BANGALORE UNIVERSITY

SYLLABUS : 2K11

(First - Second Semester)

SCHEME OF STUDY AND EXAMINATIONS
FOR BE DEGREE COURSE IN

COMPUTER SCIENCE AND ENGINEERING

UNIVERSITY VISVESVARAYA COLLEGE OF ENGINEERING
K.R. CIRCLE, BANGALORE – 560 001

COMPUTER SCIENCE AND ENGINEERING

I SEMESTER

Sl. No	Code	Subject	No. of Hr. / week		Duration of Exams		Sessional Marks	Exam Marks	Total Marks
			Theory	Practical	Theory	Practical			
1.	2K11SM1101	Engineering Mathematics - I	04	--	03	--	25	100	125
2.	2K11CE1101	Engineering Mechanics	04	--	03	--	25	100	125
3.	2K11EE1101	Electrical Sciences	04	--	03	--	25	100	125
4.	2K11SP1101/ 2K11SC1101	Engineering Physics / Engineering Chemistry	04	--	03	--	25	100	125
5.	2K11SP1102/ 2K11SC1102	Engineering Physics lab / Engineering Chemistry lab	04	--	03	--	25	100	125
6.	2K11CI1301	Programming in C	04	--	03	--	25	100	125
7.	2K11EE1302/ 2K11CI1302	Electrical laboratory / C Programming lab	--	03	--	03	25	100	125
8.	2K11EM1101 / 2K11EM1102	Mechanical Engineering Science / Workshop Practice	--	03	--	03	25	100	125
Total			24	06	18	06	200	800	1000

II SEMESTER

Sl. No	Code	Subject	No. of Hr. / week		Duration of Exams		Sessional Marks	Exam Marks	Total Marks
			Theory	Practical	Theory	Practical			
1.	2K11SM1201	Engineering Mathematics - II	04	--	03	--	25	100	125
2.	2K11CE1201	Strength of Materials	04	--	03	--	25	100	125
3.	2K11EC1201	Basic Electronics	04	--	03	--	25	100	125
4.	2K11SP1101/ 2K11SC1101	Engineering Physics / Engineering Chemistry	04	--	03	--	25	100	125
5.	2K11SP1102/ 2K11SC1102	Engineering Physics lab / Engineering Chemistry lab	04	--	03	--	25	100	125
6.	2K11EM1201	Engineering Drawing	04	--	03	--	25	100	125
7.	2K11CI1302/ 2K11EE1302	C Programming lab / Electrical laboratory	--	03	--	03	25	100	125
8.	2K11EM1101/ 2K11EM1102	Mechanical Engineering Science / Workshop Practice	--	03	--	03	25	100	125
Total			24	06	18	06	200	800	1000

BE I SEMESTER COMPUTER SCIENCE AND ENGINEERING

2K11SM1101: ENGINEERING MATHEMATICS –I

Note:

FOUR questions from PART A and FOUR questions from PART B to be set.
Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per Week: 4 Examination Marks: 100 Sessional Marks: 25

PART A

Unit-1: Successive Differentiation:
nth derivative of standard functions, Leibnitz theorem and problems, Polar curves and angle between two polar curves, Pedal equation of polar curves.

Unit-2:
Rolle's Theorem, Lagrange and Cauchy mean value theorem and applications, Taylor's theorem and Maclaurin's expansion for a single variable and two variables (Without proof), Indeterminate forms, Evaluation of Limits by L-Hospital's rule (without proof) Maxima and Minima for a function of two variables.

Unit 3:
Derivative of an arc in Cartesian, parametric and polar forms. Curvature of plane curves-formula for radius of curvature in Cartesian parametric, polar and pedal forms, centre of curvature – evolutes, singular points, asymptotes and envelopes.

Unit-4: Partial Differentiation:
First and higher order derivatives, Euler's theorem, Total differentiation, Differentiation of implicit functions and composite functions, Jacobians, Errors and Approximations.

