B. TECH. (MECHANICAL ENGINEERING)

SEMESTER WISE COURSE DISTRIBUTION FOR B. TECH. (MECHANICAL ENGINEERING) BATCH 2009-2010

S.No.	Course No.	Course Name	Credit hrs.
I Semester			
1	BPM-111	Engineering Mathematics-1	3 (3+0)
2	BPC-111	Engineering Chemistry-II	2 (1+1)
3	TCE-111	Solid Mechanics	4 (3+1)
4	BPP-111	Physics-I	3 (2+1)
5	TME-111	Thermodynamics & Heat Engine	4 (3+1)
6	TCP-111	Introduction to Computer & Programming	3 (1+2)
7	TWP-111	Work Programme	1 (0+1)
		Total	**20 (13+7)**
II Semester			
1	BPC-121	Engineering Chemistry-I	3 (2+1)
2	BPP-121	Physics-II	3 (2+1)
3	BPM-121	Engineering Mathematics-II	4 (4+0)
4	TCE-121	Engineering Drawing	2 (0+2)
5	TPE-121	Workshop Practice	2 (0+2)
6	BHS-121	Technical Writing	3 (2+1)
7	TME-121	Internal Combustion Engines	4 3+1()
		Total	**21 (13+8)**
III Semester			
1	TEE-211	Principles of Electrical Engineering	4 (3+1)
2	TPE-211	Material Science	3 (2+1)
3	BPM-211	Engineering Mathematics-III	3 (3+0)
4	TCE-211	Fluid Mechanics	3 (2+1)
5	TCP-211	Programming in Fortran & C	4 (3+1)
6	TME-211	Kinematics of Machines	3 (2+1)
7	NSS-211	N.S.S. – Non – Credit	(0+2) N.C.
		Total	**20 (15+5)**
IV Semester			
1	TEE-221	Basic Electronics	3 (2+1)
2	TME-221	Manufacturing Process	4 (3+1)
3	TME-222	Theory of Fluid Flow	3 (2+1)
4	TME-223	Machine Drawing	2 (0+2)
5	BPM-221	Probability, Statistics & Queuing Models	2 (2+0)
6	TME-224	Measurement & Control	4 (3+1)
7	TME-225	Numerical Methods for Mechanical Engineers	2 (1+1)
		Total	**20 (13+7)**
V Semester			
1	TME-311	Strength of Materials	4 (3+1)
2	TME-312	Heat and Mass Transfer	4 (3+1)
3	TME-313	Fluid Machinery & System-I	4 (3+1)
4	TME-314	Ref. & Air Conditioning	4 (3+1)
5	TME-315	Theory of Machines	4 (3+1)
		Total	**20 (15+5)**
VI Semester			
1	TME-321	Mechanical Vibrations	4 (3+1)
2	TME-322	Fluid Machinery & Systems-II	4 (3+1)
3	TPE-321	Industrial Economics	3 (3+0)
4	TPE-322	Production Engineering	4 (3+1)
5	TME-323	Machine Design-I	4 (3+1)
6	TPE-323	Work Study	3 (3+0)

7	TME-324	Practical Training	30 days
		Total	**22 (18+4)**

Note: Training shall be completed in the semester break

VII Semester

1	TME-411	Power Plant Engineering & Energy Conversion	4 (3+1)
2	TPE-411	Industrial organization & Management	3 (3+0)
3	TME-412	Machine Design II	4 (3+1)
4	TME-413	Computer Aided Design	3 (1+2)
5	TME-414	Automobile Engineering	4 (3+1)
6	TME-415 (A)	Project	2 (0+2)
		Total	**20 (13+7)**

VIII Semester

1	TME-	Elective-I	4 (3+1)
2	TME-	Elective-II	4 (3+1)
3	TME-	Elective-III	4 (3+1)
4	TME-	Seminar	1 (0+1)
5	TME-415 (B)	Project	4 (0+4)
		Total	**27 (9+8)**
			160 (109+51)

ELECTIVE COURSES (ANY THREE)

1	TME-421	Nuclear Engineering	4 (3+1)
2	TME-422	Solar thermal Processes	4 (3+1)
3	TME-423	Design of Rotadynamic Pumps	4 (3+1)
4	TME-424	Bearing and Lubrication	4 (3+1)
5	TME-425	Design of Blowers and Rotary compressors	4 (3+1)
6	TME-426	Non-conventional Energy Sources and Systems	4 (3+1)
7	TME-427	Fuels and combustions	4 (3+1)
8	TME-428	Metrology	4 (3+1)

Note: All other courses of 400 series of any other department of College of Agricultural Engineering and Technology.

I SEMESTER

Name of the course : Engineering Mathematics-I
Course No. : BPM-111
Credit hours : 3 (3+0)
CATALOGUE DESCRIPTION:
Syllabus: The sign of the first derivative, concavity and point of inflexion. Asymptotes and symmetry, Rolle's Theorem, Mean Value Theorem, Extended Mean Value Theorem, Taylor's formula, Estimating approximation errors. Taylor Theorem with remainder and estimating the remainder. Newton's method for approximating solution of equation and Picard's Method. The first and second fundamental theorem of Intergral Calculus. Leibnitz's rule. Approximating finite sums with integrals. Rules for approximating definite integrals with the help of Trapezoidal and Simpson's rule and their error estimation. Convergence and divergence of infinite series non-negative terms with the help of comparison test, integral test, Limit comparison test, Ratio test, Root's test. Limit and continuity of function of two or more variables.

Partial Derivatives, chain rules for functions of two or more variables. Linear approximation of z=f (x,y) and their increment estimation. Maximum, minimum and saddle points for function for two or more variables, Lagrange's Calculating volume by slicing, volume modeled with shells and washers. Length of a plane curve. Area of a surface of revolution.

Convergence and divergence of improper integrals, Calculating volume by slicing, volume modele with shells and washers. Length of a plane curve. Area of a surface of revolution.

Polar coordinates; Polar equations of conics and other curves, Area of plane curves, Arc length and surface area.

Multiple Integrals: Double integrals, area bounded by curves, First and second moments, Polar moment of intertia, Radius of gyration, changing double integrals for cartesion to polar co-ordinates. Evaluation of triple integrals.

Parametric equations in alalytical geometry and idea of spherical and cylindrical co-ordinates.

Hyperbolic Functions: definition and identities, derivatives and integrals, Inverse hyperbolic functions.

Books:

1. Calculus & analytic geometry by Thomas & Finney
2. A text book of Engineering Mathematics by Bali & Lyengar
3. Higher Engineering Mathematics by B.S. Grewal.

Name of the course : Engineering Chemistry-II
Course No. : BPC-111
Credit hours : 2 (1+1)

CATALOGUE DESCRIPTION:

Water and waste water treatment, chemistry of strategic elements and their applications, basic organic reaction mechanism and reactions of industrial significance, polymer chemistry, environmental chemistry, pollution and majors of pollution central.

Syllabus:

Introduction, hardness of water and its disadvantages in industries with special reference to steam generation, softening methods, soda lime, zeolites ion exchange, Basic principles, reaction intermediates, elementary chemistry and some name reactions of industrial application like Beckmann, Hoffman, Reimen tiemann, Cannizaro, Diels-elder and Skrup's synthesis. Polymers and their classification, mechanism of polymerization and catalysts like. Tacticity of polymers, introduction and uses of natural and synthetic resins end fibers and rubbers, introduction to biopolymers, Introduction to environmental segmental structure and composition of atomesphere, chemistry and photochemical reaction (with special reference to ozone chemistry and chemistry of oxide of nitrogen and sulphor). Source and sinks for pollutants, pollution control methods.

Books:

1. Text book of Environmental Chemistry by S.S. Dara
2. Engineering Chemistry by Jain & Jain.
3. Polymer Science & Technology by Joel R. Fried.
4. Synthetic Rubbar their chemistry & Tech. by D.C. Blanckley
5. Organic Chemistry by Morrison and Boyd.
6. Environment Chemistry by A.K. De.

Experiments:

1. To determine the ferrous content in supplied sample using external indicator.
2. To determine chloride content in water using Mohar's salt.
3. To determine the constituents and amount of alkalinity of supplied samples.
4. To determine temporary and permanent hardness of water using compexometric method.
5. To determine the percentage of chlorine in supplied sample.
6. To determine the iron content in water sample by spectrophotometry.
7. To find chemical oxygen demand of waste water sample by potassium dichromate.
8. To determine pH of solution using pH meter and pH metric titration.
9. To determine Kinetics of hydrolysis of methyl acetate.
10. To determine the molarity of HCI pH metrically, provided with N/10 NaOH.
11. To determine relative viscosity of liquids with respect to water at room temperature by Ostwald or Redwood viscometer.
12. Demonstration of IR- spectrophotometer.
13. Determination of flashpoint.
14. Determination of equivalent weight
15. Determination of distribution coefficient.

Name of the course : Solid Mechanics
Course No. : TCE-111
Credit hours : 4 (3+1)

CATALOGUE DESCRIPTION:

Mechanics of rigid bodies, Resultnat of force systems, Equilibrium of forces, Trusses, centroid and centre of gravity, Second moment of area, Simple stresses and strains, Principal stresses and strains, Strain energy, Bending moment and shear force diagram for beams, Bending and shearing stresses, Torsion of circular shafts, Columns and struts, Slope and deflection in beams.

Syllabus:

Mechanics of rigid bodies: various two dimensional system of forces, resultant of forces, equilibrium of forces, free body diagram, parallelogram law, polygon law, moment of a focre, couple, resolution of forces into a force and a couple, Varignon theorem, various types of supports and corresponding reactions Concept of centroid: centroid of two dimensional bodies, determination of centroid by integration method, centroid of geometrically composite plane figures. Second moment of area: rectangular second moment of area, polar second moment of area, product second moment of area, radius of gyration, parallel axes theorem, perpendicular axes theorem, second moment of area of geometrically composite section Simple stresses and strains: stress, strain, actual stress and strain, nominal stress and strain, stress-strain curve for ductile and brittle materials, hook's law, Young's modulus of elasticity, concept of factor of safety, shear stress, shear strain, modulus of rigidity, complementary shear stress, elongation of various bars under self load and external loads. Temperature stresses due to uniform change in temperature, composite bars subjected to axial forces and temperature change, poison's ratio, volumetric strain, pressure, bulk modulus, Complex stresses: stresses on oblique plane induced due to two mutually perpendicular normal stresses and two shear stresses, principal stresses and principal planes. Introduction to bending moment and shear force: concept of bending moment and shear force, calculation of bending moment and shear force at any section, sign convention. B.M.D. and S.F.D. for cantilever, simply supported and overhanging beams subjected to various types of linearly varying loads. Stresses in beam: simple theory of bending (assumptions and derivation of expression for flexural and shearing resistance). Torsion of circular section: derivation of shear stress produced in a cicular shaft subjected to torsion, maximum torque transmitted by solid and hollow circular shaft, power transmitted by shaft, torsional rigidity. Slpe and deflection of statically determinate beams: slpes and deflection of cantilever and simply supported beams using Macaulay's method. Columns and struts: failure of short colun, Euler's theory for long columns, critical load, effective length of a column, slenderness ratio, limitations of Euler's theory, critical slenderness ratio, Trusses: introduction to trusses, analysis of planer statically determinate trusses, assumptions in truss analysis, method of joints, method of section.

Books:

1. Strength of Material by Surendra Singh
2. Strength of Material by B.C. Punmia
3. Engineering Mechanics by Timashankyo and Yound
4. Engineering Mechanics by Higdon and Styles
5. Strenght of Materials by R.K. Rajput.

Name of the course : Physics-I
Course No. : BPP-111
Credit hours : 3 (2+1)

Catalogue Description:

Rotation of rigid bodies, moment of inertia, relativistic mechanics, vector field magnetic field, electromagnetic induction, electric and magnetic fields in mathers, oscillations with N-degrees of freedom.

Syllabus:

Rotation of rigid bodies, angular momentum, inertial coefficients, parallel perpendicular axis theorem, moment of inertia of rigid bodies like sphere, spherical distk, Cylinder, and motion on inclined plne, Michelson Morley experiment, Inertial from of reference, Postulates of special theory of relativity, Lorentz transformation equation space and time, Length contraction, time dialation, velocity addition formula, relative mass, relativistic energy, transformation of momentum and energy, equivalence of mass energy. Scalar and vector fields, gradient, divergence, curl of the fields, Gauss's divergence and Stoke's theorem, Gauss's law and its applications, Poisson and Laplace equation Magnetic field, some properties of the magnetic field, vector potential, field of any carrying wire, electric conduction in a magnetic field (the Hall effect), Faraday's law, inductance, self-inductance, energy stored in magnetic field, a circuit containing L, C & R displacement current and Maxwell's equations, solution of Maxwell's equations in free Para-dia-ferro, and antiferro magnetic materials, B-H curve, Hysteresis. Free oscillations system with one and two degrees of freedom, Transverse mode of continous string, of non-continous systems with N degrees of freedom. Transverse oscillations of a string, longitudinal oscillations of spring and masses, coupled pendulums.

Books:

1. Fundamental of Physics by Resnick, Halliday and Walker.
2. Berkeley Physics Series Vol. I, II and III
3. Engineering Physic Vol. I & II by B.K. Pandey & Sujeet Chaturvedi
4. Engineering Physic by Satyaprakash

Name of the course : Thermodynamics & Heat Engines
Course No. : TME-111
Credit hours : 4 (3+1)

Catalogue Description:

System and properties, concept of energy, temperature & heat, equation of State, Law for closed & open systems, Pure substance & properties, Second Law thermodynamics & entropy, Boilers, mountings and accessories, boiler efficiency, engines, Rankine cycle, indicator diagrams, steam turbines. Internal combustion engines, Air standard Otto, Diesel, Dual and Joule Cycle.

Syllabus:

Introduction: Engineering system of units; system and their properties, concept of energy, temperature, work and heat, Zeroth law of thermodynamics; Equation of state for an ideal gas.

Pure substance; phase diagrams; tabulated properties, property charts and their use.

First law of thermodynamics and Engg. applications; Flow and non-flow processes; isothermal and adiabatic processes, reversible and irreversible processes.

Introduction and definition of second law of thermodynamics, Carnot cycle; definition and concept of entropy, change in entropy.

Steam Boilers: Definition and Classification of Boilers, Mounting & Accessories, Equivalent Evaporation, Boiler Efficiency.

Steam engines; Rankine cycle; construction and working of steam engine.

Steam turbine; construction and working of steam turbines; impulse and reaction turbines; velocity diagrams; work output and efficiency.

Air standard cycles; Otto, Diesel, Dual, Stirling, Joule and Atkinson etc.

I.C engines; Classification; construction and working of two stroke and four stroke engine work output; efficiency and mean effective pressure calculations.

Books:

1. Thermal Engineering by R.K. Rajput
2. Engg. Thermodynamics by Gupta & Prakash
3. Engg. Thermodynamics by P.K. Nag.

Name of the course : Introduction to Computer Programming
Course No. : TCP-111
Credit hours : 3 (1+2)
Catalogue Description:

Programming in FORTRON & C, Introduction to binary number system, Elementary logic gates and comp. org., Computer peripherals, Computer hardware & Arc + Microprocessor, Application & system software's Operating systems, Logic & language paradigm, Data structures, Algorithm & program development tools, Basics of digital data communication, Computer networks & internet.

Syllabus:

Introduction: Characteristics of computer, Evolution of computer, Generation of computers, Classification of Computers, The computer systems. Programming in FORTRON & C: Variables and expressions, basic input output, control structures, functions, arrays and strings, structure and union, pointer, dynamic memory allocation, macros, files. Number System and Logic Gates: Introduction, umber system, conversion between number bases, logic gates. Computer Architecture; Introduction, CPU, memory, communication between various units of a computer system. Input devices: Introduction, keyboard, pointing devices, speech recognition, digital camera, canner, optical scanner. Output Devices: Introduction, classification of output, hardcopy output devces, printers, plotters, softcopy output devices, monitors, audio output, projectors, and terminals. Computer Program: Introduction, software definition, relationship between software and hardware, software categories, system software, application software, software terminology, Operating Systems: Introduction, operating systems, modern operating systems. Data structure: Introduction, different type of data structures. Data communication and Computer networks: Introduction, data communication, transmission media, multiplexing, switching, computer networks, network topologies, communication protocols, network devices. Internet basics: Introduction, evolution of internet, basic internet terms, getting connected to internet, internet application, electronic mail internet, basic internet terms, getting connected to internet, internet application electronic mail (an introduction), how email works, searching the we (search engines), languages of internet, internet and viruses.

Introduction to binary number system, Elementary logic gates and comp. org, Programming in FORTRON &C, Computer peripherals, Computer hardware & Arc + Microprocessor, Application & system software's Operating systems, Logic & language paradigm, Data structures, Algorithm & program development tools, Basics of digital data communication, Computer networks & intrnet.

Books:

1. Introduction to Computer Science by ITL Education Solutions Ltd.
2. Let us C by Yashwant Kanetakar

Reference Books:

1. Programming with C written by K.R. Venugopal & Sudeep R. Prasad
2. The C programming language written by Brian W. Kernighan & Dennis M. Ritchie.
3. Computer Fundamentals by P.K. Singha
4. Introduction to Computers by Peter Norton
5. Programming in ANSIC by E. Balaguruswamy
6. Introduction to information technology, by D.S. Yadav

II SEMESTER

Name of the course : Engineering Chemistry-I
Course No. : BPC-121
Credit hours : 3 (2+1)
Catalogue Description:

Modern atomic theory, advanced treatment of chemical bonding, structure and directional properties of molecules, chemical kinetics, catalysie electro chemical cells, corrosion and its prevention, Iubrication, semiconductors, co-ordination compounds, crystalline structure, chemical thermodynamics, instrumental methods of chemical analysis.

Syllabus:

Introduction to modern atomic theory, Schrddinger wave equation and its application, wave mechanical model of hydrogen atom & hydrogen atom like ions, wave functions for hydrogen atom like ions and their usefulness in determination of most probable distance and nodal distance, mechanics of He-atom.

Molecular orbital theory of convalency and its application in energy determination of bonding and antibonding molecular of H2 + V.B. theory of covalency and its application to H2 molecule, Directional properties of H2O and NH3 molecules, pH-dependence of rate constatnts of catalysed reactions, catalysis. Kinetics of reversible, parallel and consecutive reactions theory of absolute reaction rates. Concentration cells, liquid junction potential fuel cells & their applications.

Concepts of corrosion types of corrosion and factors affecting the corrosion, chemical and electrochemical theory of corrosion, methods of preventing the corrosion. Classification and mechanism of lubrication.

Introduction, valence bond theory, crystal field theory, ligand field theory and molecular orbital theory of bonding in co-ordination compounds, isomerism in co-ordination compounds.

Crystalline structure – Bom – Haer Cycle, Bragg's condition crystal defects. Principles instrumentation and application of IR, UV-VIS.

BOOKS:

1. Ira. N. Levine: Quantum Chemistry
2. S. Glasstone: An Introduction to electrochemistry
3. P.W. Atkins: Physical Chemistry
4. Hanna: Quantum Chemistry
5. J.W. Moore & R.G. Pearson: Kinetics & Mechanism
6. Cotton & Wilkinson: Co-ordination Compounds
7. C.A. Culson: Valence
8. J.D. Lee : Concise inorganic chemistry

4. Intonation: Definition

1. Falling tone
2. Rising tone
3. Rising falling tone (Practical 2x2)

Books:

1. Strung Jr. William and E.B. White, The Element of style, Macmillan, 1967.
2. Legget, Glenn, C. David Mead and Willaim char vat, Essentials of Grammar and Composition, New Delhi: Prentice – Hall, 1988 (Indian reprint).

3. Sherman Theodore A., And Simon S. Jonhnson, Modem Technical; Writing, New Jersey: Prentice – Hall 1990.
4. Alvarez, Joseph A., The Elements of technical Writing, New York: Harcourt, 1980.
5. O'Conner, J.D., Better English Pronunciation, New Delhi University Book Stall, 1992.
6. Jones, Daniel and A.C. Gimson, Engilish Pronouncing Dictionary, London: J.M. Dent and ELBS, 1977.

POPIC

OUTLINE:	**L.P.**
1. Technical Writing	2 1x2
2. Development of a suitable style	3 3x2
3. Paragraph Writing	2 1x2
4. Report Writing	2 1x2
5. Technical Correspondence	2 1x2
6. Proposal writing	2 1x2
7. Writing Scientific and Semi-technical Articles	2 1x2
8. Study of Scientific and General Texts	

Name of the course : Physics-II
Course No. : BPP-121
Credit hours : 3 (2+1)
Catalogue Description:

Interference, Diffraction and Polarization of light, Quantum Theory and concern quantum mechanics, Lasers, Nuclear structure, crystal structure.

Syllabus:

Coherent sources, Fresnel's Biprism, Young's double slit; Newton's rigns, single double slit, Diffraction, transmission diffraction grating, resolving power of microscope and grating, Polarization of light, different kinds of polarized light, law, Malus's law, phenomenon of double refraction, construction and working of prism, retardation plates, optical activity, specific rotation and polarimeter:

Origin of x-rays, continuous and characteristic x-ray spectra, Moseley's absorption of x-rays, diffraction of x-rays, Bragg's law, Bragg's spectrometer, photos effect, Compton effect and pair production.

Wave particle duality, uncertainty principle and its applications non-existence electron in a nucleus, minimum energy of harmonic oscillator, ground state hydrogen atom.

Schrodinger's equation (time dependent and independent), expectation values, particle in a box (one dimension), harmonic oscillator, single step, rechlangular barrier and tunnel effect.

Spontaneous and stimulated emission of radiation, Einstein's coefficients, main components of laser, population inversion, ruby and He-Ne laser.

Books:

1. Concepts of Modern Physics by A. Beiser
2. Fundamentals of Physics by Resnick, Halliday and Walker
3. Engineering Physics by K.J. Pratap (New Age. Pub.)

Name of the course : Engineering Mathematics-II
Course No. : BPM-121
Credit hours : 4 (4+0)
Catalogue Description:

Differential equation: Exact deferential equation Integrating factor, orthogonal trajenctories, Picard's iteration method for solving differential equation of order on homogeneous linear differential equation of second order, second order differential equation reducible to first orger, Homogeneous second order differential equation with constant coefficient (real roots, complex roots, double roots of the characteristic Equation); cauchy's equation, linear dependency and order, Non-homogeneous linear equation: Method of Undetermined coefficients and general method. Laplace transform: definition, linearly, existence theorem, Laplace transform of derivatives and integral, shifting Theorem unit step function, convolution theorem, function, Inverse Laplace transform, Solution of differential equation and system of periodic differential equations upto second using Laplace transformation.

Martrices Types, Rank, Linear dependency and Independency of vectors Inverse Linear transformation, Billnear, Quadratic, Hermitian and skew-Hermitian forms Eigen values and Eigen vector and unitary matrices, Solution of system of Linear ditrerential equation using eigen value eigen vector method upto first order.

Vectors: Vector calculus; derivatives curves, Helix are length of cruves, curvature and Torsion, Frenet's formulas. Directional derivatives, divergence curl and gradient of vector field. Line integral evaluations, double Integral, Grean's theorem surfaces Tangent Plane. Area, surface integral, Statement of Divergence theorem of Gauss and stoke's theorem and related simple problems.

Forrier series: periodic functions, Euler's formula, functions having arbitarary period, even and odd functions, half range expansions.

Partial differential equations: Basic concept separation of variables method for solution of one Power sries. Application of power series in solution of first order differential equation and second order differential equation having distinct root of auxiliary equation. Convergence and divergence of power series.

Books:

1. Advanced Engineering Mathematics by Erwin Kreqszig.
2. A text book of engineering Mathematics by Ball and lyengar.

Name of the course : Engineering Drawing
Course No. : TCE-121
Credit hours : 2 (0+2)
Catalogue Description:

Uses of drawing instruments and scales, Free hand and technical lettering, Geometrical construction. Theory of projections, Projections of points, straight lines and planes, Auxiliary planes; solids, Development of surfaces of solids, Sections of solids Interpenetration of solids, Isometric and Perspective views.

Syllabus:

Uses of instruments and scales; Drawing board, T-Squares, mini-drafter, set squares compass, divider, fresh curves etc. Free hand and technical lettering, Types of lines thickness and shades of lines, single stroke and gothic letters and dimensioning, Geometics constructions; division of lines and curves, regular polygons, different types of curvers tangents, lengths of arcs. Theory of projections, orthographic projections, planes projection; four qualdrants, first angle and third angle projections, conventions adopted Projections points, straight lines and planes, auxiliary planes, solids, true length of lines and its inclinations with and reference planes traces of a line. Development of surfaces of solid cubes, prisms, cylinders, pyramids, cones and spheres. Section of solids: section planes, and shape of sections. Intersection of surfaces and inter-penetration of solids. Lines of isometric scale; isometric projections, definition of perspective elements, station point, picture plant vanishing point, different methods of perspective projection.

Books:

1. "Elementary Engineering drawing" by N.D. Bhatt.

Name of the course : Workshop Practice
Course No. : TPE-121
Credit hours : 2 (0+2)
Catalogue Description:

Fundamentals of general Engineering Workshop Practices including metals alloys, Wood working, fitting, Lathe, Shaper, Planer and casting operations.

