SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE Ist SEMESTER
BE 11 PHYSICS
INTRODUCTION TO ELECTROMAGNETIC THEORY

TOTAL -60 HOURS

OBJECTIVE:

The students are to be learn the below mentioned:

- Electrostatic in vacuum
- Electrostatic in linear dielectric medium
- Magnenostator in linear magnetic medium
- Faraday's law
- Electromagnetic waves

Module 1: Electrostatics in vacuum

Calculation of electric field and electrostatic potential for a charge distribution; Divergence and curl of electrostatic field; Laplace's and Poisson's equations for electrostatic potential and uniqueness of their solution and connection with steady state diffusion and thermal conduction; Practical examples like Farady's cage and coffee-ring effect; Boundary conditions of electric fieldand electrostatic potential; method of images; energy of a charge distribution and its expression in terms of electric field.

(9 HOURS)

Module 2: Electrostatics in a linear dielectric medium

Electrostatic field and potential of a dipole. Bound charges due to electric polarization; Electric displacement; boundary conditions on displacement; Solving simple electrostatics problems in presence of dielectrics – Point charge at the centre of a dielectric sphere, charge in front of a dielectric slab, dielectric slab and dielectric sphere in uniform electric field. **(9 HOURS)**

Module 3: Magnetostatics

Bio-Savart law, Divergence and curl of static magnetic field; vector potential and calculating it for a given magnetic field using Stokes' theorem; the equation for the vector potential and its solution forgiven current densities. **(9 HOURS)**

Module 4: Magnetostatics in a linear magnetic medium

Magnetization and associated bound currents; auxiliary magnetic field ; Boundary conditions on and . Solving for magnetic field due to simple magnets like a bar magnet; magnetic susceptibility and feromagnetic, paramagnetic and diamagnetic materials; Qualitative discussion of magnetic field in presence of magnetic materials. **(9 HOURS)**

Module 5: Faraday's law

Faraday's law in terms of EMF produced by changing magnetic flux; equivalence of Faraday's law and motional EMF; Lenz's law; Electromagnetic breaking and its applications; Differential form of Faraday's law expressing curl of electric field in terms of time-derivative of magnetic field and calculating electric field due to changing magnetic fields in quasi-static approximation; energy stored in a magnetic field. **(8 HOURS)**

Module 6: Displacement current, Magnetic field due to time-dependent electric field and Maxwell's equations

Continuity equation for current densities; Modifying equation for the curl of magnetic field tosatisfy continuity equation; displace current and magnetic field arising from time-dependent electric field; calculating magnetic field due to changing electric fields in quasi-static Maxwell's equation in vacuum and non-conducting medium; Energy in an electromagnetic field; Flow of energy and Poynting vector with examples. Qualitative discussion of momentum in electromagnetic fields. **(8 HOURS)**

Module 7: Electromagnetic waves

The wave equation; Plane electromagnetic waves in vacuum, their transverse nature and polarization; relation between electric and magnetic fields of an electromagnetic wave; energy carried by electromagnetic waves and examples. Momentum carried by electromagnetic waves and resultant pressure. Reflection and transmission of electromagnetic waves from a non-conducting medium-vacuum interface for normal incidence. **(8 HOURS)**

OUTCOME:

- Experimental exposure to electromagnetic induction and electromagnetic breaking.
- LC circuit and LCR circuit
- Resonance phenomenon in LCR circuit
- Magnetic field from Helmholtz coil
- Measurement of Lorentz force in a vacuum tube

BOOKS

(i) David Griffiths, Introduction to Electrodynamics

(ii) Halliday and Resnick, Physics

(iii) W. Saslow, Electricity, magnetism and light

(iv) edminister, j.a. electromagnetics physics, mc graw hill

(v) Walli, s. electromagnetics theory tech max pub. pune

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE Ist SEMESTER

BE 12 MATHEMATICS-I

TOTAL -60 HOURS

OBJECTIVE:

- The objective of their course is to familiarize the prospective engineers with techniques in calculus, multivariate analyzer and linear algebra. it aim to equip the students with standard concepts and tools at an intermediate to advance level that will serve them well towards taking more advanced level of mathematics and applications that they would find useful in their disciplines.

Module 1: Calculus:
Evolutes and involutes; Evaluation of definite and improper integrals; Beta and Gamma functions and their properties; Applications of definite integrals to evaluate surface areas and volumes of revolutions. **(12 HOURS)**

Module 2: Calculus:
Rolle's Theorem, Mean value theorems, Taylor's and Maclaurin theorems with remainders; indeterminate forms and L'Hospital's rule; Maxima and minima. **(12 HOURS)**

Module 3: Sequences and series: Convergence of sequence and series, tests for convergence; Power series, Taylor's series, series for exponential, trigonometric and logarithm functions; Fourier series: Half range sine and cosine series, Parseval's theorem. **(12 HOURS)**

Module 4: Multivariable Calculus (Differentiation):

Limit, continuity and partial derivatives, directional derivatives, total derivative; Tangent plane and normal line; Maxima, minima and saddle points; Method of Lagrange multipliers; Gradient, curl and divergence. **(12 HOURS)**

Module 5: Matrices

Inverse and rank of a matrix,rank-nullity theorem; System of linear equations; Symmetric, skewsymmetric and orthogonal matrices; Determinants; Eigenvalues and eigenvectors; Diagonalization of matrices; Cayley-Hamilton Theorem, and Orthogonal transformation.