PART - B

Unit-5:
Standard reduction formulae for definite and indefinite integrals, Evolution of these integrals with standard limits, problems, Tracing of standard curves in Cartesian forms, paramentric form and polar forms.

Unit 6:
Double and Triple integrals, Evaluation by the change of order of integration, change of variables, and applications to area and volume, Beta and Gamma functions, Relation between beta and Gamma functions, Applications.

Unit 7:
Sequence of Real Numbers: Definition of Sequence, Bounded sequence, limit of sequence, Convergent, divergent, oscillatory sequence, Monotonic sequences and their properties Cauchy's criteria.

Unit 8: **Infinite series:**
Convergence, Divergence and Oscillation of an infinite series, comparison tests, De Alembert's ratio test, Cauchy's root test, Raabe's test, Cauchy's root test (all tests without proof) for series of positive terms, Alternating series, Absolute and conditional convergence, Leibnitz's test (without proof) Summation of Binomial, Exponential and logarithmic series.

2K11CE1101 : ENGINEERING MECHANICS

Note:

FOUR questions from PART A and FOUR questions from PART B to be set.
Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART A

Unit 1: Introduction:
Concept of particle and rigid body, force and its characteristics, classification of forces principles of transmissibility of a force, composition of forces, resolution of a force, Moment of a force, couple and its characteristics, replacement of force at some other point, Varignon's theorem, free body diagrams.

Unit 2: Coplanar Concurrent force System:
Resultant and coplanar concurrent force system, resultant of coplanar parallel force system, coplanar non-concurrent forces, force polygon and funicular polygon.

Unit 3: Equilibrium of coplanar force system:
Equilibrium of coplanar concurrent force system, Lami's theorem, Equilibrium of coplanar parallel force system, Types of Beams, types of Loadings, types of supports, Equilibrium of coplanar non-concurrent force system, reaction of statically determinate beams subjected to various loads.

Unit 4: Trusses:
Introduction, classification of trusses as simple, compound and complex. Analysis of perfect plane trusses by the method of joints and method of sections.

Unit 5: Friction:
Introduction, laws of dry friction, Equilibrium of a block on (horizontal, inclined plane), Equilibrium of ladder, equilibrium of block and wedge.

PART B

Unit 6: Centroid and Moment of Inertia:
Centroid of simple geometric areas (from first principles) centroid of composite areas and built up sections. Rectangular MI, Polar MI, radius of gyration, product of inertia, parallel axes theorem, perpendicular axes theorem, moment of inertial of simple geometric areas (from first principles) MI of composite areas and builtup sections.

Unit 7: Kinematics:
Kinematics of rectilinear motion with uniform and variable acceleration. Kinematics of curvilinear motion in vertical plane and projectiles.

Unit 8: Kinetics:
Kinetics of rectilinear motion, D'Alembert's principle of dynamic equilibrium, kinetics of curvilinear motion, banking and super elevation.

2K11EE1101 : ELECTRICAL SCIENCES

Note:

FOUR questions from PART A and FOUR questions from PART B to be set.
Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART A

Unit 1: Electromagnetism:
Faraday's laws of Electromagnetic induction, Lenz's law, Concept of Inductance – Self and mutual, Inductance as a circuit elements

Unit 2: DC Circuits:
Concept of an Electric circuit, Kirchhoff's laws. Analysis of DC circuit by
a. Network reduction method b. Kirchhoff's laws c. Mesh current method.

Unit 3: AC Circuits:
A. Single-Phase Circuits: Generation of ac power, Average and effective values of sine wave, form factor and peak factor. Phasor representation, voltage, current and power relations in R-L, R-C and R-L-C circuits. Analysis of series, parallel, and Series-Parallel circuits.
B.Three-Phase Circuits:
Advantage of three phase systems. Star and delta connections. Relationship between line and phase values. Measurement of three phase power using two wattmeters in a three phase balanced system.