Syllabus:

Introduction, safety precautions, properties of metals and alloys. Forging operations and making of simple jobs. Fitting tools, carpentry work, types of seasoning and wood preservation, plywood, wooden joints and tools. **Lathes:** specifics tools and operations, **Shaper and Planer:** specifications, operations and tools, geometry single point cutting tools, **Foundry:** moulding sands, patterns and allowances, cores, prints, chaplets, moulding methods, finishing of casting and defects. Introduction to weld processes, are and gas welding, gas cutting, brazing and soldering Laboratory experiment General Introduction, Safety precautions, Properties of metals, types of metals.

Introduction to metal shaping at elevated temperature, forging materials and operations, use of forgen parts. Introduction to fitting work, scope and applications, Engineering uses of timber, seasoning and preservation. Important joints and plywood Introduction to Common m/c and operations centre lathe-principle, specifications, operations, tools etc. Cutting tool materials and geometry of single point cutting tools, tool signature. Scope of moulding, characteristics of moulding materials, types of sands, green and dry sand, moulding methods. Foundry terminology, use and applications of Pattern. Gates, Runners, Risers, Core, Core boxes, Core prints and chaplet. Fettling and finshing operations, common casting defects. Introduction to welding process, types of welding process. Arc welding. Gas welding, gas cutting, soldering and Brazing, General applications of workshop practices in Engg.

Experiments:

1. Forging tools and equipments and safety precautions.
2. Fitting tools and equipments – use of V-Block, marking gauge height gauge combination sets, taps and dies.
3. Carpentry tools, wood working lathe and band saw.
4. Foundry tools and equipments.
5. Welding equipments and safety precautions.
6. Study of metal working M/Cs and their operations.

Books:

Elements of workshop Technology volume I by S.K. Hajra Choudhry, S.K. Rose and A.K. Hajra Choudhry.

Reference Books:

1. Workshop Technology, Part 1 and 2 by Dr. W.A.J. Chapman
2. All about machine tools by H. Gerling.

Name of the course : Technical Writing (English)
Course No. : BHS-121
Credit hours : 3 (2+1)

Catalogue Description:

An advanced course meant to expose students of Science and Technology to English used in scientific texts, Expansion of non-terminological scientific vocabulary, sentence Correction and improvement, report writing official and technical Correspondence and study of scientific and general texts.

Syllabus:

Technical Writing: The nature of Technical writing, Technical style vs. eneral style (brevity versus diffuseness, clarity versus ambiguify).

Objectives versus subjectivity, simplicity versus pompsily, utility versus pleasurability), Writing Process (Pre-writing, drarting, rewriting and editing). Exarcises in grammatical pre-tequisites (Case of Nouns and Pronouns, Agreement of verb and its subject, Tense and mood, Adjectives and adverbs, Pronouns with antecedents, Voice).

Development a suitable style:

Effect of diction on style, effect of sentence – structure on style, effect of paragraphs on style, manuscript form, numbers, abbrevilations, hyphenation of compound terms, decimal system of numbering headings Equations, documentation, exercises in sentence correction (Fregmented sentences, Parailtel/ nonparallel sentences, illogical comparisons, dangling constructions squinting constructions, split infinitives, specific information, pompous style, deadwood.

Paragraph writing:

Paragraph, Definition; requirements of a good paragraph (Unity, Coherence and Emphasis, topic sentence, various orders to develop a paragraph (viz. Inductive, Deductive, Question to answer, Exposition, Time Order, Comparison and contrast, Enumeration, Space Order), Some examples of good paragraphs.

Report writing:

Report Definition and cardinal characteristics (Self – sufficiency, Interest Thoroughness, Omission of unnecessary materials, freedom from bias, Objectivity, Restraint, Appropriate degree of impersonality) Analyzing the Report-Writing situation (Making a tentative plan, gathering information, interpreting facts, making detailed outline, planning the use of visuals, writing the first draft, revision), Report Fonnals (Blank form, letter form Memorandum form, General-Survey report.

Proposal writing:

Proposal: Definition and kinds, Division of Formal Proposals (Front Matter, Letter of Transmittal, Title Page, Summary or Abstract, Table of contents, Statement of request body statement of a problem, background, scope, methodology, facilities, personnel, advantages and disadvantages, costs and reports). Some specimen proposals.

Writing Scientific and semi-technical articles:

Ounce material, topic selection, literature review, tables, figures, footnotes bibliography, some specimen articles.

B. Study of scientific and general texts.

Prescribed Text Books:

A. Arora, V.N. and Lakshmi Chandra, "Improve Your Writing" (Delhi; OUP, 1981) Lesson Numbers; reading (any two of the following):

1. Dicknes, Charles, David Copperfield
2. Hemingway Emest, The Old man and the Sea, Indian rpt, 1977, Delhi; Surjeet.
3. Desai, Anita, Fire on the Mountain.
4. Orwell, George, Nineteen Eighty four (New York: Penguin, 1984).

Laboratory practical:

Listening Comprehension – Ear – training, use of latest scientific techniques – A.V.R. Comprehension Trainer, S.A.R. Comprehension Accelerator, A.V.R. Comprehension Radiometer and E.D.T., Skimmer.

Ear-training and Comprehension acceleration through listening of thirty chapters of English Coure (Linguaphone Institute, London) each lesson on 5 min duration. Listening Comprehension through Linguaphone Travel Course containing 32 chapters/ records/ casseties (earch of 5 min. duration) (Practical 3 x 2).

2. Identification of Phonetic sounds and symbols:

1. Consonants
2. Pure Vowel
3. Diphthongs
4. Organs of Speech
5. Place of Articulation
6. Manner of Articulation

Vocieless and Voiced Sounds (Practical 2 x 2)

3. Stress and Intronation:

1. Stress: Definition
2. Initial and final consonant clusters
3. Mono syllabic works
4. Disyllabic words
5. Strong forms and weak forms
6. Accent in connected speech

Name of the course : Internal Combustion Engines
Course No. : TME-121
Credit hours : 4 (3+1)

Catalogue Description:

Two and four stroke engines; Air standard cycles; Fuels and combustion; Fundamental of ignition systems; Performance and rating of engines; Combustion characteristics and combustion chamber for S.I. and C.I. engines, supercharging.

Syllabus:

Classification of I.C. Engines, Nomenclature, Four stock, Two-stroke cycles and its comparison, Valve timing diagram; First law analysis of engine cycle; energy balance; Air- Standard cycles; Otto, Diesel, Dual cycle, Comparison of cycles, Mean effective pressure.

Fuels- petroleum bas liquid fuels-Rating and qualitites of S.I. and C.I. engine fuels, Cetane and Octane numbers; combustion equations, Air-fuel requirement Volumetric and gravemetric analysis.

Carburetor, functions air-fuel mixture requirement, distribution system; ignition system; battery ignition system; magnet ignition system; Spark plugs; Combustion in S.I. engine, flame front propagation, factors affecting flame speed, abnormal combustion, Pre-ignition; detonation; variables affecting detonation, Combustion chamber design; requirement of diesel injection systems; types of injection systems fuel pump, Type of fuel injection nozzles.

Combustion in C.I. engine; lgnition delay; knocking; Variables affecting delay; Combustion chambers for C.I. engine; Variable affecting, C.I. engine perform engine performance curves. Cooling of engine; air cooling and water cooling system charging, Methods of improving engine performance for C.I. and S.I. Engine. Supercharge control devices.

Books:

1. Internal Combustion Engine by Obert Edward F.
2. A Course in I.C. Engine by Mathur and Sharma
3. Internal Combustion Engine by Maleev and Litchy

Reference Books:

1. Internal Combustion Engines by V. Ganeshan.

III SEMESTER

SEMESTER-III

Name of the course : Principles of Electrical Engineering
Course No. : TEE-211
Credit hours : 4 (3+1)
Catalogue Description:

Magnetic circuits and transformers, fundamentals of electro-mechanical energy conversion, energy and co-energy, torque production in single excited and double excited magnetic system, reluctance torque, basic principles of d.c. machines, induction motors, servo motors.

Syllabus:

Magnetic circuit: L-H relation, B-H relation magnetic equivalent circuit Magnetization curve hysteresis and eddy current loss. Transformer. Introduction and working principle of the transformer (1-ph), its construction, e.m.f. equation phaser diagram, equivalent circuit, short circuit and open circuit tests on transformer loss, efficiency regulation. Fundamentals of Electromechanical energy conversion: Principle of energy conversion, concept of energy and co-energy Graphical interpretation of energy conversion. Torque production in single excited and doubly excited electromagnetic system: Concept of signle excited and doubly excited electromagnetic system, Torque production reluctance torque and electromagnetic torque. Basic principles of D.C. machines, induction motors, servomotor and synchronous machine: Basic concepts of rotating machines construction features of Rotating Electrical Machines. Working Principle, application. Basic principles of reluctance motor permanent magnet and hysteresis machines: working principle of reluctance permanent magnet and hysteresis machines, application. Introduction to stepper motor permanent magnet and variable reluctance application: Basic principle, Application.

Magnetic circuit: L-H relation, B-H relation Magnetic equivalent circuit Magnetization hysteresis and eddy current loss.

Transformer: Introduction and working principle of the transformer (1-ph), its construction, e.m. equation phaser diagram, equivalent circuit, short circuit and open circuit tests on transform loss, efficiency regulation.

Fundamentals of Electromechanical energy conversion: Principle of energy conversion, concentration of energy and co-energy Graphical interpretation of energy conversion.

Basic principles of D.C. machines, induction motors, servomotor and synchronous machine Basic concepts of rotating machines construction features of Rotating Electrical Machines. Working Principle, application. Basic principles of reluctance motor permanent magnet and hysteres machines: working principle of reluctance permanent magnet and hysteresis machines, application Introduction to stepper motor permanent magnet and variable reluctance application: Basic principle Application.

Books:

1. Principles of Electrical Engineering by V. Deltoro

2. Electrical Machines by P.S. Bhimbra
3. Electrical Machinery by F. Fitzerald

Name of the course : Materials Science
Course No. : TPE-211
Credit hours : 3 (2+1)
Catalogue Description:

Introduction, structure of metals and non-metals. Structural imperfections: solutions: Diffusion. Mechanical, electrical and thermal properties of materials.

Introduction to phase-diagram. Iron-Carbon system, heat treatment, T-T-T-Cast iron; Non-ferrous metals and their alloys. Powder Metallurgy. Mechanical **Metallus Syllabus:** Introduction, Aims and Scope of the course, crystalline & Non-Cryst structures, Unit-cells, Bravais space lattices, cubic and hexagonally closed packed structure co-ordination no., packing factor. Miller indices, crystallographic planes and director Structural imperfections-point, line, planer and volume defects. Dislocations, energy dislocations, structural sensitive & insensitive properties, structure property relation toughness, ductility and malleability, hardness, brittleness, strength, creep and fatigue. Deformation, strain hardening effects, slip systems. Soilid solutions, types of solid solution Alloys; definition, types and utility. Diffusion, fick's laws of diffusion, practical example Fatigue; S-N curve, mechanism of fatigue, factors affecting fatigue, examples. Creep; curve, factors effecting creep, practical examples. Thermal properties, coeff. of expansion, thermal diffusivity, thermal conductivity. Composite materials, definition, advantages and applications of composite materials. Gebb's phase rule, Uninary and Binary phase diagram, lever rule. Iron-Carbon phase diagram. Phase transformation, Nucleation growth. T-T-T-curves, Martensite transformation crystal growth An zone Precipitation hardening, Recrystallization, Grain Growth. Glass transition, Metallurgy, Cast iron and steel, Non-ferrous. Glass Transition, Smart Material and Nano material.

Books:

1. Elements of Materials Science by Van Vlack
2. First course in Materials Science by Raghvan
3. Material Science by W.D. Callister

Reference Books:

1. Introduction to physical Metallurgy by Avner.
2. Mechanical Mechanical Metallurgy by George E. Dieter.
3. The structure & Properties of Materials (Vol. 1-IV) By Havden. Moffat and Wolff.

Name of the course : Engineering Mathematics-II
Course No. : BPM-211
Credit hours : 3 (3+0)
Catalogue Description:

Complex numbers, Analytic functions, conformal Mapping, Complex integration Cauchy integrial theorem, Taylor's and Laurent's series, zero and singularities, Residue, Cauchy Residue theorem, Evaluation of real integrals by Residue theorem.

Complex number, Curves and Regions in complex plane, Limit, derivative and analytic Harmonic functions. Cauchy-Riemann equations, Laplace's equation. Exponential function, trigonometric, Hyperbolic & logarithmic functions.

Mapping, Conformal mapping, Linear fractional transformation special linear fractional transformations.

Power series, Taylor series of elementary function, Laurent's series, complex line integral & its properties, Cauchy's integral theorem and formula, Derivatives of analytic functions. Residue theorem, Evaluation of real Integrals.

Books:

1. Advanced Engineering Mathematics by Erwin Kreyszig.
2. Higher Engineering Mathematics by B.S. Grawal.
3. A text book of Engineering Mathematics, Vol I & II by Bali and lyengar.

Name of the course : Fluid Mechanics
Course No. : TCE-211
Credit hours : 3 (2+1)
Catalogue Description:

Introduction, Fluid properties, Units and dimensions, Fluid Statics, Kinematics of fluid flow, Continuity equation, Eulers and Energy equations, Impulse-Momentum principle, Dimensional analysis and Hydraulic similitude, Flow in pipes. Flow in open channels, Measurement of flow.

Syllabus:

Introduction: Fluid mechanics, Ideal and Real fluids, Difference between fluids and solids, Properties of Fluids: Mass density, weight density, specific volume, pressure, relative density, and viscosity, vapour pressure, bulk modulus of elasticity and compressibility, surface tension and capillarity. Units And Dimension: SI units, dimensions in M-L-T system. Fluid Statics: (a) Fluid pressure and its measurements, Pascal's law, hydrostatic law, atomospheric pressure, absolute pressure, section pressure, piezometers, simple manometers, differential manometers, inverted manometers, sensitivity of manometers and piezometers. (b) Hydrostatic force on surfaces, total pressure and centre of pressure, buoyancy and floatation, centre of buoyancy, metacentric height, stability of submerged and floating bodies, determination of metacentric height, time period of transverse oscillation of floating bodies. Kinematics of Fluid Flow: Types of fluid flow, path line, streamline, Continuity equation. Energy Equation: Euler's equation-derivation. Bernoulli,s equations and its applications, venturimenter, orificemeter, pitot tube, Prandtl tube, Momenum Equation and its applications, impact of jet on stationary and moving pates, force on pipe bends and on hydraulic Buckingham Pi theorem, Types of similarities. Flow In Pipes: Laminar flow, turbulent flow, Reynolds experiment, Darcy-Weisbach equation, Hagen-Poiseuilli's equation, Blasius equation, energy losses in pipes, hydraulic grade line, and total energy line, pipe in parallel and series, siphon. Open Channel Flow: Types of flow in channels, geometrical properties of channel sections, most economical channel section. Flow Measurements: Flow through orifices and mouthpieces, determinations of hydraulic coefficients, head losses of flowing liquid, flow over notiches and weirs (rectangular, triangular, trapezoidal, cipolletti), broad crested weir.

Books:

1. Elementary Fluid Mecahncis by J.K. Vennard & R.L. Street
2. Fluid Mechanics" by A.K. Jain.
3. Engineering Fluid Mecahnics by R.J. Garde & A.G. Mirajgaokar.
4. Hydraulics and Fluid Mechanics including Machines by P.N. Modi & S.M. Seth.
5. Engineering Fluid Mechanics by K.L. Kumar.

Name of the course : Programming in Fortran and C
Course No. : TCP-211
Credit hours : 4 (3+1)
Catalogue Description:

Computer and Operating Systems. Working with screen editors, creating fiels editing, complilation and execution of programmes.

Fortran Programming: Characters, constants and variables, arithmetic and logical statements control statements, subscribed variables, common and equivalence statements, functions sub-programme and sub-routines.

C programming: Characters, variables, concepts, data type and sizes, labels, declaration, operators and expressions, data input and output, control statements, C-function, arrays, strings and pointers Introduction of other languages.

Syllabus:

Fundamentals of Computer, Various I/O Units their function.

Fundamentals of Operating system type of O.S., Multitasking, timesharing, multiprogramming e.g. Unix, WINOWS 9X, MS-DOS.

Working with Unix SVR 4.2 various screen editor commands other commands e.g. Oui, pp, rm Introduction to C Programming.

Skelton of C program using simple illustrations.

Fundaments data types, class of data i.e. various, constants, idensitifiers.

Arithmetic operations, evaluation of expression, I.O. with example.

Relational logical operators, conditional expression operators, conditional statements nested conditional statements switch case statements with example.

While loop, do-loop, nested loops with example.

Functions definition, function, call recursion function with example.

Bases of Array, pointers functions & pointers with example.

Introduction to fortran Programming.

Opening a program files under Unix environmental.

Fortran constants & Variables type declarations for integer & real.

Arithmetic Operators, integer & real expressions example of arithmetic expression 2 Simple computer program, control statements relational operators, logical IF statement do-statement, repeat while, structure, simple I/O statement.

Subscripted variables, use of multiple subscripts, Dimension statement.

Function & subrountines, introduction, statement function, syntax rules for function, subprogram, subroutines.

Name of the course : Kinematics of Machines
Course No. : TME-211
Credit hours : 3 ((2+1
Syllabus:

Introduction: Aims & scope of the course & Basic concepts of Mechanisms, Basic definitions, Difference between structure & Machine, Links & their types, Types of constrained motion, Kinematic pair & their classification, Grubler's mobility critieria, Inversion of a kinematic chain, Inversion of Four bar chain, Slider crank mechanism and Double slider crank mechanism, Problems on kinematic chains. Velocity diagram of Mecahnisms: Location of Instrantaneous Center and its properties, Body Centriod and space Centriod, Number of Instantaneous center in a mechanism and their types, Special cases of location of Instantaneous center, Kennedy three centers in line theorem, Method of locating Instantaneous center in a mechanism, Methods for the velocity of a point on a link by instantaneous center method, Velocity of point on a link by relative velocity method, Velocities in slider Crank and Four bar mechanism Rubbing velocity at a pin joint. Problems based on the application of above methods. Belt, Rope and Chain drives: Types and materials of belts, Types of flat belt drives, Determination of velocity in case of simple and compound belt drive, Slip of belt, Creep of belt, Length of an open belt drive and length of a cross belt drive. Power transmitted by a belt, Ratio of driving tension for flat belt. Determination of angle of contact, Centrifugal tension in belts or ropes, Maximum tension in belts, Conditions for transmission of maximum power in case of flat belt drive, initial tension in the belt, Effect of initial tension on transmission of maximum power for flat belt drive, V-Belt Drive, Advantages and Disadvantages of V-belt drive over flat belt drive, Ratio of driving tension for V-belt and Rope. Chain drive, Advantages and Disadvantages of chain drive over belt or rope drive, Pitch and pitch circle diameter in case of chain drive and relation between them. Problems based on the application of above theory. Brakes & Clutches: Type of braking systems, force & torque analysis for block, band and band and block brake.

Friction clutches, Disk or Plate clutches & its analysis for torque transmitted based on uniform pressure & uniform wear theory. Cone clutches and its analysis for torque transmitted based on uniform pressure and uniform wear theory. Problems based on the application of above theory. Gears & gear Trains: Some basic definitions, Types of gears and gear trains and their analysis.

Experiments concerning linkages, mechanism, simple machines and geared system Problems based on the application of above theory.

Books:

1. Theory of Machines by Thomas Bevan.
2. Theory of Machines by R.S. Khurmi.

Reference Books:

1. Kinematics by H.N. Tyson.
2. Theory of Machines by J.E. Shingley.
3. Theory of Machines by S.S. Rattan.

IV SEMESTER

SEMESTER-IV

Name of the course : Principles of Electrical Engineering
Course No. : TEE-221
Credit hours : 3 (2+1)
Catalogue Description:

Solid-state devices and circuits-transistors and thyristors-their applications; transducers and measurements of non-electrical quantities; industrial applications and controls.

Syllabus:

Semiconductors and Junction Diodes: Energy Bands theory of Solids – Distinction between Conductors, Semiconductors and Insulators – Properties of Semiconductors – Semiconductor Junction Diodes – Zener Diodes – Photodiodes – LEDs. Diode Circuits: Rectifiers and Filters – Clipping and Clamping Circuits – Zener Diode Voltage Regulator.

Junction Transistors: Principle of operation – CE, CB and CC Configurations – Static Characteristics – Biasing schemes, load line concept, bias stabilization, stability factor, bias compensation, Basics of Transistor Amplifiers.

Transducers – Classification & selection criteria – principles of piezoelectric, photoelectric, thermoelectric trasnducers resistance temperature transdurers (RTD) – thermistors, strain gauge, load cells, LVDT, Measurement of non-electrical quantities (pressure, force, temperature, flow, displacement etc).

Transducers – Classification & selection criteria – principles of piezoelectric, photoelectric, thermoelectric transducers resistance temperature transducers (RTD) – Themistors, strain gauge, load cells, LVDT, Measurement of non-electrical quantities (pressure, force, temperature, flow, displacement etc).

Thyristors – Basic structure – static and dynamic characteristics – methods of turning on, gate triggering circuit, methods of turning off, commutation circuits, applications of tyristor.

Applications: electronic circuits used in industrial application and control.

Semiconductors and Junction Diodes: Zener Diodes, Photodiodes, LEDs.

Diode Circuits: Rectifiers and Filters – Clipping and Clamping Circuits, Zener Diode as Voltage Regulator.

Uni-juction Transistors: Principle of operation-CE, CB and CC Configurations, Static Characteristics, Biasing schemes, load line concept, bias stabilization, stability factor, bias compensation Basics of Transistor Amplifiers.

Transducers – Classification & selection crietiera, principles of piezoelectric, photoelectric, thermoelectric transducers – resistance temperature transducers (RTD), thermistors, strain gauge, load cells, LVDT.

Thyristors – basic structure, static and dynamic characteridtics, methods of turning on, gate triggering circuit, methods of turning off, commutation circuits, applications of thyristor.

Applications: electronic circuits used in industrial application and control.

Semiconductors and Junction Diodes: Energy Bands theory of Solids, Distinction between Conductos, Semiconductors and Indulators, Properties of Semiconductors.

Diode Circuits: Rectifiers and Filters – CE, CB and CC Configurations, Static Characteristics, Biasing schemes, load line concept, bias stabilization, stability factor, bias compensation Basics of Transistor Amplifiers.

Transducers – Classification & selection critieria, principles of piezoelectric photoelectric, thermoelectric transducers – resistance temperature transducers (RTD) thermistors, strain gauge, load cells, LVDT.

Thyristors – Basic strutuure, static and dynamic characteristics, methods of turning of gate triggering circuit, methods of turning off, commutation circuits, applications of thyristor.

Applications: electronic circuits used in industrial application and control.

Books:

1. Millman & Halkias : Integrated Electronics, MGH.
2. AS Sedra & KC Smith : Microelectronic Circuits, Oxford University Press.
3. Robert Boylestad & Louis Nashelsky: Electronic Devices & Circuit Theory, PHI.
4. DL Schilling & C Belove, Electronic Circuits, Third Ed; MGH.
5. Rangan, Sarma and Mani: Instrumentation Devices and Systems, Tata McGraw Hill.

Experiments:

Study of different electronic active and passive components

Draw the VI characteristic curve of pn junction diode in forward and reverse bias conditions

Study of Zener Diodes, Photodiodes and LEDs.

Study of Rectifiers: half wave and Full wave.

Draw the characteristic curves of n-p-n transistors.

Study of transistor in Common Base and common collector configurations.

Study of transistor in Common Emitter configuration.

Study of different transducers.

Name of the course : Manufacturing Processes
Course No. : TME-221
Credit hours : 4 (3+1)

Catalogue Description:

Tool materials, single point tool geometry, Speed Feed and depth of cut. Milling Machine construction, Operation including indexing. Tool for milling. Drilling machines and tools press working, Forming and forging. Casting and special casting processes Grinding.

Syllabus:

Tool materials, high carbon steel, high speed steel, Stellite, cemented carbides Ceramics etc., Single point and multipoint cutting tool, speed, feed and depth of cut cutting, fluids. Milling m/c types, compound and differential operations, Indexing, Milling cutters. Drilling m/c types, specifications, tools, and operations, power, Introduction to sheet metal working, presses and operation, Cutting and forming, Hot working rolling, forging and power hammer, Mechanical working of metal, extrusion, tube drawing, spinning, special castling processes, investment centrifugal and die casting, study of grinding m/c and operation.

Books:

1. Elements of workshop Technology Vol. I and II by S.K. Hajra Chaudhry, S.K. Rose and A.K. Hajra Chaudhry.

Name of the course : Theory of Fluid Flow
Course No. : TME-222
Credit hours : 3 (2+1)
Catalogue Description:

Concept of basic principles of Fluid Flow, Kinematics of Fluid Flow, Dynamics of Fluid Flow, Incompressible Flow Principles Boundary Layer Theory, Application of Hydrodynamics, Compressible Flow Principles, Mach Number, Flow Regimes, Normal Shock, Shock wave, Measurement of compressible Flow.

