Variables, Data types.

UNIT II
PHP Basics  
10 hrs
Operators, Arithmetic operators, Bitwise Operators, Comparison Operators, Logical Operators, Concatenation Operators, Increment and Decrement Operators, Operator precedence, String Manipulation, Control Structures: If Statement- if- else statement, if else if statement, Nested if , switch statements, Loop Control Structures- For loop, While loop, Do-while loop, Loop Control: break and continue.

UNIT III
Functions in PHP  
08 hrs
Functions, User Defined Function – Function definition, Function Call, Function with arguments, Function with Return Value, Call by value and Reference, Understanding variable scope, Global Keyword, Static Keyword, Built in functions in PHP

UNIT IV
Arrays and File Handling  
08 hrs
Arrays : Introduction to Array, Creating an Array, Modifying Elements of an array, Finding the size of an array, Iterating array Elements - foreach, Modifying array while iteration, Iterating array with numeric index, Converting an Array to string, Converting String to an array, Array sorting, Multidimensional array, Iterating Multidimensional array, 
File Handling : Introduction, File open, File creation, Writing to files, Reading from files, Closing a file, Using PHP with HTML Forms
UNIT V
Java Script and Form Handling  
Form Handling : Introduction Creating Forms in HTML, GET and POST, Accessing form Data, File upload

Text Books :
1. Introduction to PHP using IDE ( IBM ICE Publications)
2. Advanced PHP( IBM ICE Publications)

Note: Evaluation is done and a grade of P (pass) or NP (not pass) is awarded