(12 HOURS)

OUTCOME:
The student will learn

- To apply differential and integral calculus to notions of curvature and to improper integrals, apart from some other applications they will have a basic understanding of beta and gamma functions.
- The fallout of Rolle 's Theorem that is fundamental to application of analysis to engineering problems.
- The tool of power series and Fourier series for learning advanced Engineering Mathematics.

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o To deal with functions of several variables those are essential in most branches of engineering.

o The essential tool of matrices and linear algebra in comprehensive manner.

BOOKS:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

3. Veerarajan T., Engineering Mathematics for first year, Tata McGraw-Hill, New Delhi, 2008.

4. Ramana B.V., Higher Engineering Mathematics, Tata McGraw Hill New Delhi, 11thReprint, 2010.

5. D. Poole, Linear Algebra: A Modern Introduction, 2nd Edition, Brooks/Cole, 2005.

6. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

7. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

BE Ist SEMESTER
BE 13 BASIC ELECTRICAL & ELECTRONICS ENGINEERING

TOTAL -60 HOURS

OBJECTIVE
- To understand and analysis basic electrical and magnetic circuits
- To study the working principle of electrical machine and power converters
- To introduce the components of low voltage electrical installations.

MODULE I

Electrical circuit analysis- Voltage and current sources, dependent and independent sources, source conversion, DC circuits analysis using mesh & nodal method, Thevenin's & superposition theorem, star-delta transformation. phase AC circuits under sinusoidal steady state, active, reactive and apparent power, physical meaning of reactive power, power factor, 3-phase balanced and unbalanced supply, star and delta connections. **(12 HOURS)**

Module II

Transformers- Review of laws of electromagnetism, mmf, flux, and their relation, analysis of magnetic circuits. Single-phase transformer, basic concepts and construction features, voltage, current and impedance transformation, equivalent circuits, phasor diagram, voltage regulation, losses and efficiency, OC and SC test. **(12 HOURS)**

Module III

Rotating Electric machines- Constructional details of DC machine, induction machine and synchronous machine, Working principle of 3-Phase induction motor, Emf equation of 3-Phase induction motor, Concept of slip in 3-Phase induction motor, Explanation of Torque-slip characteristics of 3-Phase induction motor, Classification of self excited DC motor and generator.

(12 HOURS)

Module IV

Digital Electronics-Number systems used in digital electronics, decimal, binary, octal, hexadecimal, their complements, operation and conversion, floating point and signed numbers, Demorgan's theorem, AND, OR, NOT, NOR, NAND, EX-NOR, EX-OR gates and their representation, truth table, half and full adder circuits, R-S flip flop, J-K flip flop. **(12 HOURS)**

Module V

 ELECTRONIC COMPONENTS AND CIRCUITS- Introduction to Semiconductors, Diodes, V-I characteristics, Bipolar junction transistors (BJT) and their working, introduction to CC, CB & CE transistor configurations, different configurations and modes of operation of BJT, DC biasing of BJT.

(12 HOURS)

OUT COME:

- Get an exposure to common electrical component and their ratings
- Make electrical connections by wire of appropriate ratings.
- Understand the usages of common electrical measuring instruments.
- Understand the basic characteristics of transformer and electrical machines.
- Get an exposure to the working of power electronic converters.

BOOKS:

1. Vincent Del Toro, Electrical Engineering Fundamentals, PHI Learning, II Edition
2. S.Ghosh, Fundamentals of Electrical and Electronics Engineering, PHI, II Edition.
3. Millman, Halkias & Parikh, Integrated Electronics, Mc Graw Hill, II Edition
4. Nagrath & Kothari, Basic Electrical Engineering, III Edition TMH.
5. J.S. Katre, Basic Electronics Engg, Max Pub. Pune.
6. Hughes, Electrical and Electronic Technology, Pearson Education IX Edition

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BE Ist SEMESTER
BE 14 ENGINEERING GRAPHICS

TOTAL -60 HOURS

OBJECTIVE:
- All phase of manufacturing or construction requires the conversion of new ideas and design concept into the basic line language of graphics.

Module I

Scales: Representative factor, plain scales, diagonal scales, scale of chords.

Conic sections: Construction of ellipse, parabola, hyperbola by different methods; Normal and Tangent.