Syllabus:

Introduction, Definition of Fluid, Properties of Fluid, Types of Fluids, Fluid Particle, No Flow, Basic Equations, Methods of Analysis, Dimensions and Units. Fundamental Concepts. Continum, Velocity Field, Surface and body forces, Point Force, Line Force, Forces Influencing Hydraulic Phenomena-Inertia Force, Viscous Force, Gravity Force, Pressure Force, Elastic Force, Surface Tension Force, Stress at a point Description and Classification of Fluid Flows-Steady and unsteady Flow, Ideal and Real Flow, Rotational and Irrotational Flow, one, two and three-dimensional Flows, Pressure and Pressureless Flow, Sub Critical, Critical and Super Critical Flow, Isothermal, Adiabatic, Lagrangian method, Eulerian Method, Total Derivative (Material Change), Equation for acceleration, components of Acceleration in Cartesian Coordinates and Cylinderical Coordinates, Trangential and Normal Components of Acceleration, Lines of Flow – Streamilines, Pathlines and Streak lines, streamtube, Different Types of Displacement of Fluid Particle, Circulation, Vorticity; Vorticity Components in Cartesian, Cylindrical, polar, and Curvillinear orthorgonal coordinates, Irrotational and Rotational Flow. Flow of an Incompressible Fluid Differential Form of General Continuity Equation in Cartesian and Cylindrical Coordinatesl, Reynolds Transport Theorem, Integral Form of Continuity equation, Velocity Potential Function & Stream Function in Cartesian and Polar Coordinates, Relation Between Stream Function and Velocity Potential Function, Steam Surface, Flow Net, Equation of Motion, Euler's Equation of Motion; Bernoulli's Equation, Applications of Bernoulli's Equation, Linear Momentum Equation, Energy Equation, Vortex Flow, Vortex Lines, their Significance, Lift and Drag, Pressure Drag, Skin Friction Drag, Flow Around a circular cylinder, Concept of boundary layer, boundary layer along a thin flat plate, boundary layer Equation in 2-D Flow; Boundary layer thickness and Displacement thickness, Momentum thickness; Momentum Correction Factor, Energy thickness; Momentum Equation for boundary layer by Von-Karmann; Laminar boundary layer, Turbulent Boundary Layer; Boundary Layer separation, internal and External Flow. Flow of a Compressible Fluid. Introduction, Compressible Fluid Flow, Energy Equation, Flow regimes, Propagation of an Elastic Wave, Velocity of Sound, Mach Cone and Mach Angle, Stagnation point and Stagnation Properties, Isentropic Nozzle Flow, Euler's Equation of Motion (Momentum Equation), Subsonic and Supersonic Nozzle and Diffuse, Flow through a Convergent nozzle; Choked Flow; Convergent – Divergent Nozzle, Variables in terms of Mach Number, Effect of Irreversible and reversible adiabatic Shock Wave, Normal Shock, Shock Strength, Note on Oblique Shock Wave, Flow Convergent – Divergent Nozzle, Flow of Compressible Fluid through a Venturimeter. Flow Fields – Rectilinear Flow, Source and Sink Flow, Combining flows by Supperpostive Rankine method of

Constructing streamlines, Combined Flow Fields-source in a Flow, Source and Sink pair Flow, Source and Sink Pair in a Uniform Flow, Doublet Doublet in a Uniform Flow, Doublet and Free Vortex in Uniform Flow, D' Alembert Kutta-Joukowski Theorem and Magnus Effect, Flow in a porous medium.

Books:

1. Engineering Fluid Mechanics by Dr. D.S. Kumar
2. Fluid Mechanics by Dr. S.S. Rattan

Reference Books:

1. Introduction of Fluid Mechanics by Fox and Mchdonald
2. Mechanics of Fluids by I.H. Shames
3. Fluid Mechanics by Yuan

Name of the course : Machine Drawing
Course No. : TME-223
Credit hours : 2 (0+2)
Catalogue Description:

Drawing of Machine Elements, Rivets and riveted joints. Threaded Assembly and working drawings of Cotter joints, Bearings, plumber blocks, Brackets, Connecting rod, Stuffing Box, Eccentric, stop valves, safety valves, Lathe screw Jack and piping joints.

Layout of drawing sheet, Conventional Representation of common Orthographic projection- 1st angle and 3rd angle Projections Missing line problems, views. Rivet heads and riveted joints. Nuts and Bolts. Nut, bolt and washer Sectioning methods and types. Sectioning problems for Footstep bearing, Cone stepped pulley. Assembly drawings of Footstep Bearing, knuckle Joint, Plumber Eccentric, Cotter Joint, Studffing Box, Screw Jack, Connecting rod, Couplings, Break valves, Lathe Tail Stock, piping Joints.

Books:

1. Machine Drawing by Sadhu Singh and Sabh, P.L.

Reference Books:

1. Machine Drawing by N.D. Bhatt and V.M. Panchal
2. Text Book of Machine Drawing by Laxminarayana and M.L. Mathur
3. Engineering drawing by A.C., Parkinson
4. Elementary Engg. Drawing by N.D. Bhatt
5. Machine Drawing by N. Sidheswar, Kannaiah and Sastry.

Name of the course : **Probability, Statistics And Queuing Models**
Course No. : **BPM-221**
Credit hours : **2 (2+0)**
Catalogue Description:

Introduction to statistics, Arithmetic Mean, Variance and Coefficient of Variation, Probability, Axioms of Probability, Conditional Probability, Addition and Multiplication Theorem, Baye's Theorem Random Variable, Introduction to commonly used discrete and Continuous probability distributions. Sampling Distributions, Distribution of Sample Mean and t, Testing of Hypothesis, One sample and two sample test for mans based on z and distributions, Simple Correlation and Regression Analysis, Test of significance of simple correlation coefficient. Basic concepts of Queuing Models.

Syllabus:

Statistics: Definition, functions and limitations of Statistics, Computation of arithmetic mean, variance & coefficient of variation for the ungrouped and grouped data Simple correlation: Definition, Fitting of linear regression equations, Testing of hypothesis: Introduction, Null and Alternative hypothesis, First and Second kind of errors, Level of Significance, Critical region, Steps in testing of hypothesis, One sample and Two smaple tests for means based on z-distribution, One sample (student's) and Two sample (Fisher's) test based on t-distribution.

Probability: Classical, Empirical and Axiomatic definitions of probability, Addition and Multiplication theorem of probability and problems based on these two theorems, Conditional probability, Bays's theorem, Definition of discrete random variable, Binomial & Poisson probability distributions and problems based on these distributions. Definition of Continous random variable, Normal distribution and problems based on it.

Queuing Models: Introduction to Queuing Theory and its use in engineering, single channel Possion arrivals with exponential service rate (M/M/1).

Name of the course : Measurement & Control
Course No. : TME-224
Credit hours : 4 (3+1)
Catalogue Description:

Principles of measurement, accuracy, errors, measurement, velocity acceleration, pressure, temperature, flow etc. Measurig instruments, Physical systems, Laplace transformation and block diagram, methods of analysis, Application of practical problems, elements, frequency and Time response, basic concept of stability.

Syllabus:

Introduction-Measurement & Control, Measurement, basic Definitions accuracy, precision, repeatability, reproducibility, reliability, maintainability, sensitivity, Span, zero drift, ageing. Transdurcrs – Mechanical, electrical; basic requirements for transdurcers, Calibration-definition, steps in Calibration, Standards-primary, secondary, reference and working standards and gauges.

Errors, types of errors-application, operational errors, dynamic errors, environmental error, absolute & relative errors random errors, uncertainty.

Measurement system-basic components, types of measurement direct & active and passive transducers, Digital and analog system, null and deflection Instrument.

Study of working of bourdon tube pressure gauge, LVDT, Cathode Ray.

Displacement, force and torque measurements, temperature measurement Measurement of fluids-flow and Pressure measurements.

Strain gauge-working principle, materials, transverse sensitivity, Wheatstone full, half, and quarter Bridge circuit, strain rosette.

Control-definitions, elements of control system-open loop and closed loop Concept of feedback Control system.

Block diagram representation, simplification and reduction.

Transfer function, Laplace transformation, transfers function of various analogus system-mechanical and electrical analogy. Test signals-step ramp, parabolic impulse signals.

Time response for 1^{st} order system, 2^{nd} higher order system basic definition relating to 2^{nd} & higher order systems.

Basic concept of stability, Rouh's criterion, Root locus technique, curve plotting various control systems. Frequency response – Bode plot, Polar plot.

Books:

1. Control System Engg. by Nagrath & Gopal
2. Engineering Control System by K. Ogata
3. Measurement and Metrology by A.K. Sawhney & M. Mahajan

Reference Books:

1. Instrumentation by Sharma, Rangan & Mani
2. Physical Measurement & Analysis by Cook & Rabnowicz
3. Mechanical Measurement by Buck & Beckwith
4. Mechanical Measurements by System and Design Deobelin

Name of the course : Numerical Methods for Mechanical Engineering
Course No. : TME-225
Credit hours : 2 (1+1)
Catalogue Description:

Introduction, Solution of Equations of one Variable, Solution of Systems of Algebraic Equations – Direct Methods and Iterative Methods, Function Approximation Interpolation, Numerical Differentiation and Integration, Numerical Solutions of and Partial Differential Equations, Applications, Applications in Mechanical Engineering.

Syllabus:

Introduction: Objectives, Matrix Algebra, Error Measures, Significant Precision, Introduction to computing Package MATLAB. Solution of Equations Variable: Bisection Method, False Position Method, Secant. Method, Newton's solution of Systems of Linear Algebraic Equations: Direct Methods: Gauss Elimination, Gauss Elinination with Pivoting, LU Factorization, Tridiagonal-Matrix Systems, Cholesky Method. Solution of Systems of Linear Algebraic Equations: Iterative Methods: Jacobi Method, Gauss-Siedel Method, Successive Over Relaxation Method. Function Approximation: Least Square Approximation, Point Approximation. Interpolation: Polynomial Interpolation, Spline Interpolation. Numerical Differentiation and Integration: Difference Approximations, Trapezoid Rule, Simpson's Rule, Romberg's Integration, Gauss Quadrature. Numerical Solutions of Ordinary Differential Equations and Partial Differential. Equations: Initial Value Problems (Taylor, Euler, Heun), Boundary Value Problems (Shooting, Finite Difference, Superposition Methods), Liebmann's Method, Crank-Nickholson Method.

Books:

1. Numerical Methods for Engineers by steven C. Chapra and Raymond P. Canale, McGraw-Hill
2. Matlab 6 Student Edition by The Mathworks
3. Introduction to Matlab for Engineers by William Palm III, McGraw-Hill
4. Numerical Recipies: The Art of Scientific Computing by W.H. Press, B.P. Flannery, S.A. Teukolsky, and WIT, Vetterling, Cambridge University Press.
5. Introduction to Applied Mathematics by Gilbert Strang, Wellesley-Cambridge Press.
6. Introduction to Scientific Computing: A Matrix-Vector Approach using MATLAB by Van Loan and Charles F.
7. Numerical Methods by S.S. Sastry, PHI.

V SEMESTER

SEMESTER-V

Name of the course : Strength of Material
Course No. : TME-311
Credit hours : 4 (3+1)
Catalogue Description:

Stress & Strain at a point Mohr's circle 3-D Stresses, Elastic strain energy, Castigliano's theorem & Energy theorems, Theories of elastic failures, shear centre. Unsymmetrical bending, curved beams, Torsion of Non-circular bars, Analysis of Springs, Thick cylinder and spherical shell, Rotating Disc, and Cylinders.

Syllabus:

Stress and strain at a point. Cartesian stress components notation and sign convention. Principal stresses in three dimensions. Mohr's circle in three dimension. Strain displacements, rectangular strain components Interpretation of xy, yz, zx as shear strain component. Theories of failures, significance of theories of failure. Elastic strain energy and Energy methods, Elastic Strain energy due to normal and shearing stresses, **Dilations** and distortions strain energy, strain energy due to bending & torsional load, stresses due to suddenly applied loads, Strain energy theorem. **Castigliano's** Theorem, reciprocal theorem. Application of energy methods for determining slope, and deflection in beam. Unsymmetrical bending. Shear centre. Curved beams; Bending of beams having initial curvature beams of large initial curvature, location of neutral axis Distribution of stresses across cross section having rectangular, Circular & trapezoidal shapes. Analysis of springs, Torsion of non circular section. Symmetric problems; Stresses and displacements in thick cylinder, spherical shell, rotating disc, cylinders.

Books:

1. Adv. Mech. Of solids by L.S. Srinath
2. Adv. Strength of Materials by R.K. Rajput

Reference Books:

1. Adv. Mech. Of Material by Boresi, Stdebottom
2. Strenght of Materials by Sadhu Singh
3. Experimental Stress analysis by Dr. Sadhu Singh
4. Mechanics of Mat. by E.J. Heam Vol. I & II

Name of the course : Heat and Mass Transfer
Course No. : TME-312
Credit hours : 4 (3+1)
Catalogue Description:

Modes of heat transfer, One dimensional steady state heat conduction, heat transfer from extended surface, Unsteady state heat conduction, Numerical solution of steady state and unsteady state heat conduction problems, Natural and forced Convection, hydrodynamic and thermal boundary layers, heat transfer with phase change, heat exchanger, radiation properties and laws, diffusive and convective mass transfer.

Syllabus:

Introduction and Concept of Thermodynamics & heat Transfer, Modes of Heat transfer, Basic laws, Thermal Conductance and Resistance. General heat conduction equation. Radial heat conduction through tubes and spherical shells, Composite structures, Critical Insulation thickness. Heat transfer from extended surfaces. Heat Conduction rectangular and semi-infinite plates. Numerical solution of steady state problems. Unsteady state heat conduction, heating or cooling of bodies with known temperature distribution, Heating of cooling of bodies whose internal thermal resistance is known. Transient heat conduction charts, Numerical solution of Unsteady state problems. Convection Heat Transfer introduction, viscous and Inviscid flow, hydrodynamic and Thermal boundary layer, Forced and natural convection, Empirical relations. Radiation properties and laws. Radiation exchange between black surfaces and grey surfaces. Radiation shields, Electrical Network method for solving Radiation problems. Heat exchangers, classification, Overall heat transfer co-efficient, LMTD, Heat exchanger effectiveness, NTU-Method. Heat Transfer with phase change, phenomenon of condensation film wise and Drop wise condensation, Film Condensation on a vertical surface, phenomenon of boiling, Regimes of pool boiling. Transfer, Fick's laws of Diffusion, Diffusion in gases, Isothermal evaporation of water into Mass transfer co-efficient.

Books:

1. Engineering Heat Transfer by C.P. Gupta & Prakash
2. Heat Transfer by J.P. Holman
3. Heat and Mass Transfer by R.K. Rajput.

Reference Books:

1. Heat & Mass Transfer by Incropera & De Witt, Pub. John Wiley & Sons (Asia) Pvt. Ltd.
2. Heat Transfer by Bejan.

Name of the course : **Fluid Machinery and Systems-I**
Course No. : **TME-313**
Credit hours : **4 (3+1)**
Catalogue Description:

Entire spectrum of fluid machines, linear momentum and angular momentum theorems, Dynamic action of fluid on stationary and moving vanes; units and special quantities, whirling of fluids; Airfoils, Lift and Drag, Blades cascade, Lift in ideal and fluid flows, Hydro-electric power development, Impulse Turbines, Reaction turbine Governing and performance of turbines, Centrifugal pumps, Reciprocating pumps, Cavintation Hydraulic systems like Hydraulic lift, Ram, Crane, Press etc., Hydraulic Coupling, Torque Converters. Lab Experiments based on the above.

Syllabus:

Entire spectrum of Fluid Machines, dynamic action of Fluid Linear momentum a angular momentum equations, Dynamic force exerted by a jet on stationary flat and inclined plates, on curved plates/ vanes, Force on moving flat, inclined plates, and curved vanes; on series of flat plates; series of curved vanes and series of radial curved vanes; Equation of Fluid Machines; Degree of Reaction; Principle of jet propulsion and propels of ships.

Whirling of Fluids types of fluid motion, rectilinear motion, Radial flow, rotatry or vortex motion, Free and Forced vortex, cylindrical and spiral vortex, flow along a curved path; Mathematical Analysis.

Unit and specific quantities Unit Quantities as unit discharge, unit force, unit power, unit speed, unit torque etc., specific quantities; specific speed of pumps and of turbines.

Classification and types of Turbines: Head, Losses and efficiencies of hydraulic turbines.

Impulse turbines main components; their functions; guide Mechanism; buckets and runner, casing; Hydraulic brake, speed ratio, jet ratio, Different layouts; Design of components of a Pelton turbine; turbine power; Efficiencies; Velocity triangles etc.

Francis and **Deriaz** Turbine; Types of Francis turbines-closed and open flow types; main components of modern Francis turbines; Guide Mechanism, Draft tube; types of draft tubes; Draft tube theory; Design of components of Francis Turbine, shapes of Francis runner, Cavitation; Methods of avoid cavitation, Selection of speed. Runway speed. Deriaz turbine; Influence of variable pitch on hydraulic performance; Force, Torque; power and efficiencies.

Propeller and Kaplan Turbines: Components; Turbine proportions; adjustments of Kaplan blades; Performance at part loads.

Governing of Water turbines function of a water turbine governor; Types of governors; Qutlines and Working of oil pressure governors, Governing of Impulse and Reaction Turbines etc.

Centrifugal Pumps; Principle of operation; Classification; Layout; Head of a pump; Theory of C.F. pumps; work done and manometric efficiency; Pressure rise, Manometric head; Efficiencies; Shapes of blades; Axial thrust; cavitation in pumps; NPSH, Selection of C.F. pumps.

Reciprocating Pumps Classification, slip and coefficient of discharge; Indicator diagrams; velocity and acceleration of water in reciprocating pumps; Air vessels; Saving in work by air vessels; Theory of working of air vessels.

Characteristic of water turbines and centrifugal pumps Aerofoil theory Hydraulic System Hydro-static and Hydro Kinematical systems; constant and variable delivery systems; hydraulic lift,

Hydraulic crane; Pressure accumulator; intensifier; fluid couplings; Hydraulic torque converters etc.

Books:

1. Hydraulic Machines by Dr. Jagdish Lal
2. Hydraulic Machines by S.S. Rattan

Reference Books:

1. Hydraulics & Fluid Machines by Modi and Seth
2. Fluid Flow Machines by Govinda Rao

Experimental Work:

Lab Experiments based on the above (Hydraulics Laboratory, Civil Engineering Department).

Name of the course : Refrigeration and Air Conditioning
Course No. : TME-314
Credit hours : 4 (3+1)
Catalogue Description:

Basic vapour compression refrigeration cycle; influence of operating conditions cycle performance; Multistage and multi evaporator system; Cascade system; Refrigerants Thermodynamic, Chemical and physical requirements, Lubricants in refrigeration systems.

Introduction to vapour absorption system, air cycle, Refrigeration compressors, types thermodynamic processes, volumetric efficiency, performance characteristics of reciprocating compressors, Properties of moist air, use of psychrometric charts, Psychrometry of air conditioning processes, Sensible, Latent and Total heat processes, SHF, Bypass factor, Air washers, Simple summer air conditioning system, Comfort air conditioning and effective temperature; cooling load calculations.

Syllabus:

Review of Basic Laws of Thermodynamics, methods for production of cold. Vapour compression refrigeration cycle, comparison with reversed Carnot cycle, standard rating cycle and effect of operating conditions; evaporator pressure, condenser pressure, suction vapour superheat & liquid subcooling on cycle performance, Refrigerant compressors, types thermodynamic processes, Volumetric efficiency, principal dimensions performance characteristics. Multistage & multi evaporator systems, Cascade systems. Refrigeration characteristic, Thermodynamic physical, Chemical requirements, effect of moisture and lubricating oil, mixed refrigerants, Binary Mixtures. Thermodynamic properties of moist air adiabatic saturation process; psychometric chart. Psychometric of air conditioning processer simple air-conditioning system and state and mass-rate of supply air. Design conditions Inside & Outside design conditions, comfort air conditioning and effective temperature, Heat transfer in building structures, methods to evaluate heat-transfer through walls & roofs. Load calculations & applied psychometrics, Internal & system heat gains, Ventilation load & RSHF, cooling load estimate. Miscellaneous Refrigeration systems; Introduction to Absorption refrigeration, air – cycle refrigeration & thermoelectric cooling.

Book:

1. Refrigeration and Air conditioning by C.P. Arora
2. Refrigeration and Airconditioning by R.S. Khurmi

Reference Books:

1. Thermal Environmental Engineering by J.L. Threlkald
2. Refrigeration and Air Conditioning by W.F. Stoecker
3. Principles of Refrigeration by Dossat Roy J.

Name of the course : Theory of Machines
Course No. : TME-315
Credit hours : 4 (3+1)

Catalogue Description:

Analysis of cam and follower motion, Intermittent and straight line motions, Theory of gearing, Advanced problems on gear trains, Inertia forces in reciprocating parts Gyroscope, Flywheel, Balancing of rotating and reciprocating masses, Hook's Joint and streering Mechanisms, Governors.

Syllabus:

Introduction, Analysis of cam and follower motion, Classification of cams and Followers, Terminology, Types of follower motion, Velocity and acceleration diagrams, Construction of various cam profiles and complex design, Intermittent and straight line motion. Various intermittent motion.

Mechanism, Different types of straight line motion mechanism. Theory of Gearing: Classification of gears and terminology, Law of gearing, systems of gears teeth, Interference and efficiency of gears, applications of gears advanced problems on Gear trains, Epicyclic gear train, Compound gear train, Torque analysis and various applications of complex gear gear train, Torque analysis and various applications of complex gear trains. Inertia Forces in reciprocating parts: Resultant effect of a system of forces acting on a rigid body, 'D' Alemberts principle, Klein's construction, Bennett's construction, Analytical method for velocity and acceleration of the piston, angular velocity and acceleration of connecting rod, Force analysis of reciprocating engine mechanism and inertia torque calculations. Introduction to gyroscope, precessional motion and definitions, Effect of gyroscope couple in aeroplane, Effect of gyroscopic couple on naval ship during Steering, Pitching and rolling, Stability of four-wheel and two wheel vehicle during turning, Gyroscopic stabilization. Flywheels: Fluctuation of energy and speed, Application of flywheel to various operations and mechanisms of Machine, balancing of rotating and reciprocating masses: Different methods of balancing of rotating masses, Primary and secondary unbalanced forces of Reciprocating masses and partial blancing, Method of direct and reverse crank, balancing machine. Hook's joint & steering mechanism; Analysis of Hooks' Joint motion mechanism, Davis and Ackerman Steering Gear Mechanism. Classification of governors and terminology, Functions and working of various types of governors and Analytical analysis.

Books:

1. Theory of Machines by Thomas Bevan
2. Theory of Machine by R.S. Khurmi

Reference Books:

1. Theory of Machines by Pandya & Shah
2. Theory of Machines by J. Lal and Shah

VI SEMESTER

SEMESTER-VI

Name of the course : Mechanical Vibrations
Course No. : TME-321
Credit hours : 4 (3+1)

Catalogue Description:

Static force analysis, dynamic force analysis, Vibration of Single and two degrees of freedom system. Undamped, damped and Forced vibrations. Vibration absorbers and vibration isolation. Vibration of many degree of freedom system. Exact analysis and Numerical methods.

Syllabus:

Periodic and harmonic motions, harmonic analysis. Vector method of representing vibrations. Superpositon of simple harmonic motions. Work done in harmonic Motion. Free vibration without damping. Equilibrium method, energy method and Rayleigh's method. Effect of mass of spring and shaft. Free vibrations with viscous and coulomb damping. Forced vibrations with and without viscous damping. Reciprocating and rotating unbalance. Vibration isolation and transmissibility. Viration measuring instruments. Whirling of light flexible shafts with a unbalanced disc at the centre and without damping. Critical speed. Normal mode vibrations. Torsional systems, Combined Rectilinear and angular vibrations, Vehicle suspension. Vibration absorbers. Free and forced vibrations of multi degree systems ithoud damping. Method of influence numbers. Holzer's Method. Raleigh's method, Dunker ley's formulae.

Books:

1. Mechanical Vibration by Tse, Morse and Hinkle, Prentice-Hall

Reference Books:

1. Mechanical Vibration by A.H. Church
2. Vibration Theory and Application by W.T. Thomsn Prentice Hall
3. Mechanical Viubration by G.K. Grover Nem Chand Publishers, Roorkee.
4. Mechanical Vibrations by Wesley and S.S. Rao

Name of the course **: Fluid Machinery & Systems-II**
Course No. **: TME-322**
Credit hours **: 4 (3+1)**
Catalogue Description:

Thermodynamics of Turbo-machines, Gas Turbines and jet propulsion, Centrifugal and axial flow compressors, fans and blowers, propellers, wind Tunnels.

Syllabus:

Introductions, classifications of turbines, applications, General Characteristics of turbo machines, Euler's Turbine equation. Thermodynamcis of Turbo-machines ideal gas turbine cycles, Practical gas turbine cycles, Types of turbines. Turbine work and efficiencies, Polytropic efficiency effect of operating variables on the performance. Applications of gas turbines. Jet Propulsion – Performance of Turbojet engines; Introduction to rocketry engine.

Axial flow compressors-flow analysis, Stage pressure rise and efficiency, degree of reaction, efficiency of blade rows, compressor blade cascade efficiency, free & forced vortex blades. Propellers-Froudes momentum theory, **Aisscrew** coefficients and efficiency, Helicopter Rotor, Hovercraft. Types of wind tunnels, wind tunnel instruments, Flow visualization, Testing of turbine & Compressor blade cascades.