Unit 4: DC Machines:
A. DC GENERATOR: Basic principle of working, constructional features, Lap and Wave Windings. Types of Generators, EMF equation, Concept of armature reaction and commutation. Characteristics and applications of DC machines.
B. DC MOTOR: Principle of operation, back EMF, Torque equation, types of motors, characteristics and applications. Necessity of starters, three point starter (excluding design).

PART B

Unit 5: Single Phase Transformer:
Principle of operation, Construction, EMF equation, Power losses and efficiency. Definition of Regulation, Open circuit and Short circuit tests. Predetermination of regulation and efficiency from OC and SC test data. All day efficiency.

Unit 6: Three Phase Induction Motor:
Constructional features, Principle of operation, Production of Torque, Slip, Torque-slip characteristics, losses and efficiency, Star-delta starter and applications.

Unit 7: a. Alternators:
Constructional features. Principle of operation, EMF equation considering winding factors (Excluding derivation of winding factors)
b. Different Methods of Power Generation.

Unit 8: a) Measuring Instruments:
Moving iron and moving coil meters-extension of ranges Dynamometer type of wattmeter. Induction type energy meter. Megger
b) Earthing: Necessity, Types of Earthings.

2K11SP1101 : ENGINEERING PHYSICS

Note:

FOUR questions from PART A and FOUR questions from PART B to be set.
Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART A

Unit 1: Physics of Vibrations:
Free oscillations - differential equation and solution, Damped vibrations - differential equation and solution, critical, over and under damping, analogy with electrical circuits, forced vibrations - differential equation and solution, amplitude and velocity resonance, sharpness of resonance and quality factor, LCR resonance.

Unit 2: Elasticity:
Hooke's law, Elastic constants and Poisson's ratio, Derivation of relation between elastic moduli, torsion of Cylinder, expression for couple per unit twist and expression for bending moment, theory of single cantilever

Unit 3: Free electron theory of metals:
Classical free electron theory for electrical conduction in metals, Expression for drift velocity and electrical conductivity, expression for electrical conductivity, Weidman Franz law, Limitations of Free electron theory.

Unit 4: Superconductivity:
Temperature dependence of electrical conductivity in metals and superconductors, magnetic effects, Meissner effect-type I and type II superconductors, Temperature dependence of critical magnetic field, qualitative ideas of BCS theory of superconductivity, high temperature superconductors, applications of super conductors – cryotron super conducting magnets.

Unit 5: Cryogenics:

Idea of throttle expansion of gases, Joule Thomson experiment, Expression for inversion temperature, Methods of production of low temperature, Linde's air liquefier, Measurements of low temperature by different methods, platinum resistance thermometer -theory and construction.

PART B

Unit 6: Lasers:

Spontaneous and stimulated emission of radiation, population inversion necessary condition for laser action, optical resonator, construction and working of Ruby, Helium-Neon and semiconducting laser, applications of laser (any two).

Unit 7: Optical Fibre:

Schematic of optical Fibre, total internal reflection, Derivation of expression for numerical aperture and acceptance angle, types of optical fibres, attenuation, absorption and scattering effects, applications in communication, point to point.

Unit 8. Holography:

Fundamentals of holography, difference between photography and holography, Construction of hologram, recording and reproducing of three dimensional images, applications of holography (any two).

Unit 9 : Dielectric materials:

Definitions of dielectric constants and polarization, different types of polarization, electronic, orientation, ionic, Clausius - Mossetti equation, Ferro electric materials, applications of dielectric materials.

Unit 10: Magnetic materials:

Definition of magnetic susceptibility - dia, para, ferro, ferri materials, Langevin theory of dia and para magnetism, soft and hard magnetic materials, applications.

Unit 11: Liquid Crystal:

Classification of Liquid Crystal, Orientational order intramolecular forces, deformation of the director, magnetic effects, optical properties, applications, LCD.