Special Curves: Cycloid, Epi-cycloid, Hypo-cycloid, Involutes, Archimedean and logarithmic spirals.

(10 HOURS)

Module II

Projection: Types of projection, orthographic projection, first and third angle projection, **Projection of points and lines**, Line inclined to one plane, inclined with both the plane, True Length and True Inclination, Traces of straight lines. **(10 HOURS)**

Module III

Projection of planes and solids: Projection of Planes like circle and polygons in different positions; Projection of polyhedrons like prisms, pyramids and solids of revolutions like cylinder, cones in different positions. **(10 HOURS)**

Module IV

Section of Solids: Section of right solids by normal and inclined planes; Intersection of cylinders.

Development of Surfaces: Parallel line and radial - line method for right solids. **(10 HOURS)**

Module V

Isometric Projections: Isometric scale, Isometric axes, Isometric Projection from orthographic drawing. **(10 HOURS)**

Module VI

Computer Aided Drafting (CAD): Introduction, benefit, software's basic commands of drafting entities like line, circle, polygon, polyhedron, cylinders; transformations and editing commands like move, rotate, mirror, array; solution of projection problems on CAD. **(10 HOURS)**

OUTCOME:

The student becomes aware of below**:**

- Introduction to Engineering drawing covering

- Orthographic projections

- Section of solids

- Isometric projection

- Computer aided drafting

BOOKS:

1.   Visvesvaraya Tech. University; A Premier on Computer Aided Engg drawing; VTU Belgaum

2.   Bhatt N.D.; Engineering Drawing, Charotar

3.   Venugopal K.;Engineering Graphics; New Age

4.   John KC; Engg. Graphics for Degree; PHI.

5.   Gill P.S.; Engineering Drawing; kataria

6.   Jeyopoovan T.; Engineering drawing & Graphics Using AutoCAD; Vikas

7.   Agrawal and Agrawal; Engineering Drawing;TMH

8.   Shah MB and Rana BC; Engg.drawing; Pearson Education

9.   Luzadder WJ and Duff JM; Fundamental of Engg Drawing; PHI

10.   Jolhe DA; Engg. Drawing an Introduction; TMH

11.   11 Narayana K.L.; Engineering Drawing; Scitech

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE Ist SEMESTER

BE 15 BASIC CIVIL ENGINEERING & ENGINEERING MECHANICS

TOTAL -60 HOURS

OBJECTIVE:

- Resolve the forces.

- Find the resultant of given force system

- Find the reaction of beam

- Find the centre of gravity of composite solid.

- Find M.A.,V.R., Efficiency and establish law of machine

Module I Building Materials & Construction

Stones, bricks, cement, lime, timber-types, properties, test & uses, laboratory tests concrete and mortar Materials: Workability, Strength properties of Concrete, Nominal proportion of Concrete preparation of concrete, compaction, curing.Elements of Building Construction, Foundations conventional spread footings, RCC footings, brick masonry walls, plastering and pointing, floors, roofs, Doors, windows, lintels, stair cases types and their suitability. **(12 HOURS)**

Module II Surveying & Positioning:

Introduction to surveying Instruments – levels, thedolites, plane tables and related devices. Electronic surveying instruments etc. Measurement of distances – conventional and EDM methods, measurement of directions by different methods, measurement of elevations by different methods. Reciprocal leveling. **(12 HOURS)**

Module –III Mapping & Sensing:

Mapping details and contouring, Profile Cross sectioning and measurement of areas, volumes, application of measurements in quantity computations, Survey stations, Introduction of remote sensing and its applications. **(12 HOURS)**

Module IV Forces and Equilibrium:

Graphical and Analytical Treatment of Concurrent and non- concurrent Co- planner forces, free Diagram, Force Diagram and Bow's notations, Application of Equilibrium Concepts: Analysis of plane Trusses: Method of joints, Method of Sections. Frictional force in equilibrium problems.

(12 HOURS)

Module – V Centre of Gravity and moment of Inertia:

Centroid and Centre of Gravity, Moment Inertia of Area and Mass, Radius of Gyration, Introduction to product of Inertia and Principle Axes.Support Reactions, Shear force and bending moment Diagram for Cantilever & simply supported beam with concentrated, distributed load and Couple. **(12 HOURS)**

OUTCOME:

The students understand the below mention:

- Verification of law of triangle law of forces and Lami's theorem.

- Verification of law of parallelogram law of forces.

- Determination of moment of inertia of flywheel.

- Determination of coefficient of friction between two given materials.

- Determination of forces in the member of jib crane

BOOKS:

1. S. Ramamrutam & R.Narayanan; Basic Civil Engineering, Dhanpat Rai Pub.

2. Prasad I.B., Applied Mechanics, Khanna Publication.

3. Punmia, B.C., Surveying, Standard book depot.

4. Shesha Prakash and Mogaveer; Elements of Civil Engg & Engg. Mechanics; PHI

5. S.P,Timoshenko, Mechanics of stricture, East West press Pvt.Ltd.

6. Surveying by Duggal – Tata McGraw Hill New Delhi.

7. Building Construction by S.C. Rangwala- Charotar publications House, Anand.

8. Building Construction by Grucharan Singh- Standard Book House, New Delhi

9. Global Positioning System Principles and application- Gopi, TMH

10. R.C. Hibbler – Engineering Mechanics: Statics & Dynamics.

11. A. Boresi & Schmidt- Engineering Mechines- statics dynamics, Thomson' Books

12. R.K. Rajput, Engineering Mechanics S.Chand & Co.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE Ist SEMESTER
BE 16 INTRODUCTIONS TO YOGA

TOTAL -60 HOURS

OBJECTIVE:

The students to be made aware of yoga,concept of kriya yoga,bandha and mudras,yoga vashitha,nadi and kanda.

MODULE-1
- Meaning of yoga, Definition, Aim and Objective of yoga.
- Concept of ideal Hut and ideal place and its relevance in modern times.
- Do's and Don't for a yoga practitioner.
- Goal of Hatha yoga and relevance of hatha yoga in contemporary times. **(12 HOURS)**

MODULE -2
- Concept of kriya yoga.
- Concept of Asanas (Definition, various classification, number of Asanas).
- Concept of pranayama (Definition and types).
- Concept of shhat karma (Dhoti, Neti, Vasti, Kapalbhati, Tratak, Noli, and Agnisaar).

(12 HOURS)

MODULE -3
- Concept, definition of bandha and mudras.
- Concept, definition, benefits and techniques of pratyahar (Patanjalean and Hathyogic).
- Concept of Dharna and dhyana (Patanjali and non Patanjali Concept). **(12 HOURS)**

MODULE -4
- Highlights of yoga vashitha.
- Yamas, Niyamas, Asanas, Pranayam, Pratyahar, Dharna And Samadhi According to vashitha sanhita.
- Concept of vayu-prana 5 principal pranas function, location, 5 Uppranas sub ordinate function, location.
- Concept of Nadi and Kanda their location and range, its importance in yoga. **(12 HOURS)**

MODULE -5
- Raja yoga.
- Gyan Yoga.
- Karma Yoga.
- Bhakti Yoga.
- Mantra Yoga.
- Importance of Haths yoga in daily life and social life.**(12 HOURS)**

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PRACTICAL

ASANA

1. Halasana
2. Pashichmoutanasana
3. Ardha Matsyendra Asana
4. Akrnadhanurasana
5. Uttan Kurmasana
6. Trikorasana
7. Matsyendrasana
8. Kukkutasana
9. Naukasana
10. Garulasana
11. karnaperasana
12. Padangusthaasana
13. Vatayanasana
14. Guptasana
15. Ugrasana
16. Vipreetkarni
17. Tadaasana
18. Sarwangasana
19. Varkshasana

PRANAYAMA

1. Anulom – vilom
2. Sitkari
3. Ujjayi
4. Shitali
5. Bhastrika

MUDRA

1. Yoga Mudra
2. Brahm Mudra

BHANDHA

1. Jalandhar Bhandha
2. Udiyan Bhandha

MEDITATION

1. 10-15 minutes

OUTCOME:
The students having learned types of asana, pranayama ,mudra, bhandha and Meditation.

BE II nd SEMESTER

BE 21 CHEMISTRY–I

TOTAL -60 HOURS

OBJECTIVE:

The concept developed in their course will aid in qualification of several concepts in chemistry that have been introduced at 10+0 levels in schools. Technology is being increasingly based on the electronic, atomic and molecular lever modifications.Quantum theory is more than 100 years old and to understand phenomenon at nanometer levels, one has to be base the description of all chemical processes at molecular levels.

Module I Atomic and molecular structure

Schrodinger equation. Particle in a box solutions and their applications for conjugated molecules and nanoparticles. Forms of the hydrogen atom wave functions and the plots of these functions to explore their spatial variations. Molecular orbitals of diatomic molecules and plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pimolecular orbitals of butadiene and benzene and aromaticity. Crystal field theory and the energy level diagrams for transition metal ions and their magnetic properties. Band structure of solids and the role of doping on band structures. **(09 HOURS)**

Module II Spectroscopic techniques and applications

Principles of spectroscopy and selection rules. Electronic spectroscopy. Fluorescence and its applications in medicine. Vibrational and rotational spectroscopy of diatomic molecules. Applications. Nuclear magnetic resonance and magnetic resonance imaging, surface characterization techniques. Diffraction and scattering. **(09 HOURS)**

Module III Intermolecular forces and potential energy surfaces

Ionic, dipolar and van Der Waals interactions. Equations of state of real gases and critical phenomena. Potential energy surfaces of H3, H2F and HCN and trajectories on these surfaces.

(09 HOURS)

Module IV Use of free energy in chemical equilibria

Thermodynamic functions: energy, entropy and free energy. Estimations of entropy and free energies. Free energy and emf. Cell potentials, the Nernst equation and applications. Acid base, oxidation reduction and solubility equilibria. Waterchemistry. Corrosion. Use of free energy considerations in metallurgy through Ellingham diagrams. **(09HOURS)**

Module V Periodic properties

Effective nuclear charge, penetration of orbitals, variations of s, p, d and f orbital energies of atoms in the periodic table, electronic configurations, atomic and ionic sizes, ionization energies, electron affinity and electronegativity, polarizability, oxidation states, coordination numbers and geometries, hard soft acids and bases, molecular geometries. **(08 HOURS)**

Module VI Stereochemistry

Representations of 3 dimensional structures, structural isomers and stereoisomers, configurations and symmetry and chirality, enantiomers, diastereomers, optical activity, absolute configurations and conformational analysis. Isomerism in transitional metal compounds. **(08 HOURS)**

Module VII Organic reactions and synthesis of a drug molecule

Introduction to reactions involving substitution, addition, elimination, oxidation, reduction, cyclization and ring openings. Synthesis of a commonly used drug molecule. **(08 HOURS)**

OUTCOME:

The course will enable the student to:

- Analyze microscopic chemistry in terms of atomic and molecular orbital's and intermolecular forces.

- Rationalize bulk properties and processes using thermodynamic considerations.

- Distinguish the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques.

- Rationalize periodic properties such as ionization potential, electronegatively.

- List major chemical reactions that are used in the synthesis of molecules.

BOOKS:

1) University chemistry, by B. H. Mahan

2) Chemistry: Principles and Applications, byM. J. Sienko andR. A. Plane

3) Fundamentals of Molecular Spectroscopy, by C. N. Banwell

4) Engineering Chemistry (NPTEL Web-book), by B. L. Tembe, Kamaluddin and M. S. Krishnan

5) Physical Chemistry, by P. W. Atkins

6) Organic Chemistry: Structure and Function by K. P. C. Volhardt and N. E. Schore, 5th Edition

http://bcs.whfreeman.com/vollhardtschore5e/default.asp

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE II nd SEMESTER
BE 22 MATHEMATICS-II

TOTAL -60 HOURS

OBJECTIVE:

- The objective of their course is to familiarize the prospective engineers with techniques in multivariable integration ordinary and partial differential equations and complex variables.it aims to equip the students to deal with advance level of mathematics and applications that would be essential for their disciplines.

Module 1:

Multivariable Calculus (Integration):

Multiple Integration: Double integrals (Cartesian), change of order of integration in double integrals, Change of variables (Cartesian to polar), Applications: areas and volumes, Center of mass and Gravity (constant and variable densities); Triple integrals (Cartesian), orthogonal curvilinear coordinates, Simple applications involving cubes, sphere and rectangular parallelepipeds; Scalar line integrals, vector line integrals, scalar surface integrals, vector surface integrals, Theorems of Green, Gauss and Stokes.

Module 2:

First order ordinary differential equations

Exact, linear and Bernoulli's equations, Euler's equations, Equations not of first degree: equations solvable for p, equations solvable for y, equations solvable for x and Clairaut's type.

Module 3:

Ordinary differential equations of higher orders:

Second order linear differential equations with variable coefficients, method of variation of parameters, Cauchy-Euler equation; Power series solutions; Legendre polynomials, Bessel functions of the first kind and their properties.

Module 4:

Complex Variable – Differentiation

Differentiation, Cauchy-Riemann equations, analytic functions, harmonic functions, finding harmonic conjugate; elementary analytic functions (exponential, trigonometric, logarithm) and their properties; Conformal mappings, Mobius transformations and their properties.

Module 5:

Complex Variable – Integration

Contour integrals, Cauchy-Goursat theorem (without proof), Cauchy Integral formula (without proof), Liouville's theorem and Maximum-Modulus theorem (without proof); Taylor's series, zeros of analytic functions, singularities, Laurent's series; Residues, Cauchy Residue theorem (without proof),Evaluation of definite integral involving sine and cosine, Evaluation of certain improper integrals using the Bromwich

contour.

BOOKS:

1.   G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

2.   Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

3.   W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.

4.   S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

5.   E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.

6.   E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.

7.   J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., Mc-Graw Hill, 2004.

8.   N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

9.   B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

OUTCOME:

The student will learn

- The mathematical tools needed in evaluating multiple integrals and their usages.

- The effective mathematical tools for the solutions of differential equations that model physical

processes.

- The tools of differentiation and integration of functions of a complex variable that are use various techniques dealing engineering problem.

Textbooks/References:

1. G.B. Thomas and R.L. Finney, Calculus and Analytic geometry, 9th Edition, Pearson, Reprint, 2002.

2. Erwin kreyszig, Advanced Engineering Mathematics, 9th Edition, John Wiley & Sons, 2006.

3. W. E. Boyce and R. C. DiPrima, Elementary Differential Equations and Boundary Value Problems, 9th Edn., Wiley India, 2009.

4. S. L. Ross, Differential Equations, 3rd Ed., Wiley India, 1984.

5. E. A. Coddington, An Introduction to Ordinary Differential Equations, Prentice Hall India, 1995.

6. E. L. Ince, Ordinary Differential Equations, Dover Publications, 1958.

7. J. W. Brown and R. V. Churchill, Complex Variables and Applications, 7th Ed., McGraw Hill, 2004.

8. N.P. Bali and Manish Goyal, A text book of Engineering Mathematics, Laxmi Publications, Reprint, 2008.

9. B.S. Grewal, Higher Engineering Mathematics, Khanna Publishers, 36th Edition, 2010.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE II nd SEMESTER
BE 23 PROGRAMMING FOR PROBLEM SOLVING WITH C++

TOTAL -60 HOURS

OBJECTIVE :
- To formulate simple algorithms for erythematic and logical problem
- To translate the algorithms to programs (in c++ language)
- To test and execute the programs and correct syntax and logical error.
- To implement conditional branching, iteration recursion.
- To decompose a problem into functions and synthesize a complete program using divide and Conquer approach.
- To use arrays, pointer and structures to formulate algorithms and program.
- To apply programming to solve matrix addition and multiplication problems and searching and sorting problem.

Module –I

Introduction To 'C' Language

Character set. variables and identifiers, built-in data types. variable definition, arithmetic operators and expressions, constants and literals, simple assignment statement, basic input/output statement, simple 'c' programs. **(09 HOURS)**

Module –II

Conditional Statements And Loops

Decision making within a program, conditions, relational operators, logical connectives, if statement, if-else statement, loops: while loop, do while, for loop. nested loops, infinite loops, switch statement, structured programming. **(09 HOURS)**

Module –III Arrays

One dimensional arrays: array manipulation; searching, insertion, deletion of an element from an array; finding the largest/smallest element in an array; two dimensional arrays, addition/multiplication of two matrices, transpose of a square matrix; null te01linated strings as array of characters, representation sparse matrices. **(09 HOURS)**

Module –IV

Functions

Top-down approach of problem solving, modular programming and functions, standard library of c

functions, prototype of a function: foo1lal parameter list, return type, function call, block structure, passing arguments to a function: call by reference, call by value, recursive functions, arrays as function arguments. **(09 HOURS)**

Module –V

Structures and Unions

Structure variables, initialization, structure assignment, nested structure, structures and functions, structures and arrays: arrays of structures, structures containing arrays, unions. **(08 HOURS)**

Module –VI

Pointers

Address operators, pointer type declaration, pointer assignment, pointer initialization, pointer arithmetic, functions and pointers, arrays and pointers, pointer arrays. **(08 HOURS)**

Module –VII File Processing

Concept of files, file opening in various modes and closing of a file, reading from a file, writing onto a file. **(08 HOURS)**

OUTCOME:
- To formulate the algorithimsfor simple problems.
- To translate given algorithms to a working and correct program.
- To be able to correct syntax errors or reported by the compiler.
- To be able to identify and correct logical error encountered at run time.
- To be able to write interative as well as recursive programs.

Reference

1. Let Us C-Yaswant kanetkar,BPB
2. Programming in ANSI C-E. Balagurusamy, TMH

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE II nd SEMESTER
BE 24 ENGLISH

TOTAL -60 HOURS

OBJECTIVE:

The student will acquire basic proficiency in English including reading and listening comprehension, writing and speaking skill.

Module I - Languages and skills of communication

Linguistic techniques, Modern usages, Reading comprehension, English phonetic symbols/sings, Oral presentation, Audition Communication, Processes of Communication, Verbal and Non Verbal Communication, Barriers to Communication. **(12 HOURS)**

Module II - Application of linguistic ability

Writing of definitions of Engineering terms, Objects, Processes and Principles (Listening) Topics of General Interest, Reproduction from business, daily life, travel, health, buying and selling, company structure, systems etc. **(12 HOURS)**

Module III - Letter Writing:

Applications, Enquiry, Calling quotations, Tenders, Order and Complaint. **(12 HOURS)**

Module IV

Precise Writing, Noting and drafting, Technical Description of simple engineering objects and processes (writing), Report writing, precise writing, Note writing, Slogan writing comment, Speech advertising. **(12 HOURS)**

Module V

Writing Technical reports of the type of observation report, Survey report, Report of trouble, Laboratory Report and Project Report on the subjects of engineering. (Speaking) Vocabulary, Presentations, Demonstrations, Conversation– Telephone media, socializing, cultural events, debates, speech. **(12 HOURS)**

OUTCOME:
The student understands the below mention:

- Language and skills of communication
- Application linguistic ability
- Letter writing precise writing
- Writing technical reports

- To be able to represent data in arrays, stringsand structure and manipulate them through a program.

- To be able to declare pointers of different types and use them in defining self-referential structures.

- To be able to create, read and write to and from simple text files.

Topics to be covered in the Language laboratory sessions

1. Basic Grammar & Vocabulary (Synonyms /Antonyms, Analogies, sentence completion, correctly spelt words, idioms, proverbs, common errors).

2. Phonetic symbols and pronunciation.

3. Listening skills (Including Listening Comprehension)3

4. Reading Skills (Including Reading Comprehension)

5. Writing Skills (Including structuring resume and cover letter)

6. Speaking Skills

7. Body Language

8. Oral Presentation: Preparation and delivery using audio – visual aids with stress n body language And voice modulation (Topic to be selected by the teacher.) Final Assessment Should be based on Assignment, presentation and interview.

BOOKS:

1. Business Correspondence and Report Writing - By Sharma; TMH.

2. Living English Structure – By W.S. Allen; Longmans.

3. English Grammar – Ehrlich, Schaum Series; TMH.

4. Spoken English for India – By R.K. Bansal and IB Harrison Orient Longman.

5. New International Business English – by Joans and Alexander; OUP.

6. Effective Technical Communication – Rizvi; TMH.

SARVEPALLI RADHAKRISHNAN UNIVERSITY, BHOPAL

BE II nd SEMESTER
BE 25 ENVIROMENTAL STUDIES

TOTAL -60 HOURS

Module –I Energy-

Sources of Energy : Renewable & Non Renewable, Fossil fuel, Biomass Geothermal, Hydrogen, Solar, Wind, hydal, nuclear sources. **(12 HOURS)**

Module –II Ecosystem –

Segments of Environment: Atmosphere, hydrosphere, Lithosphere, biosphere. Cycles in Ecosystem – Water, Carbon, Nitrogen. Biodiversity: Threats and conservation, **(12 HOURS)**

Module –III Air Pollution & Sound Pollution

Air Pollution: Air pollutants, classification, (Primary & secondary Pollutants) Adverse effects of pollutants. Causes of Air pollution chemical, photochemical, Green house effect, ozone layer depletion, acid Rain. Sound Pollution: Causes, controlling measures, measurement of sound pollution (deciblage), Industrial and non – industrial. **(12 HOURS)**

Module –IV Water Pollution–

Water Pollution: Pollutants in water, adverse effects. Treatment of Domestic & Industrial water effluent.

Soil Pollution – Soil Profile, Pollutants in soil, their adverse effects, controlling measures.

(12 HOURS)

Module –V Society, Ethics & Human values

Impact of waste on society. Solid waste management (Nuclear, Thermal, Plastic, medical, Agriculture, domestic and e-waste). Ethics and moral values, ethical situations, objectives of ethics and its study Preliminary studies regarding Environmental Protection Acts , introduction to value education, self exploration, sanyam & swasthya. **(12 HOURS)**

BOOKS:

1.   Harris, CE, Prichard MS, Rabin's MJ, "Engineering Ethics"; Cengage Pub.
2.   RanaSVS;"EssentialsofEcologyand Environment"; PHIPub.
3.   Raynold, GW "Ethics in radformation Technology"; Cengage.
4.   Svakumar; Energy Environment & Ethics in society; TMH
5.   AK De "Environmental Chemistry"; New Age Int. Publ.

6. BK Sharma, "Environmental Chemistry" ;   Goel Publ. House.

7. Bala Krishnamoorthy; "Environmental management"; PHI

8. Gerard Kiely, "Environmental Engineering" ;   TMH

9. Miller GT JR; living in the Environment Thomson/cengage

10. Cunninghan WP and MA; principles of Environment Sc; TMH

11. Pandey, S.N. & Mishra, S.P. Environment & Ecology, 2011, Ane Books , Pvt. Ltd, New Delhi

12. Joseph, B. Environmental Studies, 2009 Tata Mcgraw Hill, Edu India Ltd. New Delhi.

13. Gour R.R, Sangal, R &Bagaria, G.P. , Excel Books, A-45, Naraina Phase-I
          ,New Delhi.-110028

BE II nd SEMESTER
BE 26 WORK SHOP/ MANUFACTURING PRACTICE

TOTAL -60 HOURS

OBJECTIVE:

- The student will gain knowledge of the different manufacturing processes which are commonly employed in the industry, to fabricate components using different materials.