Centrifugal compressors pressure rise lip factor & evaluation, degree of reaction, Non dimensional quantities used for plotting compressor characteristics. Fans & Blowers-Fan Laws, performance coefficients, centrifugal & axial fans, Series and Parallel operation; application, general design principles.

Books:

1. Turbo machines by S.M. Yahya

Reference Books:

1. Gas-turbine theory by Cohen and Rogers.
2. Turbo-blowers by Stepanoff
3. Jet Propulsion and gas turbines by M.I. Zucrow.
4. Fans by Willaim C. Osborne
5. Theory & Design of gas turbine and Jet engines by E.T. Vincent.

Name of the course : Industrial Economics
Course No. : TPE-321
Credit hours : 3 (3+0)
Catalogue Description:

Introduction, economic environment, interest and annuity, Depreciation, Capital financing and budgeting. Present economics problems, value analysis. Linear programming, PERT/CPM. Basic patterns and economics study, selection between alternatives, various cost effect of economics tax. Replacement studies, minimum costs and break even studies, public projects and utilities. Recent advance in engineering accounting procedure.

Syllabus:

Decision making process, non-momentary factor and multiple objectives. Principles of engineering economics, engineering economy, methodology, cost terminology, application of cost concepts, steps in engineering economic analysis, why return of capital, origin of interest, simple and compound interest, concept of equivalence, cash flow diagram, interest formula for discrete compounding and discrete cash flows, uniform series, gradient series, different annuities, perpetuities. Nominal and effective interest, continuous compounding, Equivalence, present worth, annual worth and future worth, Methods, internal and external rates of return, payback, period method, comparison of alternatives equivalent worth methods, Rate of return methods, capitalized cost method. Depreciation and deplation, definition, types requirements of deprecation method, Depreciation methods, strainght line, S and D, declining balance with or without sitch over sinking found method, output based methods, deplation cost, Deplation percentage and deplation, Replacement studies, reasons, investiment value of existing assets; of defender and challenger, Typical replacement problem, replacement v/s augmentation, retirement without replacement. Public project evaluation by benefit cost, ratio method difference between public and private projects, multipurpose project, and rate of interest to be charged. Evaluation of independent projects, Dealing with uncertainty, Sources of uncertainty, Break even analysis, sensitivity analysis.

Engineering economy and decisions between alternatives. Measures of financial effectiveness. Equity and debt capital. Terms and definitions.

The economic environment. The elements of costs. The use of standard costs in economy studies, Break even analysis. Interest and annuity relationships. Deprectiation and valuation. Capital financing and budgeting. Linear programming, value analysis. Overview of PERT/CPM, Simple manual calculations. Basic Methods of economic study. Effect of income tax, Replacment studies. Present economy problems, public projects and utilities. Recent advances in engineering accounting procedures.

Books:

1. Engineering Economy by E. Paul Degarmo.

Reference Books:

1. Engineering Economics by Tara Chand.
2. Engineering Economics by Zemes L. Liggs.

Name of the course : Production Engineering
Course No. : TPE-322
Credit hours : 4 (3+1)
Catalogue Description:

Principal of metal cutting, Tools materials, cutting fluids, Analysis of single point machining process. Advanced topics on multi-point machining processes. Like milling, drilling, grainding, broaching. Installation and maintenance of Machines tools. Economics in machining.

Syllabus:

Introduction: Historical developments in metal-cutting, place of metal forming processes in manufacturing. Large and small-scale production systems.

Principal of Metal Cutting: Single point tools used in turning, orthogonal and oblique cutting, components of machining system-motions, tools, tool holders, tool materials. Work holding in turning. Single point tool, signature systems ASA, DIN, MAX Rake and Normal Rake systems for H.S.S. tools. Tool holder, specification for carbide inserts. Tool signature for tools bits. Chipbreakers. Different types of carbide tools holder and their applications.

Mechanics of Metal Cutting: Merchant's force diagram, shear angle and shear strain in chip and shear velocity determination, important theories of metal cutting. Assignment of cutting variables in turning and determination of machining time. Determination of chip flow angle.

Tool Wear, Tool Life and Machinability: Chip formation in turning. Tool and tool life of criteria, Mechanism of Tool failure. Machinability, factors affecting tool-life and tool-life formulae.

Cutting Fluids: Requirements of a cutting fluid, different types of cutting fluids, and methods of cutting fluid application.

Capstan and Turret Lathes: Specifications of capstan and turret lathes, tooling layout.

Economics of Machining in Turning: Determination of optimum cutting velocity for Min cost of production, Max rate of production and Maximum production.

Milling: Types of Milling machines, Face and cylindrical maching. Tool signature for a face mill. Conventional and climb milling. Symmetrical and Asymmetrical face milling. Assignment of Cutting. Variables in cylindrical and face milling. Determination of uncut chip thickness in cylindrical and face milling along with the machining time determination. Tool life equations for HSS and carbide milling cutter. Cutting force determination in face and cylindrical milling.

Drilling: Types of Drilling Machines, Drill tool geometry. Allied Operations like counter boring, tapping, counter-sinking chip thickness in drilling. Tool wear and tool life for HSS and carbide drills. Deep whole drilling and trepanning tools. Drill-point modification and chip breakers in drilling. Forces in drilling.

Grinding: Abrasive types, Grinding wheel specification. Typical features of grinding proess. Types of grinding/ abrasive machining process. Standard shapes of grinding tools and their use. Wheel mounting and dressing/ Cutting parameters in surface and cylindrical grinding with forces in grinding. Specific grinding energy. Machining time determination uncut chip thickness in external cylindrical and surface grinding.

Wheel-wear and Wheel-life equations. Lapping and other super finishing processes. Center less grinding processes.

Broaching: Application, types of broaching machines internal and surface broaching tool and methods of mounting borach tools. Broach design, uncut chip thickness maching time tool-life and tool wear in broaching.

Press Working: Introduction, types of Presses. Different operations carried out of presses; e.g. blanking, piercing, nibbling, notiching etc. Press-working tools-Simple, compound and progressive dies for blanking and piercing. Calculating center of pressure, tonnage for blanking. Scrap strip layout. Drawing and Deep drawing. Calculation of blank-size for drawing.

Acceptance testing of machine tools: EXPERIMENTS: multi-start-thread cutting, get cutting, spiral milling, gear shapping, set-up on capstan lathe, Force analysis in orthogon turning and force behavior in drilling as practical exercises.

Books:

1. Fundamental of Metal Cutting and Machine tools. by B.L. Juneja & G.S. Sekhon.
2. Metal Cutting Principles, by M.C. Shaw.
3. Modern Maching Processes, by Pandey & Shaw.
4. All about Machine Tool, by Gerling.
5. Fundamentals of Tool Design, by A.S.T.M.

Name of the course : **Machine Design-I**
Course No. : **TME-323**
Credit hours : **4 (3+1)**

Catalogue Description:

Principles of machine design, Selection of material, fits and tolerances, computation of stresses in machine parts, Theories of failure, design consideration, Design of joints and fasteners, shafts, couplings, levers, Power screws, belts, ropes and chains, pulleys and fly-wheels, springs, brakes and clutches.

Syllabus:

Introduction, Principle of design, Selection of materials, Types of loads etc. Computation of stresses in Machine parts. Theories of failures, factor of safety, fatigue stresses, stress econcentration etc. Design of Joints and fastners; Rivets Joint, Bolted Joints, Cotter and Knuckle joints. Design of shafts-Strength and rigidity criteria. Design of levers, Couplings etc. Design of springs-coil and leaf springs, Design of power screws, Pulleys and fly-wheels. Design of belts, ropes and chains, brakes and clutches.

Text Book:

1. M/C Design by J.E. Shigley, 6^{th} Edition, Tata MacGrow Hill.

Reference Books:

1. Design of M/C Elements by M.F. Spots.
2. Machine Design by Khurmi Gupta
3. M/C Design by Sadhu Singh
4. Machine Design by Bhandari
5. M/C Design by Sharma & Agarwal
6. Pro Engineer: Instructor by Keley (Tata Mc Graw Hill)

Name of the course : Work Study
Course No. : TPE-323
Credit hours : 3 (3+0)
Catalogue Description:

Productivity, work study, general problem solving technique, Method study, process and operation analysis, principal of motion economy, micro motion study. Ergronomics, enthropometry, design of man-machine systems, Work measurement, time study, allowances, PMTS, work-sampling. Value analysis. Laboratory experiments.

Syllabus:

Productivity; measurement of Productivity, factors affecting productivity, Work Study and Productivity, Work Study; Purpose and scope, Historical development, Reactions of Management and labour.

Method Study; Definition, objective and scope, recording aids, OPC, FPC. Two handed Process Chart, activity chart and their analysis, flow diagram, Models.

Motion Study; Motion economy, Principles of Motion economy and their industrial importance, Micro motion study, Therbligs. SIMO Chart; Memo-motion study, Cycle graph, Chrono-cycle graph Work Measurement; Definition, Scope and objectives, Work Measurement Techniques.

Time Study, Step watch study, Time study principle and procedure, equipments, elemental break down of job into elements. Number of cycles to be timed calculation of basic times. Rating; Rating techniques Speed rating system, Westing house system, objectives, rating system, rating index. Relaxation and contingency allowances, Personal allowance and special allowances. Introduction to PMTS, MTM. Synthetic and work Sampling. Ergonomics enthropometry, design of man-machines systems, Elementary idea of value analysis.

Topics:

Introduction, historical background, producitivity, work study as a means to raise productivity. Work study, definition and subdivisions, scrope.

Method study, human side, Process analysis, various charts, Operation analysis.

Principles of motion economy, micro motion and memo motion study.

Ergonomics, load analysis, activity analysis, design of equipment, workplace layout, working environment.

Work measurement techniques, time study, Allowances, Calculations of standard time.

Synthetic time, PMTS, work Facotr and MTM.

Production study, work sampling.

Physiological work measurement.

Wage incentive plans and value analysis.

Books:

1. Work Study by ILO
2. Work Study and Ergonomics by Shan.
3. Work Study by H.D. Sharma.
4. Motion and Time Study by Barnes.

VII SEMESTER

SEMESTER-VII

Name of the course : Power Plant Engg. and Energy Conversion
Course No. : TME-411
Credit hours : 4 (3+1)
Catalogue Description:

Type of power plants, steam nozzles; impulse turbines; Impulse Reaction turbines; internal losses; Governing of turbines; Boilers; Draught, Heat Balance, Condensers, Diesel power plant, Nuclear power plant, Power plant economics. Introduction to renewable energy sources.

Syllabus:

Introduction-Energy, Power, Sources of Energy, Direct Energy Conservation Methods. Power Cycles. Steam nozzles types of nozzles, Isentropic flow through nozzles; Effect of friction; Nozzle efficiency, Critical pressure ratio Maximum discharge; Throat and exit areas; super staturated flow. Type of steam turbine and application; Impulse turbine velocity and pressure staturated flow. Velocity and pressure compounding. Velocity diagrams for single and multistage turbines; Work output and losses; Degree of reaction, Internal losses in steam turbines; State point locus and reheat factor; Efficiency; Constructional features of blades; Governing of turbines.

Boilers and classification; Different types of low pressure and high pressure boilers; Boiler Rating; Boiler mounting and accessories; Boiler draught and draught equipment; Boiler trail and heat balance. Condensers and advantages of steam Condensers; Elements of steam condensing plant; Types Air leakage and its Effect on the performance of Condenser; Vacuum efficiency. Cooling towers, Types of cooling towers, Diesel power plant, Introduction different types of engines and their working; Thermodynamic cycles and cycle analysis. Different system of diesel power plant. Supercharging of diesel engines; advantages & disadvantages.

Nuclear Engineering basic terms and definitions; Generation of nuclear energy by fission, Nuclear fuels, Components of nuclear power plant; Nuclear reactors-types and applications Radiation hazards, Shielding, safety aspects.

Power plant economics, Plant investiment costs; fixed charges; Operation costs; Comparison of fixed and operating costs; Capacity factor; Utilization factor and diversity factor; Selection of unit sizes. Direct energy conversion, Methods-Fuel Cells, MHD Generation, Thermoelectric Power generation and other methods.

Books:

1. Power Plant Engg. by P.K. Nag
2. Thermal Engg. by Domkundwar and Kotandaraman

Reference Books:

1. Power Plant Engineering by Arora & Domkundwar
2. Steam turbine theory & Practice by W.J. Klearton

Name of the course : Industrial organization and management
Course No. : TPE-411
Credit hours : 3 (3+0)
Catalogue Description:

Industrial evaluation in India. Principles of management, organization, decision making product research and development. Planning and locating the plant building, plant layout, materials handling, human relations and leadership research, personel management, labour legislations, procuring materials, inspecting materials, stores, sales etc. work study production planning and control.

Syllabus:

Industrial evolution in India. Evolution of management science, scientific management managerial functions, personality and functions of a manager, principles of management organization structures and types of organizations, managerial decision making process leadership research, product design and development, principles, plant location. Buidling design, plant layout principles and concept of materials handling, Labour legislation and factors Act. Human relations. Personnel management, functions, policies, duties, wage administration, employees safety and health, procurement of materials, quality control and inspecton of materials, stores keeping, sales and related aspects.

Topics:

Industrial evolution in India

Management: Definition, Functions of a manager, Personality and technical knowledge, development of scientific management, advantages of scientific management, misconception about scientific management, industrial management, classical and neo-classical, theories of management.

Managerial organization: types of organizations line, line and staff and committee organization, the operating organization, the organization chart developing and organization, results of good organization.

Managerial decisions functions: functions of a manager, steps in decision making process, aids in decision making, break-even analysis in decision making.

Planning: definition, planning horizon, types of plant, planning in relation with other managerial functions.

Organizaing: Definition, basis of organizing-time, number of employees, functions, product, product line, manufacturing process, geographic and matrix organization.

Staffing: Definition, staffing as related with other function.

Direction: Definition, role and scope of direction, role of person, style of management and situation in direction.

Product design and development: Role of research in product design, types of research, principle of product development – simplification standardization and specialization and their inter-dependence, principle as influence employees, management and the consumers.

Plant location and choice of sites, selection and creation of plant building, considerations in building design, the management job.

Plant layout types of layout, considerations in layout work environment.

Materials handling, its principles and co-ordination. Materials handling at the work place types of materials handling equipments. Communication and control in material handling versus good materials handling.

Fundamentals of labour legislation, Factory Act. Workmen's Compensation Act, The payment of Wages Act, Companies Act, Parthnership Act.

Human relations, The individual in industry. H.W. Thorne experiments, Motivation. Motivational theories as proposed by Mc-Gregor, Maseow, Argyris and Herzberg.

Personal management. Functions, Policy, Duties. Organization of the personnel department. Recruitment process.

Employees safety and health. Reasons for accidents, and their prevention. Organization of safety function. Practicing safety.

Procuring materials, responsibility, organization co-ordination. Procedure and policies. Measuring efficiency.

Inspecting materials. Quality level, specifications and standards, types, costs, records and devices used.

Store-Keeping, definition, functions maintenance, co-ordination, organization, layout, economics. Sales, importance and functions, responsibilities, qualities of sales Manager, correspondence, representatives, engineering contracts.

Work study, definition, methodology, various effects, standard time.

Production planning and control, function forecasting, planning, scheduling, dispatching.

Text Books:

1. Management for business and Indusrty by C.S. George (ir.). Prentic Hall-India.

Reference Books:

1. Industrial Organization and Management by beltial, Atwater, Smith and Stackman.
2. Industrial Organization and Management by Tara Chand (New Chand and Brithers)
3. Industrial management by Walia and Banga.
4. Hand Book of Industrial Engineering.
5. Govt. of India Publication of Acts.
6. Industrial Administration and Management by J. betty (E.L.B.S.)

Name of the course : Computer Aided Design (CAD)
Course No. : TME-413
Credit hours : 3 (1+2)

Catalogue Description:

Introduction of CAD the design process, application of computer, creating the manufacturing data box, benefits of computer aided design, examples. Hardware in Computer Design; design work station, graphic terminals, operator input devices, plotters and other output devices, central processing unit, secondary storage, problems, computer graphic software.

The software configuration of a graphic station, function of graphic package, construction of geometry, transformation, data base structure and content, other CAD feature and CAD/CAM interaction, application of modeling application, use of 3-D modeling for 2-D representation. Three dimensional modeling for geometric problem

sovling, examples of 3-D modeling, introduction to information technology and finite element methods.

Syllabus:

Introduction to CAD, Application of Engineering Graphics in Design and creating the manufacturing database. Benefits of Computer-Aided Design and examples.

Hardware in computer Aided Design Workstation, Graphic Terminals. Input output devices. The Central Processing Unit, Secondary Storage problems. Computer Graphics Software.

Software configuration of a graphic station and function of graphics.

Graphics Standard for CAD, Graphics and Computing Standards – GKS-Bitmaps-Open GL – Data exchange standards – IGES – STEP – CALS – DXF, Communication Standards – WAN – LAN. Construction of geometry, transformation, data base structure and content.

Representation of Curves – Beizer curves, Cubic spline curve, B-spline curves. Surface Modeling techniques – surface patch, coons patch, bi-cubic patch – Bezier and B – spline surfaces. Volume Modeling – Boundary Models and CSG Modeling techniques – Other CAD features and CAD/ CAM Interaction.

Application in Modeling, use of 3-D Modeling for 2-D representation. 3-D Modeling for Geometric problem solving and examples of 3-D Modeling. Introduction to Information Technology and Data Base. Introduction Finite Element Method.

Books:

1. CAD/CAM by Mikell P. Groover and E.W. Zimmers. Prentice hall India Ltd.
2. Computer Graphics by Hearn and Baker.

Reference Books:

1. Computer Aided Manufacturing by P.N. Raop, N.K. Tiwari and Kundra
2. Computer aided analysis and deign by Wselfendate butleworth publication.
3. Basant, C.B. and Lui, Ghol K. "Computer – Aided Design and computer – Aided manufacturers, 3rd Edition.
4. Davis, B.L. Robothom, A.J. aid yer wood, "A Computer Aided Drawing and Design" Chapman of Hall (1991).
5. Engineering Graphics with Auto CAD – 2002 by Bethume (PHI)

Name of the course : Automabile Engineering
Course No. : TME-414
Credit hours : 4 (3+1)

Catalogue Description:

Introduction classification and engine terminology, Automobile chassis and frames vehicle suspension system, Springs, dampers and shock absorbers; Brakes – types and functioning; Steering mechanism, front – end geometry, power transmission system, Gear box torque converters, Drive line, differential and axles; vehicle dynamics and Emission control systems.

Syllabus:

Automobile and society, Scope of the course and automobile industries, Engine classification, Basic engine terminology. Automobile chassis, Main and sub frames body-alignment and instruments used.

Car body, springs and dampers. Suspension system for front and rear wheels, shock absorbers. Brakes; Function and methods of braking, types of brakes; semi servo brakes, servo and power operated braking systems and hydraulic mechanism.

Steering mechanisms; power steering, from axle steering mechanism and working. Front end geometry and alignment, Caster and camber angles, king-pin inclination, too-in and too-out. Cam and lever steering gear, steering geometry, Ackermaan's principle.

Transmission requirements; clutches of various types like friction, centrifugal, magnetic etc. Types of transmissions levers, Linkages etc. Fluid couplings.

Gear Box: Function of gear box and determination of over all gear ratio synchronous, epicyclic and pre selector gear box, Torque converters.

Universal joint and its purpose; Differential, Front and rear axles. Rear drive shafts and operation, Front wheel drive system.

Vehicle dynamics, Air, Gradient and rolling resistance, total resistance, variation of attractive efforts with speed, constant power tractive effort and maximum engine horse power curves against speed.

Pollution in our society, Types of pollutants, controlling pollution, and Road performance.

Books:

1. The motor vehicle by Newton & W. Steeds.
2. Automotive Mechanic by R. Crouse and D.L. Anglin
3. Automotive chassis & Body by W.H. Crouse
4. Automotive Mechanics by Anthony E. Schwalle.

VIII SEMESTER

SEMESTER-VIII

Name of the course : Nuclear Engineering
Course No. : TME-421
Credit hours : 4 (3+1)
Catalogue Description:

Cross section, Co-ordinate system, diffusion theory; Slowing down and moderation, Fermi Age equation, Critical conditions, Reflectors, Reactivity, Reactor control concept, Design parameters, Temperature distribution along coolant path, Liquid metal heat transfer, Burn out conditions, Heat exchanger design, pressure drop, material consideration, system design concept.

Parametric design, Mechanical design, shielding and fuel management, steam turbines for nuclear power stations, simulation of nuclear reaction of an analog computer, Radiation protection. Introduction, Chemical and nuclear reactions, Nuclear fission and chain reaction.

Nuclear cross – sections, neutron flux and reaction rates, co-ordinate systems, diffusion theory. slowing down and moderation, moderating power and moderating ratio, variation of neutron cross-sections with neutron energy, neutron life cycle, Fermi Age Equation, criticality conditions.

Design Prameters. Heat conduction in fuel elements, axial temperature distribution of coolant and fuelelements, Liquid metal heat transfer, Burn out conditions. Heat Exhanger design, pressure drop, material consideration, system design concept, parametric design, mechanical design, Safety measurers for nuclear power plants, shielding and fuel management, Radiation protection. Steam turbines for nuclear power station, simulation of nuclear reactior on an analog computer.

Books:

1. Introduction to Nuclear Engineering by K.S. Ram

Reference Books:

1. Power Plant Engineering by Morse
2. Power Plant Engineering (steam & Nuclear) by P.K. Nag

Name of the course : Solar Thermal Processes
Course No. : TME-422
Credit hours : 4 (3+1)

Catalogue Description:

Solar radiation, relevant topic in heat transfer, Radiation characteristics of opaque materials, Transmission of radiation through partially transparent media, flat plate collectors, Theory and performance of solar water and air heaters, Focussing collectors, Thermal energy storage, Elements for solar thermal power plants, Working fluids for solar power and refrigeration system, Solar powered refrigeration and space conditioning systems.

Syllabus:

Historical background, importance and application of solar energy.

The Sun, solar constant, spectral distribution of extra terrestrial radiation; Earth Sun angles; angle of incidence of beam radiation, Pyranometers and Pyrheliometer measurement of duration of sunshine; Solar radiation data, attenuation of solar radiation by the atmosphere.

Electromagnetic radiation; black and grey body concept, Planck's law and Wien's displacement law, sky radiation, heat transfer coefficients, optical properties of materials.

Absorptance and emittance; Kirchoff's law, reflection from surfaces, relationship among absorptance emittance and reflectance; selective surface, Reflection of radiation; absorption of radiation Optical properties of cover systems, transmittance of diffuse radiation, transmittance-absorptance product; Absorbed solar radiation, General description of flat plate collectors, Basic energy balance equation, temperature distributors in flat plate collectors; Overall heat transfer coefficient, temperature distribution between tubes, collector, efficiency factor, collector heat Removal factor, collector geometric collector Performance; method of testing solar collector configurations, concentration ratio, Orientation and sun tracking systems, characteristics of focusing collectors, thermal performance of focusing collectors, Types of energy storage, characteristics and capacity of focusing collectors, thermal performance of focusing collectors, types of energy storage, characteristic and capacity of storage systems, solar ponds, principles of solar thermal power generation solar thermal power generation using Strilling cycle and Brayton cycle.

Solar refrigeration and air conditioning, various methods of power generation.

Books:

1. Solar Engineering of Thermal Processes by J.A. Duffie & W.A. Beckman, John Wiley & Sons.
2. Solar Energy by H.P. Garg & J. Prakash, Tata Mc Graw Hill, New Delhi.

Reference Books:

1. Principles of Solar Engineering by F. Kreith & J.F. Kreider, Pub. Mc Graw Hill Book Comp.
2. Solar Energy by S.P. Sukhatme, Pub. Tata Mc Graw Hill.

Name of the course : Design of Rotodynamics pumps
Course No. : TME-423
Credit hours : 4 (3+1)
Catalogue Description:

Types of pumps, classification, specific speed, simplicity, Lows and dimensionless numbers, Basic equation in pump design. Power losses and efficiencies, pump characteristics, Design feature of rotodynamic pumps, Design of centrifugal, mixed flow and axial flow pumps for varied applications, Design of pump impellers, volute castings, diffuser rings (vaneless and vaned), suction and delivery pipes etc. Aerodynamic theory for the design of aerofoil shaped blades, Layout of pumping units, Axial and radial thrust, Cavitation check, Shaft vibrations, Materials used in pumps construction.

Syllabus:

Introduction classification of pumps working principle, operation; Types of impellers, casings, Multistaging flow – direction; shaft disposition; liquid type. Basic theory of pumps velocity diagram; Ideal head & torque equations; Degree of reaction; Pre rotation; Friction; Turbulence; Disc friction; Leakage, Mechanical losses; Coefficients and efficiencies; Performance curves virtual head-capacity curves. Effect of speed changes on performance curves; Diffusers. Specific speed and performance curves, Specific speed; Dimensionless numbers; specific Speed in terms of wheel dimensions; specific speed applied to pump classification; Model tests; performance Curves for various types of pumps; Effect of speed viscosity and impeller changes on performance curves, Design of Radial Flow Pump Stage Introduction; pipe connections and velocities; Impeller inlet dimensions and vane angle; Impeller Outlet dimensions and vane angle; design of vanes Design of volute; Design of diffuser; Disc friction; Multistaging Design of suction and delivery pipes. Constructional Details Shaft and sleeves; Bearing; Packing glands bearing rings; selection of materials; axial thrust; Radial Thrust; Priming; cavitations; NPSH; Available and required Suction head; shaft vibrations.