2K11SC1101 : ENGINEERING CHEMISTRY

Note:

FOUR questions from PART A and FOUR questions from PART B to be set.
Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART A

Unit 1: Solid State Chemistry / Metallic Solids:

Bonding in solids: Ionic, Covalent, Metallic and Molecular solids. Band theory of Solids: Molecular Orbital Theory, Linear Combination of atomic orbitals, bonding and anti-bonding orbitals with H and He as example, extension of band theory to Metals, Semiconductors and insulators.

Semiconductors: Intrinsic and Extrinsic – P and N types, stoichiometric, semiconducting compounds, Numerical problems.

Unit 2: Metal Finishing:

Polarisation, decomposition potential and overvoltage, Technological importance of metal finishing. Effect of plating variables on electrodeposits. Electrosplating techniques – methods of electroplating, surface preparation, plating of Cr. Electroless plating of copper for PCB.

Unit 3: Battery technology:

Battery-importance, classification, Cell Characteristics, Cell reactions and performance of primary batteries-Zn-MnO_2, Secondary batteries – working principle, cell reactions and performance of Pb-acid battery, Ni-Cd battery, Modern batteries: Zn – air battery, Li-MnO_2 battery. Fuel cells – definition, Classification, advantages and limitations. Construction and cell reactions of H_2-O_2fuel cell and methanol – oxygen fuel cell.

Unit 4: Corrosion Engineering:

Metallic corrosion-definition, electrochemical theory of corrosion, Forms of corrosion-differential aeration corrosion – pitting corrosion, waterline corrosion, stress corrosion. Factors affecting the rate of corrosion. Corrosion control – surface coatings, inorganic coatings- phosphating, anodizing, organic coatings – paints and enamels. Metal coatings – anodic metal coatings – galvanizing. Cathodic metal coatings – tinning. Corrosion inhibitors. Cathodic and anodic protection.

PART B

Unit 6: High Polymers:

Definitions – Natural and synthetic polymers, mechanism of addition polymerization (free radical mechanism), degree of polymerization, glass transition temperature. Addition and condensation polymers.

Resins and plastics: Differences between resins and plastics, thermoplastics and thermosetting plastics – manufacture, properties and applications of HDPE and LDPE, polystyrene, phenol-formaldehyde, Teflon, polymethyl methacrylates, polyurethanes and polycarbonates.

Elastomers: Deficiencies of natural rubber, vulcanizations, advantages of synthetic rubber. Manufactureand uses of Neoprene and Buna-S.

Adhesives: Manufacture and applications of epoxy resins

Unit 7: Green Chemistry:

Introduction, Principles, Atom economy : Concept, AE in oxidation of benzene & butane, synthesis of aldrin by Diels – Alder reaction; Waste : Production & Prevention, E-factor, synthesis of ibuprofen; Water as a reaction solvent : Concept & Synthesis of indole, reduction reactions; Microwave Irradiation in Organic synthesis : concept, advantages, synthesis of esters, oxidation reactions, amination of ketones; Ionic liquids : examples, concept, synthesis of 2 – phenylacrylic acid; Biocatalysis: concept, advantages, synthesis of aminopenicillanic acid; Synthesis of vitamin C.

Unit 8: Nanomaterials:

Introduction and Definition of nanoparticles and nanomaterials, electronic Structure, electronic band theory. Preparation of nanoscale materials: Precipitaion , mechanical milling, chemical vapour deposition and sputtering. Fullerenes: Nature of Carbon bond, Discovery of C60, Synthesis of C60, Structure of C60, Alkali doped.

2K11SP1102 : PHYSICS LABORATORY

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

1. Density of Glass tube
2. Volume resonator
3. Sonometer
4. Diffraction grating
5. Air wedge
6. Newton's ring
7. Experiment with laser
8. n by dynamic method
9 . y by single cantilever
10. y by bending method.