Module I

Introduction: Manufacturing Processes and its Classification, Casting, Machining, Plastic deformation and metal forming, Joining Processes, Heat treatment process, Assembly process. Powder Metallurgy, introduction to computers in manufacturing. Black Smithy Shop Use of various smithy tools. Forging operations: Upsetting, Drawing down, Fullering, Swaging, Cutting down, Forge welding, Punching and drafting. Suggested Jobs : Forging of chisel., forging of Screw Driver.

(12 HOURS)

Module II

Carpentry Shop: Timber : Type, Qualities of timber disease, Timber grains, Structure of timber, Timber, Timber seasoning, Timber preservation .Wood Working tools: Wood working machinery, joints & joinery. Various operations of planning using various carpentry planes sawing & marking of various carpentry joints. Suggested Jobs :Name Plate ,Any of the Carpentry joint like mortise or tennon joint. **(12 HOURS)**

Module III

Fitting Shop: Study and use of Measuring instruments, Engineer steel rule, Surface gauges caliper, Height gauges, feeler gauges, micro meter. Different types of files, File cuts, File grades, Use of surface plate, Surface gauges drilling tapping Fitting operations: Chipping filling, Drilling and tapping.Suggested Jobs :Preparation of job piece by making use of filling, sawing and chipping , drilling and tapping operations. **(12 HOURS)**

Module IV

Foundry: Pattern Making: Study of Pattern materials, pattern allowances and types of patterns. Core box and core print, .Use and care of tools used for making wooden patterns.

Moulding: Properties of good mould & Core sand, Composition of Green , Dry and Loam sand. Methods used to prepare simple green and bench and pit mould dry sand bench mould using single piece and split patterns. **(12 HOURS)**

Module V

Welding: Study and use of tools used for Brazing, Soldering, Gas & Arc elding. Preparing Lap &

Butt joints using gas and arc welding methods, Study of TIG & MIG welding processes. Safety precautions.**(12HOURS)**

OUTCOME:

- Upon completion of the course, students will be able to fabricate components with their own hands.

BOOKS:

1. Bawa HS; Workshop Practice, TMH
2. Rao PN; Manufacturing Technology- Vol.1& 2, TMH
3. John KC; Mechanical workshop practice; PHI
4. Hazara Choudhary; Workshop Practices -, Vol. I & II.
5. Jain. R.K. Production Technology -

The Constitution of India is the supreme law of India. Parliament of India cannot make any law which violates the Fundamental Rights enumerated under the Part III of the Constitution. The Parliament of India has been empowered to amend the Constitution under Article 368, however, it cannot use this power to change the "basic structure" of the constitution, which has been ruled and explained by the Supreme Court of India in its historical judgments. The Constitution of India reflects the idea of "Constitutionalism" – a modern and progressive concept historically developed by the thinkers of "liberalism" – an ideology which has been recognized as one of the most popular political ideology and result of historical struggles against arbitrary use of sovereign power by state. The historic revolutions in France, England, America and particularly European Renaissance and Reformation movement have resulted into progressive legal reforms in the form of "constitutionalism" in many countries. The Constitution of India was made by borrowing models and principles from many countries including United Kingdom and America. **(20 HOURS)**

The Constitution of India is not only a legal document but it also reflects social, political and economic perspectives of the Indian Society. It reflects India's legacy of "diversity". It has been said that Indian constitution reflects ideals of its freedom movement; however, few critics have argued that it does not truly incorporate our own ancient legal heritage and cultural values. No law can be "static" and therefore the Constitution of India has also been amended more than one hundred times. These amendments reflect political, social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India have played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of India and its historic contributions has been recognized throughout the world and it gradually made it "as one of the strongest court in the world".

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social and economic developments since the year 1950. The Indian judiciary and particularly the Supreme Court of India has played an historic role as the guardian of people. It has been protecting not only basic ideals of the Constitution but also strengthened the same through progressive interpretations of the text of the Constitution. The judicial activism of the Supreme Court of Course content **(20 HOURS)**

1. Meaning of the constitution law and constitutionalism
2. Historical perspective of the Constitution of India
3. Salient features and characteristics of the Constitution of India
4. Scheme of the fundamental rights
5. The scheme of the Fundamental Duties and its legal status
6. The Directive Principles of State Policy – Its importance and implementation
7. Federal structure and distribution of legislative and financial powers between the Union and the States
8. Parliamentary Form of Government in India – The constitution powers and status of the President of India
9. Amendment of the Constitutional Powers and Procedure
10. The historical perspectives of the constitutional amendments in India
11. Emergency Provisions : National Emergency, President Rule, Financial Emergency
12. Local Self Government – Constitutional Scheme in India
13. Scheme of the Fundamental Right to Equality
14. Scheme of the Fundamental Right to certain Freedom under Article 19
15. Scope of the Right to Life and Personal Liberty under Article 21.