Design of Mixed-flow and Axial-Flow pump Impellers Design of Francis-type or mixed-flow impeller, Design of propeller pump impeller; Design of aerofoil shaped blades.

Books:

1. Lazarkiewtex & Trooko Lanski, Impeller Pump’s Pergmon Press, 1965.
2. Anstin church & Jagdish Lal,” C.F. Pumps & Blowers, Metrapolitan Books, Co. (P) Ltd., Delhi- 6, 1973.

Name of the course : Bearing & Lubrication
Course No. : TME-424
Credit hours : 4 (3+1)
Catalogue Description:

Hydrodynamic Bearing and boundary lubrication, Lubricant and their properties, Newtonian & Non-Newtonian lubricant, Rheology of lubricants. Hydrostatic and flexible hydrostatic bearing. Design of rigid and flexible hydrostatic bearing, Restrictor and their use. Dynamics of bearing Rotor frequency of whirl, Threshold speed and whirl frequency ratio. Stiffness & Dumping Coefficient and entire journal mass Gas bearing and MHD bearing.

Syllabus:

Introduction, Types of lubricant, types of lubricants & their properties

Newtonian & Non-Newtonian models & rehology

Design of hydrodynamic bearing. Reynolds Equation

Design of hydrostatic bearing, Restrictors & types and role in compensated bearings, Flexible Bearing, Static characteristics of the bearing flow and attitude angle.

Dynamic charactieristics of the bearing Threshold speed, Frequency of whirl, entire journal mass.

Stiffness coefficient & damping coefficient.

Gas bearing/ MHD bearing, Hybrid bearing, Bearing materials.

Name of the course : Design of Blowers and Rotary Compressors
Course No. : TME-425
Credit hours : 4 (3+1)
Catalogue Description:

Introduction, Concept from gas dynamics, Fundametals of theory of centrifugal and axial flow trubomachines, Flow of gas through a blower/compressor stage, Energy losses, performance at varying loads, Step coefficient, Balji, Stanitz's and Stodala formulae, Compressor blade cascade, blade forces, Free vortex and forced vortex blades, Vane shape and stresses, Vane shape and characteristics, compressibility and pre-whirl, Performance characteristics of centrifugal and axial flow blowers and compressors, Design and construction details of blowers and compressors, material selection, special features.

Syllabus:

Introduction, Concept from Gas dynamics, Fundametal theory of centrifugal & axial Flow turbo machines.

Flow of gas through a blower, Centrifugal compressor stage, compressor power, calculation of stage. Compressor construction.

Energy losses in compressor, performance at varying loads step coefficient, Balji, Staniz's and Stodala formulae, performance of centrifugal compressor.

Multistage compressor blade cascade, blade forces supersonic compressor, cooling multistage compressor, Stage of axial flow compressor, axial Flow compressor designs, Calculation of main dimensions of compressor stage, examples of compressor designs, performance of axial flow compressor, free vortex and forced vortex, vane shape & stresses, Compressively & pre-whirl, Compressor construction, power & efficiency, energy Balance of compressor Design of blower, Design of compressor, Dynamics Compressor characteristics, Compressor control, Material Selection, Economy of compressor performance, Special features.

Books:

1. Reciprocating and Rotary Compressors by: V. Chlumsky Pub. SNTL Publisher, Czechoslovakia.

Name of the course : Metrology
Course No. : TME-428
Credit hours : 4 (3+1)
Catalogue Description:

Errors in measurement, Light waves as a standard of length, linear and angular measurements. Circular divisions, Limits and limit gauges; Machine-Tool metrology. Gear measurement. Measurement of screw threads. Measurement of surface finish.

Syllabus:

System of Measurement, Elements of Measuring Instrument, Errors in Measurment and their estimation. Linear Measurement; Slip Gauges, Micrometers, Vernier calipers, Surface plate, Angular Measurement; Angle Gauges, Sine bar, Microscopic Autocollimator, Inter-ferometry; Principle, Flatness testing, Pitter Gauge Interferometer, surface texture; order of geometrical irregularities, evaluation criteria of surface roughness, (RMS and CLA), measurement of surface roughness, Talysurf, Tomlinson surface meter, comparators; characteristics, mechanical (dial indicator micro kator (Zeiss optical comparator) Pneumatic comparator (Free flow air guage, measurement of bore) Electrical, Electronic comparator (LVDT), magnifications of comparators, measurement of Gear and screw theads, Selective assembly and Interchangeability.

Topics:

Introduction, Systems of Measurement, Standards of measurement objectives of metrology.

Element of Measuring instrument system, sensor, Amplifier, modulator, transdurcer, recording device etc.

Errors in measurement, various types of error, Environmental conditions responsible for errors, Source of error, Estimation, error distribution, Error Accumulation, elimination of error, calibration of measuring instrument.

Liner measurement, Need of measurement, sensitivity, accuracy, Accuracy vs cost.

Linear measuring Instruments, measurement of displacement, velocity, acceleration. Flow measurement, Vernier Callipers, Micrometer, Slip Gauges, Surface Plate, selective assembly, interchangeability specifications, limits, fits, and tolerances.

Comparator: introduction, Characteristics of a good Comparator, Mechanical Comparator, Optical Comparator, Pneumatic Comparator, Press senstive air gauging, Electrical Comparator.

Angular measurement: Introduction, principle working, Angle gauges, Sine bar, Sprit Level, Autocollimator.

Interferometer Measurement: Introduction principal of Interference of light, Concept of flatness, Flatness testing, Measurement a curved surface, use of laser Mixed Radiations. Interferometers. The pitter gauge interferometer. Measuring the periodic Errors in Micrometers.

Measurement of screw thread; Introduction, type of screw threads, Screw thread terminology, External thread measurement Effective diameter, major diameter, minor diameter, flank angle pitch and error, internal thread measurements.

Gear Measurement: Introduction, Types of gear, terminology, measurement of pitch profile, lead, backlash, tooth thickness, compsote errors.

Surface texture; Introduction, orders of geometrical irregularities, characteristics of smooth surface, evaluation of surface roughness, measurement of surface finish, ISI specification.

Acceptance test for machine tools; Introduction, instruments required for acceptance test.

Books:

1. Engineering Metrology by R.K. Jain.
2. Metrology and Measuring instruments by M.H. Taher.

Reference Books:

1. Manufacturing Science and Technology by Suresh Dalla.
2. Production Technology by O.P. Khanna and M. Lal.

Name of the course : Non Conventional Energy Sources and Systems
Course No. : TME-426
Credit hours : 4 (3+1)
Catalogue Description:

Conventional sources of commercial energy fossil fuels, Their consumption rate, Energy reserves and estimate of time for which conventional energy sources will lass Alternate Energy sources, Introduction to photovoltaic and thermoelectric Conversion Introduction to MHD Power fuel cells.

The solar-option direct and indirect applications, Availability of solar radiation Energy collection and Concentration for photo thermal applications. Thermal Storage Wing energy, types of wind mills, elementary design principle, Ocean thermal energy conversion, gerothermal energy systems, Extent of available resources. Heat transport in geothermal systems. Introduction to tidal and wave energy.

Syllabus:

Conventioanl sources of energy; fossil fuels and hydro Power etc availability in future, present status, Solar Radiations; Intensity at tilted surface, Electromagnetic radiation black and grey body concepts Sky radiating characteristics of absorber surfaces, Convection and radiation in collectors, heat transfer Coefficient Flat plate collects and concentrating collector.

Energy storage; hot water, rocked and latent heat Storage, Water heating, space heating and cooling. Introduction to photovoltaic, Mechanism of wind, Type of wind mills, Elementary design principles power in the wind (calculations) Power coefficient. Introduction, to Ocean thermal electric conversion system; open cycle, closed and hybrid cycle, Energy from tides; Basic principle of tidal power, Tidal basin, power generation, Wave energy. Introduction, advantages and disadvantages of wave energy geothermal energy. Geothermal field, Sources: Hydrothermal, vapour dominated liquid dominated systems, Geopressured resources, Hot dry rocks, magma resources, advantages and disadvantages of geothermal energy.

Introductions to Magneto Hydro Dynamics (MHD) power and fuel cells.

Introductions, Biomass conversion technologies, Bio gas generation, Types of biogas plants anaerobic digestion.

Books:

1. Energy Conversion Systems by Rakesh Das Begamudre, Pub: New Age Int. (P) Ltd.
2. Renewable Energy Sources & Conversion Technology by N.K. Banoal, M. Kleeman & M. Meliss.

Reference Books:

1. Non-Conv. Energy Source by G.D. Rai.
2. Solar Energy by H.P. Garg & J. Prakash

Name of the course : Fuels and Combustion
Course No. : TME-427
Credit hours : 4 (3+1)
Catalogue Description:

Different types of fuels, solid fuels, liquid fuels, gaseous fuels and their properties. Introduction to the combustion of fuels. Fundamental of chemical kinematics and kinetic of chemical chain reactions. Thermodynamics of combustion, laminar flame propagation, Burning velocity, Turbulent flame propagation, flame stability, Diffusion flames, Detonation wave, self ignition and its limit, construction on of liquid and solid fuels.

Syllabus:

Introduction, Energy sources of present and future, Different types of fuels, solid liquid and gaseous fuels and their properties.

Introduction to combustion of fuels and flue gas analysis. Fundamental of chemical kinetics and kinetics of chemical chain reactions, Thermodynamics of combustion, combustion process and the First law, Adiabatic flame termperature, equilibrium composition of gaseous mixture, Laminar and turbulent flame propagation, determination of burning velocities, Flame stability, characteristics stability diagram, mechanism and flame stretch theory. Diffusion flames, Detonation waves, Process of self-ignition, limits of self – ignition and factors affecting selt-ignition.

Books:

1. Fuels and Combustion by S.P. Sharma & Chandra Mohan
2. Fuels and Combustion by M.L. Smith & Stinson.

Reference Books:

1. Fuels by J.S.S. Brame & King J.G.
2. Combustion Engineering & Fuel Tech by A.K. Sahas
3. Fuels by Francis Wilfrid
4. Energy and Atmosphere by Campbell, lan. M.

B. TECH. (COMPUTER SCIENCE AND ENGINEERING)

GRADUATION REQUIREMENT FOR B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER WISE COURSE DISTRIBUTION w.e.f. 2009-2010

S.No.	Course No.	Course Name	Credit hrs. Pre-requisites
I Semester			
1	BPM-111	Engg. Mathematics-I	3(3+0)
2	BPC-111	Engg. Chemistry-II	2(1+1)
3	TCE-111	Solid Mechanics	4(3+1)
4	BPP-111	Physics-I	3(2+1)
5	TME-111	Thermodynamics & H.E.	4(3+1)
6	TCP-111	Introduction to Computer & Programming	3(1+2)
7	TWP-111	Work Programme	1(0+1)
Total			20(13+7)

II Semester

1	BPC-121	Engg. Chemistry-II	3(2+1)
2	BPP-121	Physics-II	3(2+1)
3	BPM-121	Engineering Math-II	4(4+0)
4	TCE-121	Engineering drawing	2(0+2)
5	TPE-121	Workshop practice	2(0+2)
6	BHS-121	Technical writing	3(2+1)
7	TCP-121 (For CSE only)	Digital Logic & Circuit	4(3+1)
Total			21(13+8)

III Semester

1	TCP-211	Data structure	3(2+1)
2	TCP-212	Discrete structure	4(3+1)
3	TCP-213	Formal language and automata theory	3(2+1)
4	TCP-214	Computer Graphics & Animation	4(3+1)
5	TEC-211	Circuit theory	4(3+1)
6	TEC-212	Instruments and measurements	4(3+1)
7	NSS-211	N.S.S.	(0+2)NC
Total			22(16+6)

IV Semester

1	BPM-221	Probability Statistics Queing Model	2(2+0)
2	TCP-221	Microprocessor	4(3+1)
3	TCP-222	Data processing & file system	4(3+1)
4	TCP-223	Computational & Numerical Analysis	2(2+0)
5	TCP-224	Theory of Computing	3(3+0)
6	TCP-225	Computer organisation	3(2+1)
7	TEC-221	Electronic devices & circuits	4(3+1)
Total			22(18+4)

V Semester

1	TCP-311	System Programming	4(3+1)

2	TCP-312	Programming Languages	3(2+1)
3	TCP-313	Fundamental of Computer Communication system	4(3+1)
4	TCP-314	Data Base Management System	4(3+1)
5	TCP-315	Operations Research	2(2+0)
6	TEC-311	Control Systems	4(3+1)
Total			21(16+5)

VI Semester

1	TCP-321	Computer & Society	3(3+0)
2	TCP-322	Microprocessor Based System	3(2+1)
3	TCP-323	Numerically Controlled Machines & Robotics	3(2+1)
4	TCP-324	Language Processors	3(3+0)
5	TCP-325	Operating Systems	3(2+1)
6	TCP-326	Computer Networks	3(3+0)
7	TCP-327	Design & Analysis of Algorithms	3(3+0)
8	TCP-328	Practical Training	30 days
Total			21(18+3)

Note:-Training shall be completed in semester break.

VII Semester

1	TCP-411	State of the Art Computer	3(2+1)
2	TCP-412	Software Engineering	3(3+0)
3	TCP-413	Management Information System	3(2+1)
4	TCP-414	Multimedia Technology	4(3+1)
5	TCP-415A	Project-A	2(0+2)
6	TCP-416	Seminar	1(0+1)
7	TPE-411	Principal of Management	2(2+0)
Total			18(12+6)

VII Semester

1	TCP	Open Elective-I	4(3+1)
2	TCP	Open Elective-II	4(3+1)
3	TCP	Open Elective-III	4(3+1)
4	TCP-415(B)	Project-B	4(0+4)
Total			16(9+7)
			161(115+46)

ELECTIVE COURSES

1	TCP-421	Simulation & Modelling	4(3+1)
2	TCP-422	Digital Control	4(3+1)
3	TCP-423	Satellite Communication	4(3+1)
4	TCP-424	Mobile Computing	4(3+1)
5	TCP-425	VLSI Technology	4(3+1)
6	TCP-426	Image Processing	4(3+1)
7	TCP-427	Data Mining &Ware housing	4(3+1)

I SEMESTER

SEMESTER-I

NAME OF THE COURSE : Engineering Mathematics-I
Course No. : BPM-111
Credit Hrs : 3(3+0)

Course Catalogue:

The sign of the first derivative, concavity and point of inflexion. Asymptotes and symmetry, Rolle's Theorem, Mean Value Theorem, Extended Mean Value Theorem, Taylor's formula, Estimating approximation errors, Taylor Theorem with remainder and estimating the remainder, Newton's method for approximating solution of equation. Inverse functions and Picard's Method. The first and second foundamental theorem of integral calculus. Leibnitz's rule. Appromixating finite sums with integrals. Rules for approximating definite integrals with the help of Trapezoindal and Simpson's rule and their error estimation. Ckoncergence and divergence of infinite series non-negative terms with the help of comparison test, integral test, Limnit comparison test, Ratio test, Root;s test. Limit and continuity of function of two or more variables.

Partial Derivatives, chain rules for functions of two or more variables. Linear approximation of Z=f(x,y) and their increment estimation,.Maximum, minimum and saddle points for function for two or more variables, Lagrange's multipliers method.
Convergence and divergence of improper integrals. Calculating volume by slicing, volume modeled with shelss and washers. Length of a plane curve. Area of a surface of revolution.

Polar coordinates; Polar equations of conics and other curves, Area of plane curves, Arc length and surface area.

Multiple Integrals: Double Integrals, Area bounded by curves, First and second moments, Polar moment of intertia, Radius of gyration, changing double integrals from cartesion to polar co-ordinates. Evaluation of triple integrals.
Parametric equations in analytical geometry and idea of spherical and cylindrical co-ordinates. Hyperbolic Functions: definition and identities, derivatives and integrals, Inverse hyperbolic functions.

Books:

1.Calculus & analytic geometry, Thomas & Finney.
2. A text book of Engineering Mathematics, Bali & Iyengar.
3. Higher Engineering Mathematics, B.S.Grewal.

NAME OF THE COURSE : Engineering Chemistry-II
Course No. : BPC-111
Credit Hrs : 2(1+1)

Catelogue description:

Water and waste water treatment, Chemistry of strategic elements and their applications, basic organic, reaction mechanism and reactions of industrial significance, polymer chemistry, environmental chemistry, pollution and majors of pollution central.

Course Outline with detailed syllabus:

Introduction, hardness of water and its disadvantages in industries with special reference to steam generation, softening methods, soda lime, zeolitesion exchange and desolation: method (electro dialysis and reserveosmosis processes). Basic principles, reaction intermediates, elementary tereo chemistry and some name ractions sof industrial application like Bechmann, Hoffman, Reimen tiemann, cannizaro, Diels-elder and Skrup's synthesis. Plymers and their classification, mechanisms of polymerization and catalysts like Zeigler Natta catalyst. Tacticity of polymers, introduction and uses of natural and synthetic resins, fibers and rubbers, introduction to biopolymers, introduction to environmental segments, structure and composition of atmosphere, chemistry of oxide of nitrogen and sulphor). Sources and sinks for pollutants, pollution control methods.

Books:

1. Text book of Environmental Chemistry, S.S.Dara, Engineering Chemistry, Jain & Jain.
2. Polymer Science & Technology, Joel R. Friend.
3. Synthetic Rubbar their Chemistry & Tech. D.C. Blanckley.
4. Organic Chemistry, Morrison and Boyd.
5. Environment Chemistry, A.D.De.

Experiments:

To determine the ferrous cotent in supplied sample using external indicator.
To determine chloride content in water using Mohar's salt.
To determine the constituents and amount of alkalinity of supplied samples.
To determine temporary and permanent hardness or water usisng compexometric method.
To determine the percentage of chlorine in supplied sample.
To determine the iron content in water sample by spectrophotometry.
To find chemical oxygen demand of waste water sample by potassium dichromate.
To determine pH of solution using pH meter and pH metric titration.
To determine Kinetics of hydrolysis of methyl acetate.
Determine the molarity of HC 1 pH metrically, provided with N/10 NaOH.
To determine relative viscosity of liquids with respect to water at room temperature by Ostwald or Redwood viscometer.
Demonstration of IR-spectrophotometer.
Determination of flashpoint

Determination of equivalent weight
Determination of distribution co-efficient.

NAME OF THE COURSE : Solid Mechanics.

Course No. : TCE-111

Credit Hrs : 4(3+1)

Course Catalogue:

Mechanics of rigid bodies, Resultant of force systems, Equilibrium of forces, Trusses, centroid and centre of gravity, Second moment of area, Simple stresses and strains, Strain energy, Bending moment and shear force diagram for beams, Bending and shearing stresses, Torsion of circular shafts, Columns and struts, Slope and deflection in beams.

Syllabus:

Mechanics of rigid bodies: various two dimensional system of forces, resultant of forces, equilibrium of forces, free body diagram, parallelogram law, polygon law, moment of a force, couple, resolution of forces into a force and a couple, varignon theorem, various types of supports and corresponding reactions concept of centroid: centroid of two dimensional bodies, determination of centroid by integration method, centroid of geometrically composite plane figures. Second moment of area: rectangular second moment of area, polar second moment of area, product second moment of area, radius of gyration, parallel axes theorem, perpendicular axes theorem, second moment of area of geometrically composite sections simple stresses and strains: stress, strain, actual stress and strain, nominal stress and strain, stress-strain, curve for ductile and brittle materials, hook's law, Young's modulus of elasticity, concept of factor of safety, shear stress, shear strain, modulus of rigidity, complementary shear stress, elongation of various bars under self load and external loads. Temperature stresses due to uniform change in temperature, composite bars subjected to axial forces and temperature change, poison's ratio, volumetric strain, pressure, bulk modulus, relation between various elastric constants. Complex stresses: Stresses on oblique plane induced due to two mutually perpendicular normal-stresses and to shear stresses, graphical solution to complex stresses i.e. mohar's circle method, principal stresses and principal planes. Inuoduction to bending moment and shear force at any section, sign convention. BMD and S.F.D for cantilever simply supported and overhanging beams subjected to various types of linearly varying loads. Steesses in beam: simple theory of bending (assumptions and derivation of expressions and derivation of expression of expression for flexural and shearing resistance.Torsion of circular section: derivation of shear stress produced in a circular shaft subjected to torsion, maximum torque transmitted by solid and hollow ciucular shaft, power transmitted by shaft, torsional rigidity, slope and deflection of cantilever and simply supported beams using Macaulay's method Columbs and struts: Failure of short column, Euler's theory for long columns, critical load, effective length of a column, slenderness ratio, limitations of Euler's theory for long columns, critical slenderness ratio , Trusses: Intuoduction to trusses, analysis of planer statically determinate trusses, assumptions in truss analysis, method of joints, method of section.

Books:

1. "Strength of Material" by Surendra Singh
2. " Strength of Material" by B.C.Punmia
3. "Engineering Mechanics" by Timashankyo and Young
4. "Engineering Mechanics" by Higdon and Styles

NAME OF THE COURSE : Physics-I
Course No. : BPP-111
Credit Hrs : 3(2+1)
Catalogue description:

Rotation of rigid bodies, moment of inertia, relativistic mechanics, vector field, magenetic field, electromagnetic induction, electric and magnetic fields in matters, free oscillations with N-degrees of freedom.

Syllabus:

Rotation of rigid bodies, angular momentum, inertial coefficients, parallel and perpendicular axis theorem, moment of inertia of rigid bodies like sphere, spherical shell, disk, cylinder, and motion of inclined plane. Michelson Morley experiment, Inertial frames of reference, Postulatyes of special theory of relativity, Lorentz transformation equations of space and time, Length contraction, time dialation, longitudinal Doppler effect, velocity addition formula, relativisitic mass, relativistic energy, transformation of momentum and energy, equivalence of mass and energy. Scalar and vector fields, gradient, divergence, curl of the fields, Gauss's divergence and Stoke's theorem, \Gauss's law and its applications, Poisson and Laplace equations, Magnetic field, some properties of the magnetic field, vector potential, field of any current carrying wire, electric conduction in a magnetic field (the Hall effect), Faraday's law, Mutual inductance, self inductance, energy stored in magnetic field, a circuit containing L.C. & R, the displacement current and Maxwell's equations, solution of Maxwell's equations in free space. Para-dia-ferro, and antiferro magnetic materials, B-H Curve, Hysteresis. Free oscillations of system with one and two degrees of freedom. Transverse mode of continuous string, Modes of non-continuous systems with N degrees of freedom, Transverse mode of continuous string, Modes of non-continuous systems with N degrees of freedom. Transverse oscillations of a beaded string, longitudinal oscillations of springs and masses, coupled pendulums.

Books:

1. Fundamental of Physics, by Resnick, Halliday and Walker.
2. Berkeley Physics Series Vol.I, II and III.

NAME OF THE COURSE : Thermodynamics & Heat Engines.
Course No. : TME-111
Credit Hrs : 4 (3+1)
Course Catalogue:

System and properties, concept of energy, temperature & heat, equation of State, First Law for closed & open systems, Pure substance & properties, Second Law of thermodynamics & entropy Boilders, mountings and accessories, boiler efficiency, stream engines, Rankine cycle, indicator diagrams, steam turbines. Internal combustion engines, Air standard Otto, Diesel, Dual and Joule Cycle.

Syllabus:

Introduction: Engineering system of units; system and their properties, concept of energy, temperature, work and heat, Zeroth law of thermodynamics; Equation of state for an ideal gas.

Pure substance, phase diagrams; tabulated properties, property charts and their use.

First law of thermodynamics and Engg. Applications; Flow and non-flow processes; General energy equation for steady flow; Analysis of constant volume, constant pressure, isothermal and adiabatic processes, reversible and irreversible processes.

Introduction and definition of second law of thermodynamics, carnot cycle; definition and concept of entropy, change in entropy, change of entropy for gasses.
Steam boilers; types of boilers, high pressure boilders, mountings and accessories; equivalent evaporation; boilder efficiency, boiler trial.

Steam engines; Rankine cycle; construction and working of steam engine.

Steam turbine; construction and working of steam turbines; impulse and reaction turbines; velocity diagrams; work output and efficiency; compounding of steam turbines.

Air standard cycles; Otto, Diesel, Dual, Stirling, Joule and Atkinson etc.
I.C. engines; Classification, construction and working of two stroke and four stroke engine work output, efficiency and mean effective pressure calculations.

Books:

1.Engg. Thermodynamics by Gupta & Prakash.
2. Engg. Thermodynamics by P.K. Nag.

NAME OF THE COURSE : Introduction of Computer Programming.
Course No. : TCP-111
Credit Hrs : 3 (1+2)

Catalogue Description:

Programming in FORTRON&C, Introduction to binary number system, Elementary logic gates and comp. org., Computer peripherals, Computer harware & Arc+ Microprocessor, Application & system scftware's, Operating systems, Logic & language paradigm, Data structures, Algorithm & program development tools, Basics of digital data communication, Computer networks & internet.