2K11SC1102 : CHEMISTRY LABORATORY

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART – A

1. Preparation of standard EDTA solution and determination of total hardness of water.
2. Preparation of standard EDTA solution and determination of calcium oxide in the given sample of cement solution (rapid EDTA method).
3. Determination of Cu% in brass using standard sodium thiosulphate solution (brass solution to be prepared by weighing the brass sample).
4. Preparation of standard dichromate solution and determination of iron in the given sample solution of haematite ore (external indicator method).
5. Determination of manganous dioxide in the pyrolusite using potassium permanganate solution (pyrolusite is to be weighed).

6. Determination of chemical oxygen demand of the given industrial waste water sample.
7. Estimation of Ca 2+ ions in the solution of dolomite.

PART – B

1. Determination of pKa value of a week acid using pH meter.
2. Colorimetric determination of iron / copper / any other metal.
3. Estimation of hydrochloric acid using standard sodium hydroxide solution conductometrically.
4. Determination of coefficient of viscosity of a given liquid using Ostwald's viscometer (density of the liquid is to be given).
5. Kinetics of acid hydrolysis of methyl acetate.

PART – C

1. Demonstration of Chemistry software – Viscosity experiment, demonstration of IR spectroscopy.
2. Demonstration of gravimetric estimation of nickel using dimethylglyoxime.
3. Demonstration of organic compound synthesis using microwave irradiation (synthesis of asprin, glucose pentaacetate, oxidation and reduction reactions).
4. Flamephotometric determination of sodium / potassium.

2K11CI1301 : PROGRAMMING WITH C

Note:

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Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART – A

Unit 1: Computer Fundamentals:
Introduction to digital Computer, Input Devices, Output devices, Storage devices, Operating System, Unix Commands: ls, mkdir, rmdir, cp, mv, rm, type, cat, date, who, banner, pwd, chown.

Unit 2: Fundamentals of C:
Introduction, Character Set, Identifier and Keywords, Constants and Variables, Character and Character Strings, Promotion and Typecasting, Labels, Data types, Operators and Expressions, Operator Precedence and Associativity, Basic Input and Output Statements, Library Functions, Programming Examples.

Unit 3: Control Statements:
Introduction, if Statement, if-else statement, Multi-way decisions, Compound statements, Loops, for Loop, while loop, do-while loop, break statement, switch statement, continue statement, goto statement, Programming Examples.

Unit 4: Functions and Scope:
Introduction, Necessity of Functions, Function Declaration and Definition, Classification of Functions, User defined and library functions, Function parameters, Return values, Recursion, Scope and Extent, Programming examples.

PART – B

Unit 5: Arrays and Strings:
Introduction, Necessity of Arrays, Multidimensional arrays, Sorting and Searching of Arrays, Strings, Arrays of strings, Addition and Multiplication of 2 Matrices, Functions in string.h, Programming examples.

Unit 6: Pointers:
Introduction to Pointers, Declaration and Initializing of pointers, Accessing a variable through its pointer, Pointers and Arrays, Passing Arrays to Functions, Pointers and Functions, Accessing arrays inside functions, Programming Examples.

Unit 7: Structures and Unions:
Introduction, Declaring and using Structures, Structure initialization, Operations on structures, Array of structures, Array within structure, Structures and Functions, Pointers to Structure, Pointers within the Structure, Union, Differences between Structure and Union, Operations on a union, Programming Examples.

Unit 8: Dynamic Memory Allocation:
Introduction, Library functions for dynamic memory allocation, Dynamic multi-dimensional arrays, Self Referential Structures, Singly linked list.

Unit 9: Files:
Introduction, File structure, File-handling functions, File Types, Concatenation of files.

2K11CI1302 : C PROGRAMMING LAB

1. a) Write a program to determine the mean, variance and standard deviation of n numbers.
   b) Write a Program to convert a given number in binary to decimal.

2. a) Write a program to find the smallest and largest element in an array.
   b) Write a program to concatenate two strings.
3. a) Write a program to find the sum of squares.

b) Write a program to solve the quadratic equation for all conditions i.e., roots are equal, imaginary and distinct.

4. a) Write a program to print the reverse of an integer.
   b) Input 'n' integers (real, character) & store them in an array.
5. Write a program to sort the elements in ascending and descending order Using a)Bubble sort b)Selection Sort.
6. a) Write a program to find whether the given string is a Palindrome or not.
   b) Write a program to insert an element into an array.
7. a) Write a program to calculate the grades of n students from three tests.
   b) Write a program to delete an element from an array.
8. a) Write a program to search an element using linear search.
   b) Write a program to find the factorial of a number using Recursion.

9. a) Write a program to search an element using binary search.
   b) Write a program to generate the Fibonacci series using recursion.
10. Input 2 matrices of size M X N and P X Q. Perform
    a) Multiplication if they are compatible.
    b) Transpose of the resultant matrix. Print the result in matrix form with suitable headings.
11. Write a program to read and display details of students using structure.
12. Write a program to concatenate two files
13. Write a program to display Norm and Symmetry of Matrix.
14. Write a program to create and display the linked list.

2K11EM1101 : MECHANICAL ENGINEERING SCIENCES

Note:

FOUR questions from PART A and FOUR questions from PART B to be set.
Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART – A

Unit 1: Energy and its Sources:
Energy - Renewable and non-renewable, thermal, hydroelectric, solar, wind, tidal, ocean and nuclear energy.

Unit 2: Steam Generation Boilers:
Fire tube (Vertical Fire tube Boiler) & Water tube boiler (Babcock & Wilcox Boiler). Concept of wet, dry and superheated stream, Enthalpy, Latent heat, dryness fraction and degree of superheat and Entropy, Related numerical problems.

Unit 3: Energy Conversion: Using the following
a) Steam turbines: impulse and reaction turbines.
b) I.C. Engines: Diesel and petrol engines. Four stroke and two stroke engines. Indicated power and brake power, mechanical efficiency and thermal efficiency, Related numerical problems.

Unit 4: a) Air Compressor:
Use of compressed air. Working of compressor brief introduction and advantages of multi stage compressors.
b) Refrigeration and Air Conditioning:
Vapour compression and vapour absorption refrigeration's, Principles of air conditioning.

PART – B

Unit 5: Fasteners:
Temporary and permanent fasteners, ISO thread profile, single and multi start threads, lead and pitch Left and right hand threads, Hexagonal and square head bolts and Nuts, Riveted joints- single riveting and double riveting and welded joints – T joint, V – Joint, Lap – Joint.

Unit 7: Brakes, dynamometers and clutches:
Functions and types of brake, dynamometers and clutches.

Unit 8: Bearings & Lubrication:
Type of bearing, Journal bearing, ball bearing Necessity of lubrication. Types of lubricants, properties of a good lubricant.

PART – C

Unit 9:
Basic principles, procedures, advantages and limitations. Applications and examples involved in the following processes.
a. Casting b. Forging c. Rolling d. Drawing e. Extrusion
f. Welding g. Brazing and soldering

10. Machining:
Lathe: Block diagram of lathe, Basic concepts in turning, taper turning and thread cutting operations.
Drilling: Block diagram of radial drilling machine and Classification of drilling operations.

2K11EM1102 : WORKSHOP PRACTICE

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

Exercises in fitting shop comprising preparation of different joints using files, hacksaw, taps, dies and drills in 50mm by 6mm thick mild steel flats. 3 Models.

Exercises in Welding shop comprising welding lap joint, butt joint, and L-Joint in mild steel flats. 3 Models.

Exercises in carpentry shop comprising planning and chiseling and preparation of different joints like dove-tail joint Tenon – Mortise joint and open bridle-mortise joint in 25mm x 50 mm cross section wood. 3 Models.

Exercises in sheet metal shop comprising development and soldering of cylinder (base closed), cubical box, simple funnel (made of frustums of cones/Pyramids) and rectangular tray in 22 gauge (1.2 mm thick) G.I. sheet.3 Models.

Use of power tools to make one of the models in each shop.

BE II SEMESTER COMPUTER SCIENCE & ENGINEERING

2K11SM1201 :ENGINEERING MATHEMATICS - II

Note:

FOUR questions from PART A and FOUR questions from PART B to be set.
Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART A

Unit 1: Solutions of ordinary differential equations of first order and first degree:
Homogeneous forms, linear and bernoulli equations exact and reduce able to exact equations using standard integrating factors orthogonal trajectories in cartesian and polar forms.

Unit 2:
Second and higher order differntial equations, homogeneous linear equations with constant and variable co efficient, problems, Method of variation of parameters, Method of undetermined coefficients.

Unit 3: Vector differential calculus:
Vector valued function a of single variable, differentiation, geometrical meaning, examples. Scalar and vector fields, gradient of scalar field, the geometrical application, divergence and curl of a vector field, Laplacian, vector identities.

Unit 4: Vector Integration:
Line, surface and volume of integral of a vector function, Green's, Stokes and Gauss theorem (without proof) problems. Orthogonal curvilinear coordinates.

PART B

Unit 5: Laplace transforms:
Definition and basic properties, Laplace transform of elementary functions and standard results, Laplace transforms of derivatives and integrals, Laplace transforms of periodic function, Unit step functions.

Unit 6:
Inverse Laplace transforms, Convolution theorem, Applications of Laplace transforms to solve linear ordinary Differential equations of first and second order with constant coefficients.

Unit 7: Analytical geometry in 3 dimensions:
Direction cosines and Direction ratios, Planes, Straight lines, angle between planes / straight lines coplanar lines shortest distance between skew line and right circular cone and right circular cylinder.

Unit 8:
Special functions series solution of Bassel differential equation, Recurrence relation, Orthogonality, Generating function. Series solution of Legendre differential equation, Recurrence relations, Generating functions, Legendre polynomials.

2K11CE 1201 : STRENGTH OF MATERIALS

Note:

FOUR questions from PART A and FOUR questions from PART B to be set.
Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART A

Unit 1: Introduction:
Introduction to Body forces, surface forces, equilibrium of a deformable body, Normal stress, shear stress, allowable stress, stresses, deformation and strain.

Unit 2: Mechanical properties of materials:
Tension and compression test, stress strain diagram, stress strain behaviour of ductile and brittle materials, Hooke's law, Poisson's ratio, Saint Venant's principle, Principle of superposition, Young's Modulus, Secant Modulus, Ultimate stress, Rigidity Modulus, Bulk Modulus, relation between elastic constants, Compound bars, thermal stresses, stress concentration. Definition of stiffness and flexibility of axial bars in tension.

Unit 3: Bending moment and shear force:
Bending moment and shear force diagrams for statically determinate beams subjected to concentrated, uniformly distributed and varying loads, Moment diagrams by integration of shear, Shear diagrams by integration of load.

PART B

Unit 4. Deflection of Beams:
Introduction to elastic curve, moment curvature relation, governing differential equation, boundary conditions, deflections of statically determinate beams by double integration and Mecaulay's method.

Unit 5: Torsion:
Introduction, Basic assumptions, Torsional formula, application of torsion formula for circular sections. Replacement of solid shaft by hollow shaft and saving in weight. Applications of Torsion theory to closed and open coiled helical springs.

Unit 6: Pressure Vessels:
Thick and thin walled cylindrical and Spherical pressure vessels.

Unit 7: Buckling of Columns:
Introduction to critical load, Ideal column, Columns having different support, effective length, slenderness ratio, Rankine's formula

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2K11CE 1201 : BASIC ELECTRONICS

Note:

FOUR questions from PART A and FOUR questions from PART B to be set.
Students should answer FIVE questions selecting atleast TWO from each PART.
For every SIX hours of syllabus ONE question may be set.

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART A

Unit 1: Introduction to Electronics :

What is electronics, Electronic Devices, Evolution of Electronics-Vacuum tubes to Integrated Circuits, Conduction in Semiconductor: Electrons and holes in an intrinsic semiconductor, conductivity of a semiconductor, carrier concentration in an Intrinsic semiconductor, donor and acceptor impurities , charge densities in a semiconductor, Fermi level in a semiconductor having impurities, life time of carriers, Hall effect. Introduction to Solar energy Conversion, Photovoltaics.

Unit 2: Semiconductor - Diode Characteristics:

Qualitative theory of a PN junction, PN Junction as a diode, Volt – Ampere characteristics , temperature dependence of PN junction, half wave and full wave rectifiers, ripple factor, capacitor filter, Zener Diode- characteristics, Zener and avalanche breakdown, Zener regulated power supply.

Unit 3: Transistor Characteristics:

Junction transistor, transistor – current components, transistor as an amplifier, common base configuration, common emitter configuration and Common Collector configuration with input and output characteristics, CE cutoff region, CE saturation region , large signal , DC and small-signal CE values of current gain, operating point, bias stabilization, decibel, Classification of amplifiers, RC coupled amplifier, frequency response, distortion in an amplifier, cascading transistor.

Unit 4: Theory of Sinusoidal oscillators:

Concept of feedback, sinusoidal oscillators, working of RC phase shift, Colpitts and Hartley's oscillator using BJT's Expressions for frequency of oscillation (No derivation), crystal oscillator.

PART B

Unit 5: Operational Amplifiers (OPAMP):

Introduction, ideal OPAMP, need for OPAMP, OP AMP characteristics, OPAMP applications: voltage follower, addition and subtraction using OP AMP circuits, OPAMP integrating and differentiating circuits.

Unit 6. Communication systems:

Basic block diagram of communication systems: Radio AM & FM, TV, Overview of Mobile communication, Satellite communication, Modulation, Amplitude Modulation , Frequency spectrum, power relations, Phase and Frequency modulation , comparison of AM and FM, radio telephony, super heterodyne receiver, Transmitters.

Unit 7: Digital Electronic:
Digital logic – Binary numbers base conversion, Octal and Hexadecimal numbers , binary addition and subtraction using One's and Two's complements, addition and subtraction in Binary, Octal and Hexadecimal Number systems, BCD and EX-3 addition and subtraction, numbers, binary logic symbols, basic theorems & properties of Boolean Algebra, De-Morgan's theorem. AND OR logic gate realizations using Transistor – Transistor Logic (TTL), MOS, CMOS , NMOS,PMOS . Symbols used for NOT, OR, AND, NAND, NOR, XOR gates and their truth tables, Realization of Boolean functions using basic gates. Realization of basic gates using universal gates.

Unit 8: Introduction to Cathode Ray Oscilloscope (CRO):
Basic block diagram, use of CRO for measurement of amplitude Frequency and Phase.

2K11EM 1201 : ENGINEERING DRAWING

Hours per week : 4 Examination Marks : 100 Sessional Marks : 25

PART – A

Projection of Points:
Concept of Orthographic Projection, Projection of points in different quadrants, emphasizing on First Angle Projection.

Projection of Straight Lines:
Projection of lines in simple positions, inclined to one plane and parallel to other plane, inclined to both planes. To find true length and true inclinations, Practical problems.

PART – B

Projection of Plane Surfaces:
Projection of right regular triangle, square, rectangle, pentagon, hexagon, and circle without through holes (by change of position method and Auxiliary plane method.)

Projection of Solids:
Projection of the following simple and right regular solids: Prisms, Pyramids, Cones and Cylinders (without through holes), inclined to both HP & VP (by change of position method and Auxiliary plane method.)

PART – C

Isometric projection:
Isometric projection of right regular solids viz. prisms, pyramids, cone, cylinder and their frustums and sphere and combination of any two of these solids.
Simple Department of Mechanical Engineering - Machine parts.