Syllabus:

Introduction: Characteristics of computer, Evolution of computers, Generation of computers, Classification of Computers, The computer systems. Programming in FORTARON & C: Variables and expressions, basic input, control structures, functions, arrays and strings, structure and union, pointer, dynamic memory allocation, macros, files, Number System and Logic Gates: Introduction, number system, conversion between number bases, logic gates. Computer Architecture: Introduction, CPU, memory, communication between various units of a computer system, Input Devices: Introduction, keyboard, pointing devices, speech recognition, digital camera, scanner, optical scanner, Output Devices: Introduction, classification of output, hardcopy output devices, printers, plotters, softcopy output devices, monitors, audio output, projectors, and terminals. Computer Program: Introduction, software definition, relationship between software and hardware, software categories, system software, application software, software terminology. Operating systems, functions of an operating systems, modern operating system, Data Structure: Introduction different type of data structures. Data communication and Computer networks: Introduction, data communication, transmission media, multiplexing, switching, computer networks, network topologies, communication protocols, network devices. Introduction, evolution of internet, basic internet terms, getting connected to internet, internet application, electronic mail (an introduction), how email works, searching the web (search engines), languages of internet, internet and viruses.

Introduction to binary number system, Elementary logic gates and comp. org. programming in FORTRON&c, Computer peripoherals, Computer hardware & Arc+Microprocessor, Application & system software's Operating systems, Logic & language paradigm, Data structures, Algorithm & program development tools, Basics of digital data communication, Computer networks & internet.

Books:

1. Introduction to Computer Science by ITL Education Solutions Ltd.
2. Let use C by Yashwant Kanetakar.

Reference Books:

1. Programming with C written by K.R. Venugopal & Sudeep R. Prasad.
2. The C programming language written by Brain W. Kernighan & Dennis M. Ritchie.

3. Computer Fundamentals by P.K. Singha
4. Introduction to Computers by Peter Norton.
5. Progamming in ANSI C by E. Balaguruswamy.

II SEMESTER

SEMESTER-II

NAME OF THE COURSE : ENGINEERING CHEMISTRY - I.
Course No. : BPC-121
Credit Hrs : 3(2+1)

Catalogue description:

Modern atomic theory, advanced treatment of chemical bonding, structure and directional properties of molecules, chemical kinetics, catalysis electro chemical cells, corrosion and its prevention, lubrication, semiconductors, co-ordination compounds, crystalline structure, chemical thermodynamics, instrumental methods of chemical analysis.

Syllabus:

Introduction to modern atomic theory, Schrddinger wave equation and its application, wave mechanical model of hydrogen atomlike ions, wave functions for hydrogen atom like ions and their usefulness in determination of most probable distance and nodal distance, mechanics of He-atom.

Molecular orbital theory of covalency and its application in energy determination of bonding and antibonding molecular of H2+V.B. theory of covalency and its application to H2 molecule.

Directional properties of H2Oand NH3 molecules, SO3, PC15 and Xeo2. Kinetics of temperature on surface reaction, pH-deopendence of rate consants of catalysed reactions, auto catalysis.

Kinetics of reversible, parallel and consecutive reactions theory of absolute reaction rates. Concentration cells, liquid junction potential fuel cells and their applications.

Concepts of corrosion types of corrosion and factors affecting the corrosion, chemical and electrochemical theory of corroslon, methods of preventing the corrosion, Classification and mechanism of lubrication.

Theories of semiconductors, n-type and p-type semiconductors, conductivity of semiconductors, model for impurity semiconductors, organic semiconductors.
Introduction, valence bond theory, crystal field theory, ligand field theory and molecular orbital theory of bonbding in coordination compounds, isomerism in coordination compounds.

Crystalline structure Born-Haber Cycle, Bragg's condition crystal defects. Free energy and entropy changes the chemical process calculation of free energy change entropy change and enthalpy change in chemical and phase changing processes. Gibbs Helmholtz equation, clausius chaperon equation, chemical potential and Gibbs Duhem equation.

Principles instrumentation and application of IR, MNR, UV-VIS, Mass and as.

Books

1. Ira. N. Levine: Quantum Chemistry.

2. S. Glasstone: An Introduction to electrochemistry.
3. P.W. Atkins: Physical Chemistry.
4. Hanna:Quantum Chemistry.
5. J.W. Moore & R.G. Pearson: Kinetics & Mechanism.
6. Cotton & Wilkinson: Co-ordination Compounds.
7. C.A. Culson: Valence
8. J.D. Lee: Concise inorganic chemistry.
9. S.H. Marone & J.B. Lando: POhysical Chemistry.

NAME OF THE COURSE : PHYSICS-II
Course No. : BPP-121
Credit Hrs : 3 (2+1)
Catalogue description:

Interference, Diffraction and Polarization of light, Quantum Theory and concepts of quantum mechanics, Lasers, Nuclear structure, crystal structure.

Syllabus:

Coherent sources, Fresnel's Biprism, Young's double slit, Newton's rings, single slit, double slit, Diffraction, transmission diffraction grating, resolving power of telescope, microscope and grating, Polarization of light, different kinds of polarized light, Brewster's law, Maus's phenomenon of double refraction, construction and working of Nicol prism, retardation polates, optical activity, specific rotation and polarimeter.

Origin of x-rays, continuous and characteristic x-ray spectra, Moseley's law, absorption of x-rays, diffraction of x-rays, Bragg's law, Bragg's spectrometer, photoelectric effect, Compton effect and pair production.

Wave particle duality, uncertainty principle and its applications, non-existence of an electron in a nucleus, minimum energy of harmonic oscillator, ground state energy of hydrogen atom.

Schrodinger's equation (time dependent and independent) expectation values, particle in a box (one dimension), harmonic oscillator, single step, rectangular brrier and tunnel effect.

Spontaneous and stimulated emission of radiation, Einstein's coefficients, main components of laser, population inversion, ruby and He-Ne laser.

Books

1. Concepts of Modern O Physics by A. Beiser.
2. Fundamentals of Physics by Resnick, Halliday and Walker.

NAME OF THE COURSE : ENGINEERING MAITHEMATICS- II.
Course No. : BPM-121
Credit Hrs : 4(4+0)
Catalogue description:

Differential equation: Exact deferential equation Integrating factor, linear first order differential equation variation of parameters, orthogonal trajectories, Picard's iteration method for solving differential equation of order one, homogeneous linear differential equation of second order, second order differential equation reducible to first order, Homogeneous second order differential equation, with constant coefficient (real rools, comple roots, double rools of the characteristic equation), Cauchy's equation, linear dependency and order, Non-homogeneous linear equation; Method of undetermined coefficients and general method.

Laplace transform: Definition, linearly existence theorem, laplace transform of derivatives and integral, shifting theorem unit step function, convolution theorem, periodic function, Inverse laplace transform, solution of differential equations and system of differential equations upto second order using Laplace transformation.

Matrices: Type, Rank, linear dependency and independency of vectors inverse linear transformation, Bilinear, quadratic, Hermition & skew-Hermition forms eiger values of linear differential equation using eigen value-eigen vector method upto first order.

Vectors: Vector calculus, derivatives curves, circular Helix are length tangent curvature and Torsion, Frenet's formulas. Directional derivatives Divergence curl and gradient of vector field, line integral evaluations double integral, Green's theorem, surfaces Tangent plane. Area, first fundamental form, surface integral, statement of divergence theorem of Gauss and stoke's theorem and related simple problems.

Fourier series: Periodic functions, Euler's formula, functions having arbitrary period, even and odd functions, half range expansions.

Partial differential equations: Basic concept separation of variables method for solution of one power series. Application of power series in solution of first order differential equation and second order differential equation having distinct root of auxiliary equation, convergence and divergence of power series.

Books:

1. Advanced Engineering mathematics by Erwin Kreyszig.
2. A text book of engineering mathematics by Bali & Iyenger.

NAME OF THE COURSE : Engineering Drawing
Course No. : TCE-121
Credit hrs. : 2(0+2)
Course Catalogue:

Use of drawing instruments and scales, Free – hand and technical lettering, Geometrical construction, Therory of projections, Projections of points, straight lines and planes, Auxillary planes, solids, Development of surfaces of solids,Sections of solids, Interpenetration of solids, Isometric and Perspective views.

Syllabus:

Uses of instruments and scales: Drawing board, T-squares, mini-drafter, set squares, compass, divider, fresh curves etc. Free hand and technical lettering, Types of lines thickness and shades of lines, single stroke and gothic letters and dimensioning, Geometrical constructions: division of lines and curves, regular polygons, different types of curves, langents, lengths of arcs. Theory of projections; orthographic projections, planes of projection; four quadrants first angle and third angle projections, conventions adopted. Projections: points, strainght lines and planes, auxiliary planes, solids, true length of lines and its inclinations with the reference planes traces of a line. Development of surfaces of solids: Cubles, prisms, cylinders, pyramids, cones and spheres,: Section of solids: Section planes, true shape of sections. Intersection of surfaces and Inter-penetration of solids: Lines sof isometric scale, isometric projections, definition of perspective elements, station point, picture planes, vanishing point, different methods of perspective projection.

Books:

1. Elementary Engineering Drawing by N.D. Bhatt.

NAME OF THE COURSE : WORKSHOP PRACTICES
Course No. : TPE-121
Credit Hrs : 2 (0+2)
Catalogue description:

Fundamentals of general Engineering Workshop Practices including metals and alloys, wood working, fitting, Lathe, Shaper, Planer and casting operations.

Syllabus:

Introduction, safety precautions, properties of metals and alloys. Forging tools, operations and making of simple jobs. Fitting tools, carpentry work, types of timber, seasoning and wood preservation, plywood, wooden joints and tools, Lathes, specifications, tools and operations, sundry, moulding sands, patterns and allowances, cores, core prints, chaplets, moulding methods, arising of casting and defects. Introduction to welding processes, are and gas welding, gas arising, brazing and soldering, Laboratory experiments.

Introduction to metal shaping at elevated temperature, forging materials and operations, use of merge parts. Introduction to fitting work, scope and applications Engineering uses sof timber, reasoning and preservation. Important joints and plywood. Introduction to common m/c and operations centre lathe-principle, specifications operations, tools and shaper and planer-principle, specifications, operations tools etc. Cutting tool materials and geometry of single point cutting of tool signature. Scope of moulding, characteristics of moulding materials, types of sands, open and dry sand, moulding methds. Foundry terminology, use and applications of pattern, Runners, Riserts, core boxes, core oprints and chaplet. Fetting and finishing operations, commomen casting defects. Introduction to welding process, types of weldidng process. Arc welding. Welding gas cutting, soldering and Brazing. General applications of workshop practices in Engg.

Experiments:

1. Forging tools and equipments and safety precautions.
2. Fitting tools and equipments-use of V Block, marking gauge height gauge, combination sets, taops and dies.
3. Carpentry tools, wood working lathe and Band saw.
4. Foundry tools and equipments.
5. Welding equipments and safety precautions.
6. Study of metal working M/Cs and their operations.

Books:

Orients of workshop Techology Volume 1 by S.K. Hajra Choudhury
S.K. and A.K. Choudhury.

Reference Books:

Workshop Technology, Part 1 and 2 by Dr. W.A.J. Chapman.
All about machine tools by H. Gerling.

NAME OF THE COURSE : TECHNICAL WRITING (ENGLISH)
Course No. : BHS-121
Credit Hrs : 3 (2+1)

Catalogue description:

An advanced course meant to exposes students of Science and Technology to English used in scientific, Expansion of non-terminological scientific vocabulary, sentence Correction and improvement, report writing official and technical correspondence and study of scientific and general texts.

Syllabus:

Technical Writing: The nature of Technical writing; Technical style Vs general style (brevity versus diffuseness, clarity versus ambiguity.
Objectivity versus subjectivity, simplicity versus pomposity, utility versus pleasurability), Writing process (pre-writing, drafting, rewriting and editing), Exercises in grammatical pre-requisites (Case of Nouns and Pronouns, Agreement of verb and its subject. Tense and mood, Adjectives and adverbs, Prouns with antecedents, Voice).

Development of a suitable style:

Effect of diction on style, effect of sentence-structure on style, effect of paragraphs on style, manuscript form, numbers, abbreviations, hypernation of compound terms, decimal system of numbering headings, Equations, documentation, exercises in sentence correction (Fragmented sentences, parallel/nonparallel sentences, illogical comparisons, dangling constructions, squinting constructions, split infinitives, specific information, pompous style, deadwood.

Paragrapoh Writing:

Paragraph, Definition, requirements of a good paragraph (Unity,Coherence and Emphasis, topic sentence, various orders to developa paragraph (viz. inductive, deductive, question to answer, exposition, time order, comparision and contrast, enumeration, space order), Some examples of good paragraophs.

Report Writing:

Report: Definition and cardinal characteristics (self-sufficiency, Interest, Thoroughness, Ommission of unnecessary materials, freedom from bias, objectivity, Restraint, Appropriate degree of Impersonality) Analyzing the Report Writing situation (Making a tentative plan, gathering information, interpreting facts, making detailed outline, planning the use of visuals, writing the first draft, revision), Report Formats (Blank form, letter form, Memorandum Form, General Survey report).

Technical Correspondence:

General Ptrinciples of Technical Correspondence (Format in letters, characteristicslike clarity, consciseness, countinuity, set-formats, simplicity, naturalness, neatness, objectivity, correctness creditability). Parts of a letter (Heading, address, salutation, body, complimentary closing, signature) Type of letters (letters giving instructions, inquiries and answers to inquiries, complaints and adjustments, letters urging action, applications and resumes).

Proposal Writing:

Proposal: Definition and kinds, Division of Format Proposals (Front Matter, Letter of Transmittal, Title page, summary of Abstract,Table of contents, statement of request, body-statement of problem, background, scope, methodology, facilities, personnel, advantages and disadvantages, costs and reports). Some specimen proposals.

Writing Scientific and semi-technical Articles:

Source material, topic selection, literature review, tables, figures, footnotes, bibliograophy, some specimen articles:

B. Study of Scientific and geral texts.

Prescribed Text Books:

A. Arora, V.N. and Lakshmi Chandra, "Improve Your Writing" (Delhi, OUP, 1981) Lesson Numbers: 1.2, 1.6, 2.4, 2.6, 3.5,4.1, 4.3, 5.1, 5.4, 6.2.

B. For Extensive reading (any two of the following)

1. Dickens, Charies, David Copperfield.
2. Hemingway, Emest, The Old man and the Sea, Indian rpt., 1977, Delhi: Surjeet.
3. Desai, Anita, Fire on the Mountain.
4. Orwell,George, Nineteen Eighty four (New York: OPenguin, 1984).

Laboratory Practical:

Listening Comprehension-Ear-training, use of latest scientific techniques-A V R Comprehension Trainer, S.A.R. Comprehension Accelerator A. V.R. Comprehension Radiometer and E.D.: Skimmer.

Ear-training and Comprehension, acceleration, through listening of thirty chapters of English Course (Linguaphone Institute, London) each lesson of 5 min. duration. Listening Comprehension through Linguaphone Travel Course containing 32 chapters/records/cassettes (each of 5 min. duration) (Practical 3 x 2)

2. Identification of ophonetic sounds and symbols:

1. Consonants.
2.Pure Vowel
3.Diphthongs.
4.Orgons of Speech.
5.Place of Articulation.
6.Manner of Articulation
7.Voiceless and Voiced Sounds (Practical 2x2)

3. Stress and Intonation:

1.Stress:P Definition.
2.Initial and final correspondent clusters.
3.Mono syllabic words.
4.Bisyllabic wsords
5.Strong forms and weak forms
6.Accent in connected speech.
4.Intonation: Definition:
1. Falling tone
2. Rising tone

3. Rising falling tone.

Books:

1. Strung Jr. William and E.B. White. The Element of style, New York: Maomillan, 1967.
2. Legget, Glenn, C. David Mead and William Char vat, Essentials of Grammer and Composition, New Delhi: Prentice-Hall, 1988 (Indian reprient).
3. Sheman Theodore,A. And Simon S. Johnson, Modern Technical; Writing, New Jersey, Prentice-Hall, 1990.
4. Alverez, Joseoph,A. The Elements of Technical Writing, New York: Harcourt, 1980.
5. O' Conner, J.D. Better English Pronunciation, New Delhi University Book Stall, 1992.
6. Jones, Daniel and A.C. Gimson, English Pronouncing Dictionary, London, J.M. Dent and ELBS, 1977.

TOPIC OUTLINE:	**L.P.**
1.Technical Writing	2 1x2
2.Development of a suitable style	3 3x2
3.Pragraph Writing	2 1x2
4. Report Writing	2 1x2
5.Technical Correspondence	2 1x2
6.Proposal Writing	2 1x2
7.Writing Scientific and Semi technical Articles	2 1x2
8.Study of Scientific and general texts	2 1x2

NAME OF THE COURSE : Digital Logic and Circuits
Course No. : TCP-121
Credit Hrs : 4(3+1)

Catalogue description:

Digital Code, Logic gates, Boolean Algebra, Combination logic circuits & design, K-Maop, QM Technique, Adder, Subtractor, Encoder, Decoder, Seven segment display, MUX, DEMUX, Parity checker, Semi conductor Memories, ALU and other circuits, Sequential circuits; Synchronous /Asynchronous circuits, Latch, Flip flop, Counters, registers, practical seqential circuits, design and application. Introduction to finite State Machine: Mealey & Moore Machine.

DETAILED CATALOGUE DESCRIPTION:

Digital codes: BCD, ASCII, Gray, 1-2-4-8, Logic gates: AND, OR, NOT, NAND, NOR, EX-OR, EX-NOR, Boolean, Algebra: Postulates and Theorems, Applications, Karnaugh Map; QM Technique; Combinational logic Circuits & design, Adder: Half Adder, Full Adder, Subtractor: Half Adder,Full Adder,Comparator circuit, Decoder, Encoder, Seven Segment Display, Multiplexer, Demultiplexer, Parity checker, Semiconductor Memories, ALU and other circuits. Sequential circuits; Synochronous/Asynchronous circuits: Latch, Flip flops: RS,JKL, D.T;

Counters: Up counter, Down counter, Ring Counter/Johnson Counter.

Registers: Shift Registers, Uses of register; Practical sequential circuits, design & applications. Introduction to finite State Machine: Mealey & Moore Machine.

III SEMESTER

SEMESTER-III

NAME OF THE COURSE : DATA STRUCTURE
Course No. : TCP-211
Credit Hrs : 3 (2+1)

Catalogue description:

Introduction to prelimubart concepts, string processing, Arrays, pointers, linked list stacks, Queues, trees, Graphs & theirs applications, sorting & searching techniques "C" programming for developing programmes for the above topics.

DETAILED CATALOGUE DESCRIPTION:

Introduction:

Introduction, Basic terminology, elementary data organization, data structures, data structure operations, algorithmic complexities.

PRELIMINARIEs:

Mathematical notations & functions, algorithmic notations, control structures, sub algorithms, variable data types.

STRING PROCESSING:

String processing & Storing:

ARRAYS, RECORDS AND POINTERS:

Linear arrays representation of arrays in memory, Traversing linear arrays, Inserting, deleting, sorting-Bubble sort, searching-linear search, Binary search. Multidimensional Arrays, pointers, pointer arrays, records, structures, representation of records in memory, parallel arrays, matrices.

LINKED LISTS:

Introduction, linked list representation of linked lists in memory, Traversing a linked lists, searching a liniked list. Deletion from linked list, insertion into linked list, header linked list and two way linked list.

STACKS, QUEUES AND RECURSION:

Introduction, stacks, array representation of stacks, Arithmetic operations, polish notations, Quick sort, an application of stack-recursion, Tower of Hanoi, Implementation of recursion by stack, queues. Dequeues, priority queues.

TREES:

Introduction, Binary tree, representation of Binary trees in memory, Binary search tree, AVL. Tree, application of binary trees. Searching and inserting in binary trees, deletion in binary search tree, Heap sort. Huffman's algorithm, general trees.

GRAPHS & THEIR APPLICATION:

Graphs theory, terminology, sequential representation of graphs, Adjacency matrix, path matrix, warshall's Algorithm, shortest paths, linked representation of graphs, traversing a graph.

SORTING & SEARCHING:

Insertion sort, selection sort, merging, radix sort, searching & data modification, Hashing. Programming using 'C' for the above topics.

REFERENCE BOOKS:

1. Data structures by Seymour Lipschutz McGraw Hill Pub.
2. Data Structures & Program Design in "C"
   By Rober L Kruse, Bruce & P.Leung & Clovis L.Tondo
   Prentice Hall-Pub.
3. Data Structures, Sawhaney Horowitz.
4. Data Structure C & C++ By Tenenbaum PHI.

NAME OF THE COURSE : DESCRETE STRUCTURE
Course No. : TCP-212
Credit Hrs : 4(3+1)
Catalogue description:

Propositional logic and proofs, set theory, algebraic structures, Groups and semi groups, graphs, Lettices and Boolean algebra, Finite Fields.

DETAILED CATALOGUE DESCRIPTION:

SET THEORY:

Set notation & description, basic set operations, &notation, ven. Diagram, combinatories, permutation combination, power set.

PROPOSITION LOGIC:

Proposition, logical operation, propositions generated bya set, Tautologies, Equivalence & implication, Laws of logic.

PROOF:

Mathematical system, proof in propositional calculus: Direct proof, conditional conclusion, Indirect proof, Principle of mathematical induction, proof using previously proven theorem.

ALGEBRAIC SYSTEM:

Common properties of operations, levels of abstraction, Group, some general properties of group, subsystem, Direct products, Isomorophism.

GROUP:

Cyclic group, cosets & factor groups, permutation group, normal sub group & group Homomorphism, coding theory.

GRAPH:

Introduction, data structure, connectivity, Traversal, Graph optimization, planarity & coloring.

BOOLEAN ALGEBRA:

Posets, lattices, atoms of boolelan algebra, finite Boolean algebra as n tuple Boolean expression, application of Boolean algebra to switching theory.

FILEDS:

Ring, basic definition & concepts, fields polynomialring, Field extension, finite fields.

REFERNCE BOOKS:

1. Discrete Mathematical Structure with application to Computer Science.
By J.P. Trembley & R. Manohar, TMH.
2. Discrete Mathematics for Computer Science by J.Trauss (Addision Wesley).
3. Discrete Mathematics by Seymour Liptschutz, TMH.
4. Discrete Mathematics byJhonson Baugh, Macmillan Pub.

NAME OF THE COURSE : Formal Languages Automata Theory
Course No. : TCP-213
Credit Hrs : 3(2+1)
Catalogue description:
INTRODUCTION:

Review of cominational circuits. Transformation groups and group invariance. Sequential circuits and finite state machine. Finite State Automata. Language and grammars.

Deterministic and non deterministic finite automata, conversion of NFA with null moves to DFA, without null moves to DFA, minimization, Regular grammars and finite state machines, Pumping Lemma, Regular expressions, regular languages and regular expression. Transitition graphs and regular expressions.

Two way deterministic finite automata.

Push down automata, Context free languages and push down automata.

TURNING MACHINES

Introduction and definition. Turing machines as decision procedures. Computation with Turing machines.

REFERENCE BOOKS:

1.Switching & Finite Automata |Theory, Zvi Kohawi, Tata McGraw Hill.
2.Introduction to Automata Theory Language and Computation, Hopcroft & Ullman, Addison Wesly.
3.Theory of Computer Science, Mishra & Chadrashekharan, East West Pub.
4.Theory of Computer Science, EV Krishnamoorthy, East West.

NAME OF THE COURSE : Computer Graphics And Animation
Course No. : TCP-214
Credit Hrs : 4(3+1)
Catalogue description:

Introduction, point plotting, line drawing, raster graphics and vector displays, two dimensional transformations, clipping, Windowing, Graphic input devices and input techniques graphic packages, segmented display files, Geometric models and picture structure, three dimensional graphics curves and surfaces transformations, perspective hidden-surface elimination, device independent graphic systems.

DETAILED CATALOGUE DESCRIPTION:

Introduction: State of the art trends, dimensionality and coordinate systems, continuous and discrete, points plotting, line drawing, vector graophics, vector refresh display etc.

RASTER GRAPHICS:

Bitmap aspect ratio, spatial and intensity resolution, videocard scanning process, spot size, gray-level and colour displays, scan conversion, symmetrical DDA, Bresenham's line drawing and circle generation algorithms.

2-D TRANSFORMATIONS:

Representation of a poinyt as a column vector and row vector and matrix notations, affine transformations, composing, homogeneous transformations etc.

WINDOWING AND CLIPPING:

Window and view port, transformation from picture plane to screen coordinates, clipping, scissoring, cohen-sutherland algorithm etc.

GRAPOHIC INPUT DEVICES AND TECHNIQUES:

Analog and digital input devices, logical input functions,Non-traditional devices.

GRAPHIC PACKAGES:

Ground rules for graphics software design functional domains, graphic primitives, windowing functions, and miscellaneous functions.

SEGMENTED DISPLAY FILES:

Segments, functionsfor segmenting the displayfiles, posting and unposting a segment, segment naming schemes.

GEOMATRIC MODELS:

Global, local, view, picture plane and screen coordinate systems, displaying a geometrical model, instances transformations.

PICTURE STRUCTURE:

Defining symbols by procedures, boxing, structured display files.

3-D GRAPHICS:

Wire frame models, introduction to projections 3-D affine transformations, perspective transformation, two approaches to hidden surface elimination.

DEVICE INDEPENDENT GRAPHIC SYSTEMS:

Normalized device coordinates, Mapping NDC on to the device.

REFERENCE BOOKS:

1. Principles of Interactive Computer Graphics,
   Sproul, Newmann McGraw Hill.
2. Procedure Elements of Computer Graphics.
   Rogers, McGraw Hill.

3. Computer Graphics, A Programme of Approach by Herrington (McGraw Hill).

NAME OF THE COURSE : CIRCUIT THEORY
Course No. : TEC-211
Credit Hrs : 4(3+1)
Catalogue description:

Development of circuit concepts, Network equations, Network theorems, D.C. and A.C. (single phase) circuits, coupled circuits, Resonance, Magnetic circuits, 3-phase balanced A.C. circuits, 3-pohase unbalanced A.C. circuits, Symmetrical components, Fourier Series, Laplace transforms, electrical transients.

DETAILED CATALOGUE DESCRIPTION:

Circuit variables, system of units, circuit analysis, An overview, voltage and current,. The ideal basic circuit element, Power and energy, circuit elements, voltage and current sources. Analysis of circuits contgaining depoendant sources, simple resistive circuits, equivalent resistance computation, voltage and current divider circuit. A to Y equivalent circuits, Node voltage method, Node voltage method with deopendant sources, Mesh current methods with and deopendant sources, sources transformation methods, Network theorems, Thevenin's and Norton equivalents, Maximum power transfer theorem, Superposition theorem, subsTCTution theorem, Compensation theorem, Millmans theorem, Inductors and caopacitors, series and parallel combination of Inductors and capacitors, Natural response of R-L and R-C circuits, Step response of R-L and R-C circuits, sinusoidal Steady State Analysis, sinusoidal generation, sinusoidal response. The phaser, The passive circuit elements in phaser domain, Kirchoff's laws in phaser domain, Phaser diagrams, Real and Reactive power. The effective or r.m.s. value of a sinusoidal signal, complex power, Impedance and admittances, Power calculations, series and parallel resonance, Bandwidth and quality factor, Balanced three phase circuits, Analysis of star and Delta connected circuits. Power calculation of three phase circuits. Measurement of average power in three phase circuits. Mutual Inductance, Polarity of mutally induced voltages. Energy calculations, Equivalent circuits for magneticallycoupled coils, Magnetic circuits, Series and parallel magnetic circuit calculations. Fourier series.

Books:

1.Principle of electrical Engineering by V. Deltoro.
2.Circuit Theory by W. Hayt.

NAME OF THE COURSE : INSTRUMENTS AND MEASUREMENTS
Course No. : TEC-212
Credit Hrs : 4(3+1)
Catalogue description:

Measuring instruments, moving coil, moving iron, rectifier and dynamometer type meters watt meters and energymeters, C.R.O. principles and applications, electronic voltmeters. Principles of measurements, bridge measurement, Q-meter, spectrum analysis, digital measurements, special transducers, measurement of non-electrical parameters, data recording and display.

IV SEMESTER

NAME OF THE COURSE: Probability Statistics and Queuing Models

Course No. : BPM-221

Credit Hrs : 2(2+0)

Sample spaces, random variables, probability distributions, expected values, joint distributions, variance, co-variance, statistics, single correlation and regression, statistical inferences point and interval estimates, testing of Hypothesis, elements of stochastic processes, Marcovian chain queuing model, M/M/K behaviors, computer science applications.

Detailed Catalogue description:

Statistics:

Importance of Statistics to Engineering, data collection, data reprsentation, data processing, data analysis, interpretation of results, prediction of pase/ future trends, chances of errors, raw data, sample, primary data, secondary data, tabular form representation, graphical representation, one dimensional, two dimensional , three dimensional, and multidimensional representation, Computation, addition, subtraction, approximation, central tendency, basic measures of central tendency:artithmatics mean, geometric mean, harmonic mean,median mode, deviations from means, median and mode, sum of deviations, overall mean, reciprocal of mean, grouped and ungrouped data, range, Par TCTion value, dispersion, measurement of dispersion, symmetry of data, quartile deviation, semi quartile range, percentile, decimal, average deviation, minimal property of average deviation, mean deviation from nean variance standard deviation, moment as measures of statistical properties, coefficient of variation, moments, effect of chance of origin and scale on moments, skewness and its measurements, Pearson's B coefficient, Pearson's Y coefficient, factorial moments, curve fitting, method of Least Squares, fitting of second degree Parabola, fitting of curves through the origin, line of regression, linear and nonlinear regression, lines of regression, deviation of lines of regression of Y on X, derivation of lines of regression of X on Y, regression coefficient, correlation, Bivariate Series, co-variation, types of correlations, positive or negative, simple, multiple and partial correlation, linear or nonlinear, degrees of correlation, measurements of linear correlation, scatter Diagram, Karl Pearson's Coefficient of Correlation, interpretations or significance, Bivariate frequency table, Correlation and regression in case of Bivariate frequency table, Correlation and regression in case of Bivariate Frequency Table or Correlation Table, Multivariate Series, Multiple Regression equation, Primary and Secondary Subscripts, Residual and its properties, Variance of Residual, Coefficient of Subscripts, Residual and its properties, Variance of Residual, Coefficient of multiple correlation, Coefficient of Partial correlation, Theorems, numerical problems.

Probability:

Meaning of probability, subjective probability, objective probability, Random Experiment, tossing a coin, throwing a die, trial, outcome space, sample space, sample points, types of sample space, tree diagram, event, favourable sample points and occurrence of an event, odds, sure or certain event, impossible events, simple event or elementary event, composite or complex event, compound or joint event.

Queuing Model:

Queuing theory, its use in engineering, examples of real queuing systems, structure of queuing models, single channel Poisson Arrivals with Export Service rate (M/M.I), multi-channel queuing models, other waiting line engineering problems of queuing theory, their model development, Market Chain queuing model, M/M/K behaviour, Hospital problem, engineering problem, Inventory control models.

NAME OF THE COURSE : MICRO PROCESSORS
Course No. : TCP-221
Credit Hrs : 4(3+1)

Catalogue description:

Introduction to microprocessors, basic architecture of microprocessors, microprocessor hardware, Instruction and timing diagram, addressing modes, Intel 8085 architecture & programming/Intel 8086 architecture and programming, basic 1/O interface.

DETAILED CATALOGUE DESCRIPTION:

Introduction to microprocessor, evolution, basic microprocessor architecture.

MICROPROCESSOR HARDWARE:

System Bus, memory organization, main memory organization, cache memory organization.

INSTRUCTION & TIMING DIAGRAM:

Basic system timing and operation status for 8085/8086 microprocessors.

ADDRESSING MODES:

Data addressing modes, register-addressing mode, immediate addressing mode, direct addressing mode, indexing, base register addressing, relative addressing, scaled Index addressing, stack addressing.

INTEL 8085:

8085 pin diagram, 8085 instruction set, timing diagrams, Interrupt, I/O operations for 8085.

INTEL 8086:

Introduction, Architecture, Addressing modes for 8086. 8086 instruction set, Asm 86, Assembler pseudo instructions, Interrupts &Interrupt service procedures, Interrupt response.

BASIC I/O INTERFACE:

Introduction to I/O interface for 8086.

DIRECT MEMORY ACCESS:

Basic DMA operation,DMA controller programming on 8086, 8085 assembly language.

REFERENCE BOOKS:

1.Microprocessor Architecture, programming and application with 8085 R.S. Gaonkar, Wiley Eastern.

2.Microprocessor & Interfacing: By Douglas V. Hall Tata McGraw Hill pub.

NAME OF THE COURSE : DATA PROCESSING & FILE SYSTEM
Course No. : TCP-222
Credit Hrs : 4(3+1)
Catalogue description:

Data processing concepts, auxiliary storage media and physical file organization, Introduction to COBOL programming, use, structure and characteristics of various file organizations such as serial, sequential indexed sequential and direct, List structured files, multiring files, inverted files, case studies, application of various file structures in the processing of large amounts of business and industrial data.

DETAILED CATALOGUE DESCRIPTION:

Data, information, hierarchy of data organization, purpose of data processing, data processing systems, data processing cycle, data processing operations, Modes of processing, keys, master file, transaction file, data management.

AUXILIARY STORAGE MEDIA:

Magnetic tape storage, Magnetic disk storage, other direct access short devices.

PHYSICAL FILE ORGANIZATION:

Objectives, organizational characteristics, serial files.

INDEXED SEQUENTIAL FILES:

Applications, Implementation, Block midexes, prime and overflow data area.

DIRECT FILES:

Applications, direct mapping techniques, Directory lookup technique address calculation techniques, approaches to the problem of collision, use programme.

MULTIKEYFILES:

Application inverted files, linked list representation, basic operations on a linkied list, header nodes, singly, doubly and multiply linked list files, ring files.

INTRODUCTION TO COBOL PROGRAMMING:

Application areas and supporting language, Nature of COBOL and its characteristics, characters used for words, punctuation, conditions, arithmetic expressions, print editing etc. rules for punctuation, reserved and non reserved words, COBOL CODING FROM AND RULES FOR ENTERING STATEMENTS, STRUCTURE OF cobol programe etc.

REFERENCE BOOKS:

1.Data Processing & File Structures by E.S.Loomi,PHI.

NAME OF THE COURSE : Computation & Numerical Analysis

Course No. : TCP-223

CREDITS WITH BREAK-UP : 2(2+0)

Catalogue description:

Floating –point computation, floating – point numbers, machine apsilon, sensitivety of problem and instability of certain algorithms, Finite differences, Interprolation and approximate integration, adaptive routines, solution of non-linear equations, Linear systems and matrix inversion eigen value problems, Lest- squares and chebyshev approximation, Initial and boundary value problems in ordinary differential equations.

DETAILED CATALOGUE DESCRIPTION

FLOATING POINT COMPUTATION

Normal form, floating point numbers, machine epsilion; computational pitfalls, Errors and their analysis. Errors in series approximation. Sensitivity of problem- Qualities of numerical algorithms, convergence, certainty of solution stability of algorithm, selection of initial solution values.

INTERPOLATION

Introduction, errors in polynomial interpolation, finite difference- forward difference, backward difference, central difference Lagrange interpolation formula, Hermites integration formula and method of successive approximation.

APROXIMATE INTEGRATION

Nuemerical differentiation, minimum and maximum values of tabulator function, Neumerical integration- Trapezoidal rules, Simpson Rule, Ram berg integration.

LENEAR EQUATION

Basic definition, transpose, Inverse, rank of a matrix, consistency of linear system of equation, matrix inversion method, Gaussion elimination method Iterative method.

ORDINARY DIFFERENTIAL EQUATION

Solutiion of Tayler series, Pecars's method. Euler method, Runge-katta method, Boundary value problem.

REFERENCE BOOKS

1. Introductory Method of Numerical Analysis
by Sastry PHI
2. Numerical Methods for scientific & Engg. Computation
by Jain, Iyengar, Jain New Age International
3. Numerical Methods
by Balaguruswamy, TMH

COURSE NUMBER : TCP-224
COURSE TITLE : THEORY OF COMPUTING
CREDITS : 3(3+0)

Deterministic and Non- deterministic computation; Waing machines, post machine RAMs and their equivalence, Universal machines, Halting problem, solvability an undecidability, Introduction to recursive function theory, equivalence of generation recursive function and turing computable function s, Church's thesis, regular, Context free, grammer context sensitive languages and their relation to automata complexity classes.

Introduction to logic for computer: Syntax of propositional formulas, Truth and ……..semantics of propositional Logic, Notions of satisfiability, validity inconsistency

Deduction Systems for propositional logic, Compppleteness of Deductive system, for Proof Theory of for, Introduction to model theory, Completeness and compactness theorems, First order theories, Robinsons Revolution, Herbrand model Completeness of resolution, Application of resolution to automatic theorem proving and logic programming.

COURSE NUMBER : TCP-225
COURSE TITLE : COMPUTER ORGANISATION
CREDITS : 3(2+1)

CATALOGUE DESCRIPTION

Introduction, evolution of computers, Von Neumann;s model, IBM 360/370 model, evolution of operating system, organization- study of different type of M/c, processors,

Memory, Input- Output devices, introductory concepts of networking, memory organization, instruction formats, addressing, assembly language programming, input-output organization.

DETAILED CAALOGUE DESCRIPTION

INTRODUCTION

Evolution of computers, Newman's stored program principle, functional components of computers, general purpose computers IBM 360/370 Model. Introduction to operation system, evolution of operating system, language levels & virtual M/cs, Hardware & software & Multi level M/c; Zero address, single address, two address m/c, 3 addressing m/c 4 address m/c's.

COMPUTER SYSTEM ORGANIZATION:

Study of different type of organization, IBM 360, 8086 based m/c, 0\80186, 80286, 80386, 80486 based system organization.

PROCESSORS:

Instruction Execution, parallel Instruction execution, processor classification.

MEMORY:

Memory address, megabits, secondary memory.

INPUT OUTPUT:

I/O devices, I/O processors.

COMPUTER NETWORK AND DISTRIBUTED SYSTEM:

Local Area Network, Wide Area, Networks, Distributed System.

MEMORY ORGANIZATION:

Main memory, virtual memory, basic concepts, cache memory, memory management.

INSTRUCTION FORMATS:

Instruction formats-introduction, Design criteria for instruction formats, Examples for instruction formats for IBM 360, 8086, 80386; RISC, CISC, Microcodes.

COURSE TITLE : ELECTRONIC DEVICES AND CIRCUITS
COURSE NUMBER :TEC-221
CREDITS : 4(3+1)
CATALOGUE DESCRIPTION :

Electron ballistics, semiconductors, junction diodes characteristics, bipolar junction transistors, field effect transistors, low frequency amplifiers, feedback amplifiers, frequency response of amplifiers, operational amplifiers, power circuits and systems, tuned amplifiers, modulation, demodulation.

DETAILED CATALOGUE DESCRIPTION:

Transport ophenomena in semiconductors: Mobility and conductivity, Intrinsic and extrinsic semicondjctors, Hall effect, Generation and Recombination of charges, injected minority carrior charge, junction-diodes characteristics: open circuited p-n junction, p-n junction as a rectifier, current components in a p-n diode, V-I characteristics, space charge capacitance, diffusion capacitance, junction diode switching times, special diodes, load-line conceopt, clipping and clamping circuits, full wave rectifier, capacitor filters, Bipolar junction transistors: transistor current components, transistor as an ampliefier, C.E. CB and CC configurations, graphical analysis of C.E configuration, transistor hybrid model, h-parameters, emitter follower, linear analysis of a transistor circuit, transistor; junction filed effect transistor, pinch-off voltage, MOSFET, JFET and MOSFET characteristics, CMOS, Digitial MOSFET circuits,, Biasing the FETl feedback amplifier: class A, Class B, Class C, Class AB amplifiers feedback concept, series and shunt feedback amplifiers, operational amplifiers: differential amplifier, basic oiperational amplifiers, emitter-coupled differential amplifier, operational amplifier applications, active filters, modulation: amplitude, frequency and phase modulation, SSB transmission, demodulation technique.

V SEMESTER

COURSE TITLE : SYSTEM PROGRAMMING

COURSE NUMBER :TCP-311

CREDITS : 4(3+1)

CATALOGUE DESCRIPTION :

Introduction, system software-defintion, components of system software, evaluation of system software, introduction to software processors, assembly language & machine language 8086 and IBM 360 language-a review. Assemblers, Macros, Macroprocessors, Introduction to computers, loaders & linkage Editors, introduction to operating system, vitural memory concept.

DETAILED CATALOGUE DESCRIPTION:

Introduction:

System softwarte definition, components of system software, evaluation of system software, model of computer system.

INTRODUCTION TO SOFTWARE PROCESSOR

Translators and software processors.

ASSEMBLY LANGUAGE AND MACHINE LANGUAGE:

IBM 360/370 ASSEMBLY LANGUAGE A REVIEW, REVIEW OF 8086 ASSEMBLY LANGUAGE.

ASSEMBLERS:

Overview of assembly process. Designs of Two pass assemblers. A single pass assemblers for IBM PC, Macros & Macro processor, Table management Sorting.

AN INTRODUCTION TO COMPLIERS:

LOADERS AND LINKAGE EDITORS:

a) Loader Schemes:

   Compile and Go loaders, General loader schemes, Absolute loaders Sub routine linkages, Relocating loaders, Direct linking loaders. Other loader schemes-Binders, linking loaders overlays. Dynamic binders, design of absolute loader, design of direct linking loader.

OPERATING SYSTEM:

Introduction, Batch processing, Multi programming, time sharing system, processor management, storage manager.

VIRTIUAL MEMORY CONCEPTS:

Reference Books:

1. System Programming by John J Donovam McGraw Hill.
2. System Programming & Operating System by DM Dharmadhere Tata McGraw Hill.
3. System Programming by Beck.

COURSE TITLE : PROGRAMMING LANGUAGE
COURSE NUMBER : TCP-312
CREDITS : 3 (2+1)

CATALOGUE DESCRIPTION:

Block structured language-design principles, abstractions control and data structures, binding, environment parameter passing mechanisms-axiomatic semantics-introduction to applicative language-study of LISP programme style in LISP data types-types and parameters data abstraction-abstract data types innovative features, design philosophies and comparative look at SNOBOL, APL, Prolog, Smalltalk, Backus'F.P. communicating sequential process etc.

DETAILED CATALOGUE DESCRIPTION:

INTRODUCTION:

Various desired feature of programming language-readability writability, data type, efficiency, pedagogy, generality etc. interrelation between different features as readability writability reliability etc. properties of language syntax, semantics, pragmatics.

EVOLUTION OF CONCEPT:

Modularity, informakltion hiding, Abstraction-their role in the evolution of programming languages, evolution and lineage of programming languages.

DESIGN PRINCIPLE:

Design of programming languages, data abstraction control abstraction, run time structure, dynamic static and stack based languages.

DATA ABSTRACTION:

Data type and structure, abstract data type, advantages of strongly typed language, data type mismatch, coercion, various data aggregating techniques.

CONTROL STRUCTURE:

Procedural languages,block structured languages, control structures statement level control structures, unit level control structures, D-structures,D-structures hierarchy of structures. Runtime structure. Code segment and activation records.

STUDY OF LANGUAGES:

Axiomatic semantics; applicative language-LISP various features, data type and structure, control structure parameter binding and parameter opassing techniques. Study of SNOBOL,APL, prolog, and Small talk on the counts mentioned for lisp.

FUNCTIONAL PROGRAMMING:

Mathematical back ground, lazy calculus, essence of functional programming features of FP & Miranda.

REFERENCE BOOKS:

1. Programming Language Design & Implementation by Terrance W.Pratt.(PHI Pub.)
2. Concept of Programming Language by Sebesta (Addition Wesley Pub.)
3. Programming Language by Sethi (2nd Addition Wesley OPub.)
4. Fundamentals of Programming Language by E.Horowitz (Galgotia Pub.)

COURSE TITLE : Fundamental Of Computer Communication System
COURSE NUMBER : TCP-313
CREDITS : 4(3+1)
CATALOGUE DESCRIPTION :
Communication concepts, channel, signal characteristics, noise, modulation fundamentals of data communication, data rates, full duplex, synchronous communication, encoding at bit, byte and frame levels, error detection & corfection, data communication sub- systems, Maultiplexing including statistical multiplexing, telephone system characteristics, modens, introduction to computer networks and application store and forward, swithing, layered architecture of communication protocols, physical and data link layer protocols, multi channel access.
DETAILED CATALOGUE DESCRIPTION
COMMUNICATION CONCEPTS
Analog and digital transmissions, digital radio, channels and shanon law, signal characteristics, causes and sources of noise, SNR
MADULATION FUNDAMENTALS OF DATA COMMUNICATION
Amplitude modulation, frequency shift and phase shift keying, quadrature amplified modulation, trellis coded modulation, pulse code modulation, delta modulation etc.
DATA RATES:
Bps, Baud dibit, tribit etc. and multi level modulation.
DIRECTIONAL CHARACTERISTICS:
Simplex, half – duplex, full duplex and full duplex modes of communication.
ENCODING
Return-to- zero, non-return to zero, alternate mark inversion, Manchester encoding, decoding etc.
ERROR DETECTION AND CORRECTION
Block parity cheek, Cyclic redundancy check, forward error correction.
DATA COMMUNICATION SUB- SYSTEMS
Modems, downline processor, front- end processor, host processor, terminals.
MULTIPLEXING
Frequency- division, time division, statistical time division multiplexin data concentrators.
TELEPHONE SYSTEM CHARACTERISTIS
Basic telephone systems, telephone instruments, local switcher equipments.
INTRODUCTION TO COMPUTER NETWORKS
Wide area and local area networks, protocol etc.
REFERENCE BOOKS
1. Data Communication and Networking, Forouzen, Tata MeGrew Hill
2. Understanding Data Communication & Networks, William. A. Shay, Vikas.

COURSE NUMBER : TCP-314
COURSE TITLE : DATA BASE MANAGEMENT SYSTEMS
CREDITS : 4(3+1)
CATALOGUE DESCRIPTION:

Introduction, data independence, data models, network model, definition and manipulation languages, hierarchical model, relational storage organization for relation, relational algebra and calculus, relational languages, query processor and optimizer, decomposition of relation schedule security, concurrent operations on data bases, recovery, distributed data bases, base machines, comparison of data base systems.

Introduction:

Coventional file Processing and DBMS approach.
Data Independence:
Three level architecture for a DBMS.
Components of a DBMS, Advtg. & Diadvtg. Of DBMS.
Data Association and Entity Relationship.
Representation Entities.
Representation, Generalization and Aggrevation, E-R Diagrams.
The Relational Model
Relational data base
Relational Algebra,
Relational Calculus
Relational database Manipulation
Data Definition : SQL
Data Manipulation :SQL
Views : SQL
Relational data base design
Relational Scheme and relational design
Functional deopendency
Normal Forms-Anomalies and data Redundancies
Lossless Join
Boyce cold Normal form
Synthesis Approach and higher order Normal forms
Multivalued dependency
Fourth Normal form
Lossless Join decomposition in to 4 NF
Normalization using Join Deopendency Fifth NF
Domain Key Normal form
The Network Model
DBTG set construct and restriction
Data description in the Network Model
Data and database manipulation
Schema and subschema
The hierarchical data model

Hierarchical data model
Data manipulation
Updates
Database security, integrity and control concurrency Mgt. etc.
Current Trends in data bases.

Reference Books

1. Data base concepts by Korth, Silbertz, Sudarshan (McGraw Hill.Pub.)
2. Fundamental of database System by Ellmasari, Navathe.
3. An Addisori to Database System by Date C.J. (Addison Wesley Pub.)
4. Database Management System by Majumdar & Bhattacharya (TMH Pub.)
5. Database Management Sysytem By Desai.

COURSE NUMBER : TCP-315
COURSE TITLE : Operations Research
CREDITS : 2(2+0)

Catalogue Description:

The art and science of operational research computations in research, computations in operations research, OPhases of O.R.Study

Linear Programming:

FORMULATION, GRAPOHICAL SOLUTION AND THE SIMPLE Formulation and grapohical soluytion, Primal simplex method, method, special cases in simplex method application.

DUALITY, SENSITIVITY AND PARAMETRIC ANALYSIS

Definition and solution of Dual problem, Sensitivity analysis.

TRANSFORMATION MODEL

Definition, application and solution of transportation model.
Model and techniques of slider.

DYNAMIC PROGRAMMING

Elements of D.P. Model, and Computation.

PROJECT SCHEDULING BY PERT-CPM

Network diagram representations, Critical path calculation.

REFERENCE BOOKS:

1.Operations Research Wagner, PHI
2.Operations Research, Taha.

COURSE NUMBER : TEC-311
COURSE TITLE : CONTROL SYSTEM
CREDITS : 4(3+1)

Catalogue Description:

Equations and models of Linear system, Time response of feedback control system, Transient response, steady state error and error coefficient. The Nyquist criterion, the root locus techniques, sampled data feedback control system.

1. Inroduction, different equations of physical systems, transfer frequency block diagram algebra, signal flow graophs. Feedback and non feedback systems, Reduction of feedback parameters by use of feedback, control over wsystem dynamics by use of feedback, control of the effects sof disturbances signals by use of feedback. Regeuerative feedback.
2. Introduction, standard test signals, time response of first orders system, time response of second order system, steady state errors and error coefficient, effect of adding a zero to a system, design specifications of second order and higher order systems.
3. Introduction, correlation between time and frequency response, polar plots, bode plots, all poass and minimum phase system,. Log magnitude verses phase plots.
4. Introduction, Mathematical poreliminaries, Nyquist stability criterion, assessment of relative stability using Nyquist crierion, closed loop frequency response, senwsitivity analysisin frequency domain (27-35).
5. Introduction, the root locus concept construction of roof loci root contours systems with transportation lag, sensitivity of the roots of the characteristic equations.
6. Introduction, spectrum analysis sof sampling process, signal reconstruction, difference equations, the transform, the Z transfer for, the inverse Z transform & response of linear discrete system. The Z transform analysis of sampled data control systems, response between sampling insfauts, the Z & domain relationship stability analysis, Compensation techniques.

REFERENCE BOOKS:

Nagrath & Gopal
B.C. Kuo.

VI SEMESTER

SEMESTER-VI

COURSE NUMBER : TCP-321
COURSE TITLE : COMPUTER AND SOCIETY
CREDITS : 3(3+0)

Catalogue Description:

Role of computers in society scientific computating product design, information systems, process control, instrumentation, office automation, expert systems modernization, labour displacement changing workplace, model of social interaction expanding computer industry, manpower needs privacy and security effect of government, backing, journalism, judiciary, literature, communication, intelligent machine, roles and ethics of a computer scientist.

Detailed Catalogue Description:

Introduction:

Role of compouters in society. Issues of privacy, confidentiality and security. Thereat to privacy. Uses and abuses of computers. Threats to computer systems, security considerations of a computer system/network. Passive and active infiltration. Counter measures against infiltration. Access control, privacy transformations, processing restrictions, monitoring procedures, integrity management etc. cryptographic techniques to data processing, security matrix.

DATA BANK SYSTEMS

Structure, (subject, controller, custodian, collector, intruder, society), privacy and security.

Computer related frauds, Graceful degradation in case of computer failure.

ROGUE PROGRAMMES

Various types of rogue software and their impact of compute security. Popular methods of infection used by computer viruses.

Computer and Law

REFECENCE BOOKS

1. IT Act 2000, Govt. of India
2. EDP Auditing by Ronweber
3. Data Security by Ankit Firodia

COURSE NUMBER : TCP-322
COURSE TITLE : MICROPROCESSOR BASED SYSTEM
CREDITS : 3(2+1)

CATALOGUE DESCRIPTION

System design using microprocessor, digital interfacing and analyzing interfacing, Microcomputer system peripherals.

DETAILED CATALOGUE DESCRIPTION

SYSTEM DESIGN USING MICROPROCESSORS:

Address & Data bus Concepts, ROM, EPROM, static RAM, Dynamic RAM, programmed I/O, 8 bit I/O ports, 16 bit I/O ports, and microprocess, micro-computer system.

DIGITAL INTERFACING:

Programmable I/O ports, Interfacing a microprocessor keyboard, interface to alphanumeric displays, optical Motor shaft encoders.

ANALLOGUE INTERFACING & INDUSTRIAL CONTROL

D/A converters, interfacing & applications; A/D converters, specification interfacing, Microprocessor based industrial process control system.

MICROCOMPUTER SYSTEM PERIPHERALS

CRT Displays, CRT Terminal Raster scan color graphics, mass data system, oiptical disc storage, Microprocessor based applications.

Reference Books:

Microprocessor & Interfacing-programming and Hardware by Doughlas V.Hall Tata McGraw Hill.

COURSE NUMBER : TCP-323

COURSE TITLE : Numerically Controled Machines And Robotics

CREDITS : 3(2+1)

Catalogue Description:

Introduction:

Numerical control, base components of N.C. system, machining center, N.C. procedure, characteristics of work opart for N.C. advantages and disadvantages of N.C., cycles of N.C. Drill bycle, dwell cycle, bore cycle, tap cycle, mill cycle, Linear interpolation, circular interpolation.

N.C. MOTION CONTROL SYSTEMS:

Point to point control system, straight cut control system, certing control system.

N.C.PROGRAMMING:

Introduction to Computer assisted part programming with APT language, ATPlanguage, Geomertry statements, motion statements, post processor statements, aux, statements. Drive surface, part surface, check surface of work part. Writing simple programs and macros.

N.C.MACHINE CONTROL SYSTEMS

Controller unit, automatic control system, closed loop control system, open loop control system.

FEED BACK SYSTEMS

Transducers, direct feed back system, indirect feed back system.

CNC AND DNC

Configuration, functions, advantages.

CIMS (COMPUTER INTERGRATED MANUFACTURING SYSTEM)

Introduction types, different components; m/c tool, MHS, human labour, compute control system, CINS data files, advantages.

ROBOTICS

Robot technology physical configuration, motion system; degree of freedom point to unit introduction motion, contouring motion, to frequently used terms in robotics,: work volume, precision of movement weight carrying capacity. Methods of programming a robot, programming languages used in robotics, application of robot. Introduction CAD/CAM

COURSE NUMBER : TCP-324
COURSE TITLE : LANGUAGE PROCESSOR
CREDITS : 3 (3+0)

CATALOGUE DESCRIPTION

Lexical analyzer, design of assemblers, two pass assembler location counter, symbol definition, symbol table, manipulation, expression parser expression evaluation machine code generation bootstrapping, absolute loader, relocation, relocating loader, linker, link editor, dynamic loader, dynamic linker debugger segments, multiple location counters macros-macro pre-processor macro assembler introduction to compolation recursive descent parsers code generation for assignment Statements, expression, conditional statements etc.

DETAILED CATALOGUE DESCRIPTION

INTRODUCTION

Translators & compiler, cousin of compilers boot strapping, compiler writing tools, phases of compilers.

LEXICAL ANALYZER

The role of lexical analyzer regular expression finite automata, implementation of Lexical analyzer from DFA, scanning & token generation; Buffer management of Lexical analyzer, various desired features of lexical analyzer.

PARSING

Syntactic specification of programming languages context free grammer, capabilities of context free grammar, Basic Parsing technique shift reduce, operator Precedence top down, predictive passing, LR parsing.

ASSEMBLER

Design of Assambler- statement of problem, data structure formate of data based Algorithm, look for modularity.

Loaders- design of absolute loader- statement of problem, data structure format of data basses, Algorithm.

Macros – features of, macrofacility- macro instruction argument conditional macro expansion. Implementation- two pass algorithm, single pass algorithm, Implimentation within an assembler.

SYMBOL TABLE

Symbol, contents of symbol table data structure representation of scope information, implementation, simple list self-organizing list, hash table run time storage administration- case of FORTRAN, ALGOL

CODE GENERATION & OPTIMIZATION

Synax directed translation, Intermediate code- Qudurple Triple Translation of statements assignment, Boolean Expression & arithmetic expression.

Principle services of optimization, loop optimization, loop invariant computation, Induction value elimination.

Problems in code generation, machine model Asimple code generator.

REFERENCE BOOKS

1. Compilers Design by
   Aho, Ullman, Sethi, Addison (Wesly Pub.)
2. Compiler Construction by
   DM Dhamdhare (TMH Pub.)

COURSE NUMBER : TCP-325
COURSE TITLE : OPERATING SYSTEMS
CREDITS : 3(2+1)

CATALOGUE DESCRIPTION

Historical perspectives, Batch processing, Time sharing components of an operation system. Review of device drivers, Basic system calls interrupt mechanism, concurrent processes, mutual exclusion, Synchronizaion; Process management, Handling deadlocks, Procssor scheduling, switching, synchronizing. Memory Management, swapping, segmentation, paging, virtual memory, page replacement and space allocation policies, segmented paging, dynamic linking. Catching of secondary storage information, I/O scheduling policies, TERMINAL I/O handling. Data Management, directory structure, Basic file systems, gaining access to files, case studies.

DETAILED CATALOGUE DESCRIPTION

INTRODUCTION

What is an operation system? Early system Generation of operating Systems, Multi programming, Timesharing, Real Time systems unbundling of software and hardware.

PROCESS MANAGEMENT

Process concepts, process states, process state transition the Process control block, operations on processes process Graphs, Hierarchy of processes.

Concurrent Processes: Concurrency, concurrent statements, precedence Graphs, Concurrency condition Fork/ Join constructs: Parbegin/parend constructs. Process synchronization and Mutual Exclusion.

The critical section problem,
Data sharing, Resource sharing,
Implementing Mutual Exclusion Primitives,
Two Process solutions,
Dekker's Algorithm,
N- process software solution,
Hardware solution to Mutual Exclusion,
Test- and – set Instruction,
Semaphores- process synchronization with semaphores.
Counting Semaphores,
Examples/Classical problems.
*Producer-Consumer
*Readers-Writers
*Dining Philosophers
*Bounded-Buffer.
DEAD LOOKS
The Deadlock Problem.
Deadlock characterization:Resource concepts, Permanent Resources
Necessary conditions for dead lock

Deadlock prevention
Deadlock Avoidance and Banker's Algorithm
Deadlock Detection-Resource Graphs
Deadlock Recovery
Combined approach to deadlock handling.
MEMORY MANAGEMENT
Introduction, storage organization, management storage hierarchy.
Contiguous Vs Non contiguous storage allocation and variable part multiprogramming fetch, placement and replacement strategies. Overlays Fragmentations.
Virtual Storage Organisation:
Virtual storage: Basic concepts.
Multilevel storage organization block mapping.
Paging: Basic concepts.
Segmentation
Passing/Segmentation Systems.
Virtual Storage management.
Overlays, deamdn paging, anticipatory paging, page size,
Vertical Memory Mgt. Strategies
Page reploacement strategies
Page replacement strategies
Locality of Reference
Working set
Page Replacement Algorithms
Thrashing
Programme Behaviour under paging and other considerations,
Optimal page size consideration etc.
Processor Management:
Job and processor scheduling
Scheduling levels
Scheduling objectives
Scheduling criteria
Pre Emptive Vs Non pre emptive schedule
Priorities, deadline scheduling
FIFO, Rocured Robin, SJF,SRT, and other scheduling algorithms
Algorithm Evaluation
Multiple Aproicessor scheduling.
DISK AND DRUM SCHEDULING:
Operations of Moving Head Disk Storage
Physical characteristics
Why scheduling is necessary?
Desireable characteristics of scheduling policies
Seek optimization Rotational optimization

FEFS, SSTF, SCAN and other Algorithm
Selecting a Disk Scheduling Algorithm
Selecting a Disk Scheduling Algorthm
Sector Queuintg and systems Considerations.
FILE STYSTEMS:
File system functions
File System Services
Data hierarchy: Blocking and Buffering
File Organization
Access Methods
File Characteristics
File system, Allocating and freeing space
File Descriptor
Accessor Control Matrix, Access control by user classes
Backup and Recovery Directory and Data structure Data Base Models.
Example systems/ Case studies
Unix, MS-Dos, Windows etc.

Reference Books:

1.Operating systems by Harvey, M.Deitel, Addison Wesley (Narosa Pub.)
2.Operating systems concepts by Peterson, Silberschatz, Addison Weslely (Narosa Pub.)
3.Operating systems by Andrew S. Tannehaum, Prentice Hall of (I) Pub.
4.Operating systems by Per Brinch Hansen Prentice Hall of (I) Pub.
5.Introduction to operating Sys. Design by Amn.Harberman Golgotia Pub.
6.The Design of Unix Operating Sys. By Maurice. J.Bach, Prentic Hall (I) Pub.

COURSE NUMBER : TCP-326
COURSE TITLE : COMPUTER NETWORKS
CREDITS : 3(3+0)

CATALOGUE DESCRIPTION

Networking goals and applications, design-cost delay and throughput, packet switching Vs circuit switching, broadcast channel access in satellite-based networks, local area bus arid ring structures, data link and network transport, network services, electronic mail, file transfer, introduction to protocol specification, validations and testing.

DETAILED CATALOGUE DESCRIPTION:

INTRODUCTION:

Networking goals, its application, techno-economic factor of computer networking; Indtroduction to ARPANET, sna, decent, X.25 DESIGN, COST AND DELAY ANALYSIS, Network topology, connectivity analysis cuts and network flow, Maxflow algorithm, Monte-carlo connectivity analysis. Delay analysis-Queuing theory, M/M/1 queuen backbone design, and placement of concentrator, Perturbation Heuristics.

PHYSICAL LALYER:

Introduction to CCITT; Transmission & Multiplexing; X-21 interface circuit switching and packet switching, communication satellite; Transmission error, error correcting code, error detecting code, broad band & Base band channel.

DATA LINK LAYER:

Simplex protocol, stop and wait protocol for noisy channel, window sliding protocol, protocol efficiency, verification.

NETWORK LAYER

Virtual circuit & Datagram, routing algorithm-static, centralized isolated and distributed routing, congestion-causes and remedies satellite packet broad cost; pocket ratio.

TRANSPORT AND SESSION LAYER

Addressing & connection establishment, flow control & Buffering inter connection of packet switched network Internet, gateways X-75 model.

PRESENTATIONLAYER

Data representation and compression, Net Work security, cryptography.

APPLICATION LAYER:

File transfer, Access and Management, Electronic mail, virtual terminals, Directory services, Picture Storage & Transfer, Teletext and Videotext.

VARIOUS SERVICES PROVIDED BY COMPUTER NETWORK:

E.mail, ATM, Internet text & Graphics Services, database access etc.

REFERENCE BOOKS:

1.Computer Networks, A.S. Tanenbaum, PHI
2.Computer Networks, Black, PHI
3.Unix Network Programming Sterons
4.Internetworking with TCP/IP, Comer, PHI

5.Data & Computer Communication,W.T. Stallings, Macmillan Press.

COURSE NUMBER : TCP-327

COURSE TITLE : DESIGN AND ANALYSIS OF ALGORITHMS

CREDITS : 3 (3+0)

CATALOGUE DESCRIPTION

Review of basic data structures and concepts on algorithm analysis, asymptotic complexity- domain independent techniques for algorithm design such as divide and conquer, greedy, dynamic programming and back tracking- techniques for lower bound algorithms for sets, graphs and text processing, internal and external sorting/searching/merging, height balanced trees, 2-3 trees, B- trees hashing algorithms for dynamic storage allocation, Garbage collection and compaction.

DETAILED CATALOGUE DESCRIPTION

REVIEW OF BASIC DATA STRUCTURES

Data types and structures, arrays and arrays of structures, variables and expressions, primitive operations, precedence of oprators, built- in functions, algorithm and heuristics.

CONCEPTS IN ALGORITHM ANALYSIS

Space complexity, time complexity, asymptotic complexity, asymptotic notations etc.

TECHNIQUES OF ALGORITHM DESIGN

General algorithm, refinement, pseudo code, format conversions, statement and control structures, string operators, relational operators, logical oprations and expressions, precedence of all operators, sub algorithm, parameters, tracing and trace table etc.

REVIEW OF SOME SAMPLE ALGORITHMS AND GENRAL PROBLEM SOLVING STRATEGIES :

REFERENCE BOOKS

1. Computer Algorithms Introduction to Design & Analysis
   Basse (Addison Wesley Pub.)
2. Data Structure & Algorithm
   Aho, Hopcrot, Ullman (Addison Weslay Pub.)
3. Fundamental of Computer Algorithm
   Horowitz & Sahani (Galgotia)

VII SEMESTER

SEMESTER - VII

COURSE NUMBER : TCP-411
COURSE TITLE : STATE OF THE ART COMPUTER
CREDITS : 3(2+1)
CATALOGUE DESCRIPTION
Course Contents

Latest Computer systems- their architecture and salient features. Cost comparisons storage media, Input/Output systems in vogue. Latest trends in Computer applications. Familiarization with state of hardware and software in Computers.

COURSE NUMBER : TCP-412
COURSE TITLE : SOFTWARE ENGINEERING
CREDITS : 3(3+0)
CATALOGUE DESCRIPTION:

Definition O Phase Definition of Software Engineering, Goals of software Engineering, life cycle, Prototyping, A Generic view of software Engg., system requirements analysis, preliminary software planning. Software requirements.

DEVELOPMENT PHASE:

Preliminary Design, design, details design, organization for software development.

MAINTENANCE PHASE:

Software Engineering, Maintenance.

STRUCTURED CODING:

Importance oif structure, structured coding, code format.

SOFTWARE ENGINEERING FOR SMALL PROJECTS:

Nature of small projects small project definition, small project development, small project maintenance, fundamentals of software engineering economics, software cost estimation methods and procedures.

MANAGEMENT ISSUES:

An organizational framework software project failure, software engg. Education, how to establish software engineering.

REFERENCE BOOKS:

1.Software Engineering a Practitioner Approach by Pressman,R. (McGraw Hill Pub.)
2.Software Engineering by Sommerville (Addition Wesley Pub.).
3.Fundamentals of software Engineering by Mall R.(OPHI Pub.).

COURSE NUMBER : TCP-413
COURSE TITLE : MANAGEMENT INFORMATION SYSTEMS
CREDITS : 3(2+1)

CATALOGUE DESCRIPTION :

Introduction to management information systems, system approach to management and information, MIS planning and development analysis and design tools, data modeling, MIS design and evaluation, Technological aspects of MIS.

DETAILED CATALOGUE DESCRIPTION:

Introduction:

Basic definitions of information systems (IS) and MIS etc. Levels of management, concept and types of management information, functions and roles of management information needs of managers, properties of useful management information characteristics of MIS, Structure of MIS.

SYSTEM APPROACH TO INFORMATION AND MANAGEMENT:

System concepts, feedback and control, control of system performance, other system characgeristics, a business as a system, Is concepts, Is model, Is activities, Is resources, operations information systems. Is for management decision making, information reporting systems decision support system, executive information system.

MISPLANNING AND DEVELOPMENT ANALYSIS AND DESIGN TOOLS:

Introduction to planning termoinology, types of planning, role of planning, role of planning, tactical and operational planning, planning methodologies, Business system planning, BSP approach, critical success factors CSF approach, critical success factors, CSF approach, development cycle, systems investigation, planning and feasibility organizational environment, system requirements analysis, system design, user in surface design, data design, process design, logical system design, physical system design.

DATA MODELLING:

Hierarchical, Network, Relational and Micro-based and client server models.

MIS DESIGN AND EVALUATION:

Gross design, detailed design, steps in the design of MIS, Evaluation, technological and behavioural aspects.

REFERENCE BOOKS:

1.Management Information System by O.Brain (TMH Pub.)
2.Management Information System by Jawadegar (THM pub.).

COURSE NUMBER : TCP-414
COURSE TITLE : MULTI MEDIA TECHNOLOGY
CREDITS : 4(3+1)
CATALOGUE DESCRIPTION

Introduction:

Introduction to multimedia, Multimedia objects, Multimedia in business and work.

Stages of Multimedia Projects:

Multimedia Hardware, memory and storage Devices, Communication Devices, Multimedia software's, presentation tools for object generations, video, sound, image capturing, authoring tools Card and page based authoring tools.

Multimedia Building Blocks: Text, sound, MIDI, Digital Audio, audio file formats, MIDI under windows environment, Audio & video Captur.

Data Compression

Huffman Coding, Shannon Fano Algorithm, Huffman Algorithms, Adaptive Coding, Arithmetic Coding, Higher Order Modeling, Finite Context Modeling, Dictionary based Campression, sliding window compression, LZ77, LZW compression, compression ratio lossless and lossy compression.

Speech Compression & synthesis:

Digital audio concept, Sampling variables, Lossless compression of sound, lossy compression & silence compression.

Images: Multiple monitors, bitmaps, vector drawing, lossy graphic compression, image file formation animations, Images standards, JPEG Compression, Zig Zag Coding

Video: Video representation, Colors, Video Compression,MPEG standard, MHEG Standards, recent development in Multimedia.

Text Books & Referece Book

1. Tay Vaugham "Multimedia, Making it work" Osborne McGraw Hill
2. Buford, "Multimedia Systems" Addison Wesley
3. Mark Nelson " Data Compression Book" BPB
4. Rosch " Multimedia Bible" Sams Publishing.

COURSE NUMBER : TPE-411
COURSE TITLE : PRINCIPLE OF MANAGEMENT
CREDITS : 2 (2+0)
CATALOGUE DESCRIPTION

Growth of Management thought, Management and industry, functions of a Manager, dualities, Responsbilities, planning, organizing, staffing controlling and directing, motivation & work environment, planning and management of Computer centers.

VIII SEMESTER

ELECTIVE COURSES

COURSE NUMBER : TCP-421

COURSE TITLE : SIMULATION AND MODELLING

CREDITS : 4 (3+1)

Catalogue Description:

Systems and models, discrete and continuous simulation, programming considerations and languages, random number generations, testing of random number, stochastic variates generation, output analysis, control of length of simulation, verification and validation of simulation.

DETAILED CATALOGUE DESCRIPTION:

INTRODUCTION:

Mathematical modeling-Baissic axioms; qualities of a good model and some of elementary case studies; classification of modeling: Discrete and continuous modeling deterministic and probabilistic models; simulation-simulation programming considerations and languages. Simulation softwares (SIMSCRIPT) Advantages of simulation case studies.

1.SIMULATION AND NUKE TEST

2.Flight simulators

3.Modeling and Analysis of computer communication Networks.

4.Some practical applications of simulation and modeling to the problems related to computer science and engineering.

REFERENCE BOOKS:

1.Modeling and Analysis of Computer Communication Networks by J.P. Hayes (Khanna).

COURSE NUMBER : TCP-422
COURSE TITLE : DIGITAL CONTROL
CREDITS : 4 (3+1)

Catalogue Description:

Basic elements of a digital control systems. Introduction to supervisor digital control and direct digital control direct didgital transducers and actuators, sampling process and construction of discrete signals, hold circuits, Z-transform of difference equations, pulse transfer function, modified, Z-transform, Inverse Z-transform and its applications, stability in the Z-plane. Application to digital control in Railway/Air reservations, traffic control, process control, off and on-line control.

DETAILED CATALOGUE DESCRIPTION:

INTRODUCTION:

Discrete data control systems, sampled data control systems, digital control systems supervisory digital control, direct digital control, numerical control etc.

DIRECT DIGITAL TRANSDUCERS AND ACTUATORS

Sampled-data transducer, digital transducer, digital, controllers, hybrid controllers, advantages of digital controllers, digital filters.

MATHEMATICAL MODELLING OF DIGITAL CONTROL SYSTEM:

Block diagrams of digital control system.

SAMPLING PROCESS:

Mathematical analysis, types of sampling operations, sampling theorem.

HOLD CIRCUITS:

Function of a clamper, zero, first and fractional order holds.

Z-TRANSFORM:

Theory, solution of difference equations, pulse transfer function, modified L-transform, inverses Z-transorm and its applications.

STABILITY ANALYSIS:

Mapping of left half s-plance into the z-plane, stability analysis in the plane.

REAL-LIFE ILLUSTRATIONS:

Applications in process control, serve systems, two position control, traffic control etc.

STATE SPACE ANALYSIS:

State-space representation of discrete- time systems, solution of discrete time state equations.

REFERENCE BOOKS:

1.Digital Logic Application and Design by John,M. Yarbrough (Vikas Pub.).

COURSE NUMBER : TCP-423
COURSE TITLE : SATELLITE COMMUNICATION
CREDITS : 4 (3+1)

Satellite Networks, Modulation Techniques, Attitude and orbit, Operational parameters, space environment, sub- systems, ground station. VSAT, Low Earth Orbit (LEO) satellite systems, Prediction of Range performance, Signal to noise Ratio system losses, Doppler effect, Tracking, Phase Shifter, Dielectric and Magnetic absorbers. Future Public Land Mobile Telecommunication System (FPLMTS) Satellite based system Traffic Demand, LEO Topologies, Uniqueness of LEO topologies, ATM and Satellite systems.

COURSE NUMBER : TCP-424
COURSE TITLE : MOBILE COMPUTING
CREDITS : 4 (3+1)

Mobile computing framework, Wireless Delivery Technology & swishing methods: Ratio based systems, Cellular communication, Wireless packet data Network, Satellite Networks, Very Small Aperture Terminals (VSAT), Paging and Satellite Networks, Infrared or Light Based Mobile Computing, Mobile Information Access Devices: Portable Computers, Hybrid Pen Computer Personal Digital Assistants (PDA), Personal Communication, Palmtops, Cellular Moderns and PCMCIA adapters, Mobile Data Internetworking Standards Code Division Multiple Access (CDMA), TDMA, Mobile IP How Mobile IP Works, Network Computers and Mobile computing, changes with IPV6, Cellular Data Communication.

COURSE NUMBER : TCP-425
COURSE TITLE : VLSI TECHNOLOGY
CREDITS : 4 (3+1)
CATALOGUE DESCRIPTION:

VLSI device fundamental, VLSI architecture, VLSI applications and testing, VLSI-memories, future prospects.

Introduction to VLSI Design & Methods:

Evolution of IC technology, CMOS device modeling, CMOS circuit design and layout of few selected circuits, parasitic capacitances, circuit simulation VLSI design methodology, introduction to sea of gates, semi custom and full custom design,k Physical and Logical design Tools. Testability and characterization introduction to CAD tools and Algorithms. Implementation of routing algorithms in C++/orC.

REFERENCE BOOKS

1.Basic VLSI,D.A. Pucknell & Eshraghia, PHI.
2.Modern VLSI Design Systems on Silicon, Wayne Wolf, Addison Wesley.
3.Introd. to digital micro Electronic circuits, K.Gopalan, TMH.
4.Micro Electronics Millman and Grabel, McGraw Hill.

COURSE NUMBER : TCP-426
COURSE TITLE : IMAGE PROCESSING
CREDITS : 4 (3+1)

CATALOGUE DESCRIPTION:

Image representation, digitization, quantization, image compression and coding problem, data structures for picture representations quqad trees, template matching region analysis, contour following, frequency domain operations, descriptions of line and shape, descriptive methods in scene analysis, statistical and syntactical models for picture classification.

DETAILED CATALOGUE DESCRIPTION:

INTRODUCTION:

Relation among graphics, image processing and pattern recognition.

IMAGE REPRESENTATION: