

**COURSE CURRICULUM
FOR
UNDERGRADUATE PROGRAMME
B.TECH
IN
COMPUTER SCIENCE & ENGG.**



**FACULTY OF ENGINEERING & TECHNOLOGY
CHANDRA SHEKHAR AZAD UNIVERSITY OF
AGRICULTURE & TECHNOLOGY,
CAMPUS ETAWAH-206001**

Course Curriculum of B.Tech. (Mechanical Engineering)

Branch : Mechanical Engineering

Year:1

Semester-1 (Common to all branches)

Sl. No.	Course No.	Subject	Periods			Credits
			L	T	P	
1.	HU 111	Professional Comm. I (common to all branches)	2	1	0	3
2.	CH 111	Engineering Chemistry-I	2	1	3*	4
3.	PH 111	Engineering Physics-I	3	1	3*	5
4.	MA 111	Mathematics-I	3	1	0	4
5.	CE 111	Engineering Mechanics	3	1	3**	5
6.	EE 111	Basic Electrical Engineering	3	1	3**	5
7.	CE 111	Engineering Graphics-I	0	0	3	1
8.	ME 111	Workshop Practices-I	0	0	3	2
9.	GP 111	GENERAL PROFICIENCY				2
Total			16	6	12	32

* To be taken in alternate weeks

** To be taken in alternate weeks

Total Periods : 34
Total Credits : 32

Branch : Mechanical Engineering

Year:1

Semester-II

Sl. No.	Course No.	Subject	Periods			Credits
			L	T	P	
1.	HU 121	Professional Comm. II (common to all branches)	2	0	1	3
2.	CE-122	Environmental Studies	3	0	1	4
3.	CS-121	Introduction to computing	2	1	3	4
4.	CH-121	Engineering Chemistry-II (Environmental & Ecology)	2	1	0	3
5.	PH-121	Engineering Physics-II	3	1	0	4
6.	MA-121	Mathematics-II	3	1	0	4
7.	ME-121	Engineering Thermodynamics	3	1	0	4
8.	EC-121	Basic Electronics	3	1	3	5
9.	ME-122	Engineering Graphics-II (M/C Drawing)	0	0	3	2
11.	ME-123	Workshop Practice-II	1	0	2	2
10.	GP 111	GENERAL PROFICIENCY				2
Total			19	6	12	37

Total Periods : 37
Total Credits : 37

Branch : Computer Science & Engg

Year:II

Semester-III

Sl. No.	Course No.	Subject	Periods			Credits
			L	T	P	
1.	CS 231	Computer Programming	2	1	3	5
2.	MU 231	Engineering Economics	2	1	0	3
3.	CE 231	Strength of Materials	3	1	0	4
4.	EC 231	Electronics II	3	1	3	5
5.	CS 231	Computer Organization	3	1	3	5
6.	MA 231	Mathematics III	3	-	0	4
7.	ME	Material Testing Lab	0	0	3	2
	GP 231	GENERAL PROFICIENCY				2
Total			16	6	12	30

Total Periods : 34

Total Credits : 30

Branch : Computer Science & Engg

Year:II

Semester-IV

Sl. No.	Course No.	Subject	Periods			Credits
			L	T	P	
1.	CS 241	Discrete Mathematics	2	1	0	3
2.	CS 242	System Analysis & Design	2	1	0	3
3.	EC 241	Digital Circuit Design	3	1	3	5
4.	CS 243	Data Communication	3	1	3	5
5.	CS 244	Data Structure & Programming	3	1	3	5
6.	CS 245	System Software	3	1	3	5
7.	GP 241	GENERAL PROFICIENCY				2
Total			16	6	12	28

Total Periods : 34

Total Credits : 28

Branch : Computer Science & Engg

Year:III

Semester-V

Sl. No.	Course No.	Subject	Periods			Credits
			L	T	P	
1.	HU 351	Management Science	2	1	0	3
2.	CS 351	Formal Language & Automata Theory	2	1	0	3
3.	CS 352	Computer Network	3	1	3	5
4.	CS 353	Relational Database System	3	1	3	5
5.	CS 354	Operating System-I	3	1	3	5
6.	CS 355	Micro Processor Based System Design	3	1	3	5
7.	GP 351	GENERAL PROFICIENCY				2
Total			16	6	12	28

Total Periods : 34

Total Credits : 28

Branch : Computer Science & Engg

Year:III

Semester-VI

Sl. No.	Course No.	Subject	Periods			Credits
			L	T	P	
1.	CS 361	Internet Fundamental & Application	2	1	3	5
2.	CS 362	Interactive Computer Graphics	2	1	3	5
3.	CS 363	Language Processor	3	1	3	6
4.	CS 364	Computer Architecture	3	1	0	4
5.	CS 365	Operating System-II	3	1	0	4
6.	CS 366	Design Analysis of Algorithm	3	1	0	4
7.	CS 367	System Administration Lab	0	0	3	2
	GP 361	GENERAL PROFICIENCY				2
Total			16	6	12	32

Note: Summer Field training of one credit (0-0-2) of four week is compulsory in this semester in the Month of June and evaluation of which will be carried out along with seventh semester.

Total Periods : 34
Total Credits : 32

Branch : Computer Science & Engg

Year:IV

Semester-VII

Sl. No.	Course No.	Subject	Periods			Credits
			L	T	P	
1.	CS 471	Software Engineering	3	1	3	5
2.	CS 472	Object Oriented Programming & Methodology	3	1	3	5
3.	CS 473	Data Base Application Design	3	1	3	5
4.	OE 471	Open Elective-I	3	1	0	4
5.	CS 474	Professional Elective-I	3	1	0	4
6.	CS 475	Project-I	0	0	3	2
7.	CS 476	Summer Field Training	0	0	3	1
	GP 471	GENERAL PROFICIENCY				2
Total			15	5	14	28

Total Periods : 34
Total Credits : 28

Branch : Computer Science & Engg

Year:IV

Semester-VIII

Sl. No.	Course No.	Subject	Periods			Credits
			L	T	P	
1.	CS 481	Web Technology	3	1	0	4
2.	CS 482	Visual Programming	3	1	0	4
3.	CS 483	Professional Elective II	3	1	0	4
4.	CS 484	Professional Elective III	3	1	0	4
5.	OE 481	Open Elective II	3	1	0	4
6.	CS 485	Project II	3	0	12	6
7.	GP 481	GENERAL PROFICIENCY				2
Total			15	5	12	28

Total Periods : 32
Total Credits : 28

HU 111 PROFESSIONAL COMMUNICATION – I 3(2-1-0)

Unit-I

Grammar & Composition-Articles, prepositions, spotting errors, Modals, foreign expression and their usage, Formation of nouns, adjectives, precis writing, paragraph writing.

Unit-II

Nature of communication- Process of communication, non verbal communication, business communication, barriers to communication, global aspects. Ethical aspects, legal aspects, accuracy, brevity, clarity and appropriateness in communication.

Oral presentation- Importance of acquiring oral presentation skills, body language, voice, modulation, audience awareness, presentation plan, visual aids, use of connectives, conducting a meeting, participating in a meeting.

Unit III

Report writing – structure of reports, front matter, main body, back matter.

Style of reports- Definition, the scientific attitude, readability of report, choice of words and phrases, construction and length of paragraphs and sentences.

Business correspondence- Memorandum, Notice, agenda, general principles of business correspondence, forms of business letters- indented form, block form, full- block form, semi block form, hanging indented form.

Unit-IV

- Study of selected literary texts
- Collection of short essays
- of studies- Francis Bacon
- A Bookish topic- RK Narayan
- Science & Human Life- JBS Haldane
- Water- CV Raman

Unit V

- Collection of short stories
- The barbar's trade union – Mulk Raj Anand
- The lament
- The gift of magi- O' Hanry
- The eyes are not here – Ruskin Sond
- Renunciation- Ravindra Nath Tagore
- The capital of the ward- Earnest Hemingway

Practical Aspects

Use of language laboratory to develop communication skills

Word accent- Production of correct accentual patterns involving two or three syllabic words

Intonation- Rising tone, and talking time, ear training, production tests.

Common errors- In articles, prepositions, conjunctions, connectives and other aspects of language and grammar, listing reading material, tables, spelling, semantics of connectives, modifiers and varieties in sentences and paragraphs.

Books recommended

1. Legget Glenn (etal), "Essentials of grammar and composition", Macmillan, Delhi.
2. Strunk, Jr. William, (etal), "The element of style", Macmillan, 1987.
3. Thomson and Martinat, "A practical book of english grammar", Oxford University Press, Delhi, 1985.
4. Bhaskar, W.W.S., and Prabhu, N.S>, "English Through Reading", Vol1&2 MacMillan, 1978.
5. D, Souza Eurince and Shahani, "Communication skills in english", Noble publishing house, 1997.

CH 111 ENGINEERING CHEMISTRY I 4(2-1-3*)

Atoms and Molecules

Particle in a box illustrating energy quantization, angular momentum quantization, radial and angular parts of H atom wave functions/orbitals, probability and charge distribution. Many electron atoms. Homonuclear and heteronuclear diatomic, covalent bonds, ionic bonds and electro negativity concepts, hybridization and shapes of molecules. Non-covalent interaction (Van Der Waals and hydrogen bonding).

Solid State

Idea of spatial periodicity of lattices; elements of bond theory. Conductors, semiconductors and insulators.

Experimental methods of structure determination using spectroscopic techniques such as IR, UV-Vis, NMR and Mass Spectrometry.

Reaction Dynamics

Rate laws, mechanisms and theories of reaction rates (collision and transition state theory). Lasers in Chemistry.

Electrochemistry

Application of electrode potentials to predict redox reactions in solution with special reference to Lattimer and Frost diagrams.

Transition Metal Chemistry

Structures of coordination compounds corresponding to coordination numbers up to 6. Types of ligands. Isomerism (geometrical, optical, ionization, linkage and coordination). Theories of bonding in coordination compounds, viz. crystal field theory, valence bond theory. Chelation. Brief application in organic synthesis and medicines etc.

Organ metallic Chemistry and Catalysis

Structure and bonding in organ metallic complexes, the sixteen and eighteen electron rules. Homogeneous catalysis, the role of metals in catalytic cycles during- some chemical reactions (e.g. hydroformylation, hydrogenation etc.). Role of metals in biology; oxygen carrier, electron transfer.

Structure and Reactivity of Organic Molecules

Inductive effect, resonance, hyper conjugation, electrometric effect. Carbonation, carbanion and free radicals. Brief study of some addition, elimination and substitution reactions. Conformational analysis (a cyclic and cyclic molecules), geometrical and optical isomerism; E, Z and R, S nomenclature.

Polymerization

Basic concepts, classification and industrial application.

Photochemistry

Photo excitation of carbon substrates (Noh-ish type I and type II reactions), selected examples of the application of photolysis. Photosynthesis (Z-diagram). Chemistry of vision. .

List of Experiments

- Acid-base titration (estimation of commercial caustic soda).
- Redox titration (estimation of iron using permanganometry).
- Complex metric titration (estimation of hardness of water using EDTA titration).
- Preparation and analysis of a metal complex (for example thiourea/copper sulfate or nickel chloride/ammonia complexes).
- Chemical kinetics (determination of relative rates of reaction of iodide with H_2O_2 at room temperature (clock reaction)).
- Heterogeneous equilibrium (determination of partition coefficient of acetic acid between n-butanol and water).
- Photochemical oxidation-reduction (study of photochemical reduction of ferric salt).
- Viscosity of solutions (determination of percentage composition of sugar solution from viscosity).
- Synthesis of aspirin.
- Synthesis of p-nitro aniline from acetanilide.
- Detection of functional groups in organic compounds.
- Utilization of paper/thin layer/column chromatographic techniques in the separation of organic compounds.
- Radical polymerization of vinyl monomers such as styrene, acrylonitrile etc.
- Conductometric titration (determination of the strength of a given HCL solution by titration against a standard NaOH solution).

Suggested Text Books & References

1. "Blocks 1-5 of Chemistry Course", Indira Gandhi Open University, IGNOU, New Delhi, 1996.
2. Alberty, R.A., and Silbey, R. J., "Physical Chemistry", John Wiley & Sons, Inc., Singapore, 1996.
3. Cotton, F.A., Wilkinson, G., and Gaus, P. L., "Basic Inorganic chemistry", John Wiley & Sons, Inc., Singapore, 3rd Ed., 1996.
4. Graham-Solomon, T.W., "Fundamentals of Organic Chemistry", John Wiley & Sons, Inc., Singapore, 1997.
5. Odian, G.G., "Principles of Polymerization", John Wiley & Sons, Inc., New York, 1981.
6. Sykes, P., "A Guidebook to Mechanism of Organic Chemistry", Longman Inc., New York, 1981.
7. Dyer, J.R., "Application of Absorption Spectroscopy of Organic Compounds", Prentice Hall of India, 1965.
8. Williams D.H and Fleming; I., "Spectroscopic Methods in Organic Chemistry", Tala McGraw Hill Edition, New Delhi, 4th Ed., 1988.
9. Atkins, P.W. "Physical Chemistry", Oxford Univ. Press, 4th Ed., 1990.
10. Pine, S.H., "Organic Chemistry", McGraw Hill Book Co., New Delhi, 5th Ed., 1987.
11. Sharma, B.K., "Engineering Chemistry", Krishna Prakashan Media (P) Ltd., Meerut, 1996.
12. E.E. Conn and Stumpf, P.K. "Outlines of Biochemistry", Wiley Eastern Ltd., New Delhi, 4th Ed, 1985.
13. Morrison R.T and Boyd, R.N. "Organic Chemistry", Prentice Hall of India, 6th Ed., 1992.
14. Rao C.N.R. and Agarwala, U.C. "Experiments in General Chemistry", East-West Press, New Delhi, 1969.
15. Furnis, B.S., Hannaford, A.J. Smith P.W.G. and Tatchell, A.R., Vogel's "Textbook of Practical Organic Chemistry", ELBS, 5th Ed., 1989.
16. Vogel's "Textbook of Quantitative Analysis", Longman, New York, 4th Ed., 1978.
17. Elias, A.J. Sundar Manoharan S. and Raj, H. "Laboratory Experiments for General Chemistry", I.I.T. Kanpur, 1997.

PH 111 ENGINEERING PHYSICS-I 5(3-1-3*)**Theory of Relativity**

Inertial frame of reference, Noninertial frames and fictitious forces, Outline of relativity, Michelson-Morley experiment, Lorentz transformation of space and time, length contraction, variation of mass with velocity, equivalence of mass and energy.

Geometrical Optics

Combination of thin lenses, cardinal points of coaxial system of thin lenses, thick lenses, location and properties of cardinal points, graphical construction of images.

Physical Optics

Interference- analytical treatment of interference, intensity distribution of fringe system, coherent and non-coherent sources, fundamental conditions of interference, Fresnel's biprism, displacement of fringes, wedge shaped films, Newton's rings Diffraction- single slit and double slit diffraction, diffraction grating, Limit of resolution, resolving power of grating and image forming systems. Polarisation-Brewster's law, double refraction, geometry of calcite crystal, optic axis, nicol prism, circularly and elliptically polarised light, retardation plates, production and analysis of planes, polarimeter.

Thermal Physics

Kinetic theory of gases, maxwellian distribution, mean free path, transport phenomena in gases, Imperfect gases and vander Waal's equation of state.

Acoustics

Production and applications of Ultrasonics, Acoustics of buildings.

Dynamics of fluids

Continuity equation, Bernoulli's theorem and its applications, Torcelli's theorem, Viscosity, flow of liquid through a capillary tube, capillaries in series and parallel, stoke's formula, rotation viscometer.

List of Experiments

- To determine the coefficient of viscosity of water by capillary flow.
- To determine the thermal conductivity of a bad and good conductor by Lee's method and Searl's method, respectively.
- To determine the wave length of light by Newton's ring method.
- To determine the wave length of light by Fresnel's biprism.
- To determine the dispersive power of the given material of the prism.
- To determine the focal length of combination of two thin lenses by nodal slide assembly and its verification.
- Determination of e/m by J. J. Thomson's method.
- Measurement of thermo emf between different types of thermocouples as a function of temperature difference between the junction, measurement of an unknown temperature.
- Use of Carry Foster Bridge. Study of electromagnetic induction.
- Study of electromagnetic damping and determination of terminal velocity reached by a magnet falling in a metallic tube.
- Study of LCR circuits with AC current.
- Determination of Plank's Constant using photocells.

Suggested Text Books & References

1. Jenkins and White, "Optics", McGraw-Hill Book Company.
2. Mathur, D.S., "Mechanics".
3. Saha and Srivastava "A Treatise on Heat".
4. Singh, R.B., "Physics of Oscillations and Waves".
5. Ghatak, A.K., "Optics".

MA 111 MATHEMATICS – I 4(3-1-0)**Calculus of Functions of One Variable**

Successive differentiation, Libnitz's theorem (without proof). Rolle's theorem mean value theorems and Taylor's theorem. Fundamental theorems of integral calculus, elementary reduction formulae for integrals. Applications to length, area, volume, surface area of revolution, moments and centers of gravity.

Infinite Series: Convergence, divergence, comparison test, ratio test, Cauchy Leibnitz's theorem, absolute and conditional convergence. Expansions of functions into Taylor and Maclaurin series.

Calculus of Functions of Several Variables

Partial derivatives, chain rule, gradient and directional derivative. Differentiation of implicit functions, exact differentials. Tangent planes and normals. Maxima, minima and saddle points. Simple problems in extrema of functions with constraints - method of Lagrange multipliers. Multiple integrals - double and triple integrals. Jacobians and transformations of coordinates. Applications to areas, volumes etc.

Vector Calculus

Scalar and vector fields. Line and surface integrals. Gradient, divergence and curl. Line integrals independent of path. Green's theorem, divergence theorem and Stoke's theorem (without proofs) and their simple applications...

Suggested Text Books & References

1. Thomas, G. B., and Finney, R. L., "Calculus and Analytic Geometry", 6th edition, Addison-Wesley/Narosa, 1985.
2. Piskunov, "Differential and Integral Calculus", Vol.-I & II, Mir Publishers, Moscow, 1979.

CE 111 ENGINEERING MECHANICS 5(3-1-3)**

Fundamental of Mechanics- Basic concepts**Force Systems and Equilibrium**

Force, Moment and couple, Principle of Transmissibility, Varignon's theorem, Resultant of force systems- Concurrent and non-concurrent coplanar forces, Free body diagram, Equilibrium equations and their uses in solving elementary engineering problems.

Plane Trusses

The structural model, simple trusses, analysis of simple trusses: method of joints, method of sections, graphical method.

Friction

Introduction, laws of coulomb friction, simple contact friction problems, belt friction, the square screw thread, rolling resistance.

Properties of Surface

First moment of an area and centroid, second moment and product of area of a plane area, transfer theorems, relation between second moment and product of area, polar moment of inertia, principal axes, mass moment of inertia.

Virtual Work

Work of a force, Principle of Virtual work and its application.

Kinematics of Rigid bodies

Plane motion, Absolute motion, Relative motion, Translating axes and rotating axes.

Kinetics of Rigid Bodies

Plane motion, Work and energy, Impulse and momentum.

List of Experiments

- To determine the Newton's second law of motion by Fletcher's trolley apparatus.
- To determine the moment of inertia of a flywheel about its axis of rotation.
- To verify: (a) the conditions of equilibrium of forces by parallel force apparatus. (b) The principal of moments by crank lever.
- To find the compression in the rafters and tension in ties of simple roof truss models and to verify graphically.
- To determine the dry friction between inclined plane and slide boxes of different materials.
- To determine the coefficient of friction between the belt and rope and the fixed pulley.
- To determine the velocity ratio of a simple screw jack and to plot graph between (a) Effort-Load. (b) Friction-Load. (c) Efficiency-Load.
- To measure the area of a figure with the help of a Polar Planimeter.

Suggested Text Books & References

1. Beer, F.P., and Johnston, F. R., "Mechanics for Engineers", McGraw Hill.
2. Shames, I.H., "Engineering Mechanics", Prentice Hall of India.
3. Meriam, J.L., "Statics", John Wiley.
4. Meriam, J.L., "Dynamics", John Wiley.

EE 111 BASIC ELECTRICAL ENGINEERING 5(3-1-3)**

DC Networks

Kirchoff's laws, node voltage and mesh current methods; Delta-star and star-delta conversion; Classification of Network Elements, Superposition principle, Thevenin's and Norton's theorems.

Single Phase AC Circuits

Single phase EMF generation, average and effective values of sinusoids; Solution of R, L, C series circuits, the j operator, complex representation of impedances; Phasor diagram, power factor, power in complex notation; Solution of parallel and series-parallel circuits; Resonance.

Three phase AC Circuits

Three phase EMF generation, delta and Y-connection, line and phase quantities; Solution of three phase circuits, balanced supply voltage and balanced load; Phasor diagram, measurement of power in three phase circuits; Three phase four wire circuit; Unbalanced circuits.

Magnetic Circuits

Ampere's circuital law, B-H curve, solution of magnetic circuits; Hysteresis and eddy current losses; relays an application of magnetic force.

Transformers

Construction, EMF equation, ratings; Phasor diagram on no load and full load; Equivalent circuit, regulation and efficiency calculations; Open and short circuit tests; Auto-transformers and three phase transformers.

Induction Motors

The revolving magnetic field, principle of operation, ratings: Equivalent circuit; Torque-speed characteristics; Starters for squirrel cage and wound rotor type induction motors; Single phase induction motors.

DC Machines

Construction, EMF and torque equations; Characteristics of DC generators and motors; Speed control of DC motors and DC motor starters; Armature reaction and commutation.

Electrical Measuring Instruments

DC PMMC instruments, shunts and multipliers, multi-meters; Moving iron ammeters and voltmeters; Dynamometer wattmeters; AC watt-hour meters, Extension. of instrument ranges.

Power Supply Systems

General structure of electrical power systems; Power transmission and distribution via overhead lines and underground cables, Steam, hydro, gas and nuclear power generation.

List of Experiments

- To measure the armature and field resistance of a DC machine.
- To calibrate a test (moving iron) ammeter, and a (dynamometer) wattmeter with respect to standard (DCPMMC) ammeter and voltmeters.
- Verification of circuit theorems, Thevenin's and Superposition theorems (with DC sources only).
- Voltage-current characteristics of incandescent lamps and fusing time-current characteristics of fuse wire.
- Measurement of current, voltages and power in R-L-C series circuit excited by (single phase) AC supply.
- Open circuit and short circuit tests on a single-phase transformer.
- Connection and starting of a three-phase induction motor using direct on line (DOL), or star-delta starter.
- Connection and measurement of power consumption of a fluorescent lamp.
- Determination of open circuit characteristics (GCC) of a DC machine.
- Starting and speed control of a DC shunt motor.
- Connection and testing of a single-phase energy meter (unity power factor load only).
- Two-wattmeter method of measuring power in three-phase circuit (resistive load only).
- Measurement of thermo emf between different types of thermocouples as a function of temperature difference between the junction, measurement of an unknown temperature.
- Design and use of potentiometer.
- Study of LCR circuits with AC current.

Suggested Text Books & References

1. Hughes Edward (revised by Ian McKenzie Smith), "Electrical Technology", Seventh Edition, English Language Book Society Publication with Longman, 1995.
2. Del Torro, Vincent "Electrical Engineering Fundamentals", Second- Edition, Prentice Hall of India Pvt. Ltd., 1994.
3. Cotton, H., "Advanced Electrical Technology", Issac Pitman, London, 1967.
4. Wildi, Theodore "Electrical Machines, Drives and Power Systems", Second Edition, Prentice Hall, 1991.
5. Cogdell, J R "Foundations of Electrical Engineering", Second Edition, Prentice Hall, 1996.
6. Parker Smith S. (Ed. Parker Smith N N), "Problems in Electrical Engineering", Tenth Edition, Asia Publications, 1995.

CE 112

ENGINEERING GRAPHICS-I

2(0-0-3)

General

Importance, Significance and scope of engineering drawing, Lettering, Dimensioning, Scales, Sense of proportioning, Different types of projections, Orthographic projections, B.I.S. Specifications.

Projections of Points and Lines

Introduction of planes of projection, Reference and auxiliary planes, projections of points and lines in different quadrants, traces, inclinations, and true lengths of the lines, projections on auxiliary planes, shortest distance intersecting and nonintersecting lines.

Planes Other than the Reference Planes

Introduction of other planes (perpendicular and oblique), their traces, inclinations etc., projections of points and lines lying in the planes, conversion of oblique plane into auxiliary plane and solution of related problems.

Projections of Plane Figures

Different cases of plane figures (of different shapes) making different angles with one or both reference planes and lines lying in the plane figures making different given angles (with one or both reference planes). Obtaining true shape of the plane figure by projection.

Projection of Solids

Simple cases when solid is placed in different positions, Axis, faces and lines lying in the faces of the solid making given angles.

Development of Surface

Development of simple objects with and without sectioning.

Isometric Projection

Nomography**Basic concepts and use.****Suggested Text Books & References**

1. Narayana, K.L. and Kannaiah, P. "Engineering Graphics.", Tata McGraw Hill, New Delhi, 1988.
2. Bhatt, N.D. "Elementary Engineering Drawing", Charotar Book Stall, Anand, 1998.
3. Lakshminarayanan, V. and Vaish Wanar, R.S., "Engineering Graphics", Jain Brothers, New Delhi, 1998.
4. Chandra, A.M. and Chandra Satish, "Engineering Graphics", Narosa, 1998.

ME 111 WORKSHOP PRACTICE I 2(0-0-3)**Carpentry Shop**

- Study of tools & operations of a carpentry joints.
- Simple exercise using jack plain.
- Prepare half lap corner joints, mortise & tenon joints.
- Simple exercise on wood working lathe.

Fitting Shop

- Study of tools & operations.
- Simple exercise involving fitting work.
- Making perfect male – female joints.

Black Smithy Shop

- Study of tools & equipments.
- Simple exercises based on black smithy operation such as upsetting, drawing down, punching, bending, fullering, swaging.

Welding Shop

- Study of tools & operations.
- Preparation of simple butt & lap joint.
- Oxy-acetylene welding.

Sheet Metal Shop

- Study of tools & operations.
- Making funnel complete with soldering.
- Fabrication of toolbox, tray, electrical panel boxes etc.

Machine Shop

- Study of tools & operations.
- Plane turning, step turning, taper turning, threading.
- Single point cutting tool grinding.

Suggested Text Books & References

1. Begeman, M.L.. and Amstead, B.H. "Manufacturing Process", John Wiley, 1968.
2. Chapman, W .A.J. and Arnold, E. "Workshop Technology", Vol. I & III, Viva Low Priced Student Edition, 1998.
3. Raghuwanshi, B.s. "Workshop Technology", Vol. I & II, Dhanpat Rai and Sons, 1998.
4. Chaudhary, Hajra "Elements of Workshop Technology", Media Promotors & Publishers, 1997.
5. Crawford, S. "Basic Engineering Processes", Hodder & Stoughton, 1985.

HU 121 PROFESSIONAL COMMUNICATION – II 3(2-0-1)**Unit-I**

Technical written communication- Nature origin and development of technical communication, salient features, chief characteristics of technical writing, basic difference between technical writing and general writing, Role of diction in technical writing and general writing.

Unit II

The salient features of scientific and technical communication

1. Fragmented sentences
2. Parallel comparisons
3. Squinting construction and split infinitive
4. Dangling Participles and gerunds
5. Coherence, unity, chronological, method, spatial method, inductive method, deductive method.

Unit III

Proposal writing- Types of proposals, The chief characteristics of a good proposal, structure or format of proposal the deference between a report and a proposal.

Writing scientific and semi-technical articles- Tables, figures, footnotes, bibliography, pie graphs, bar charts, flow charts, line graphs.

Unit IV

Study of scientific and general tests- Arora, V.N., "Improve your writing " Delhi; Oxford University press, 1981.

1. The effect of the scientific temper on Man –Bertrand Russell.

2. Technological Ombudsman-Alvin Toffler.
3. Population Explosion – Robert Arvill
4. The Scientist and Poet-D.G. King – Hele
5. The Language of literature and science-Aldous Huxley
6. The aims of science and the humanities – MoodyE.
7. The mother of the science- A.J. Bahm
8. The progress in the arts and science-Bronowski

Unit V

Phonetic Transcription – The definition , Broad phonetic transcription, narrow phonetic transcription, Diphthong, plosives, Fricatives, Lateral

Practical Aspects- Listing comprehension

- a. Ear Training
- b. Uses of latest scientific techniques (AVR comprehension training) comprehension accelerator, AVR comprehension reteometer.

Reading comprehension- Reading at various speeds, slow, fast, very fast, reading different kinds of texts for different purposes (for example, for relaxation, for information, for discussion at a later stage etc.)

Speaking- Achieving desired clarity and fluency, manipulating, paralinguistic features of speaking voice quality pitch tone, pausing for effectiveness, while speaking , making a short class room presentation,

Group Discussion- Use of persuasive strategies including rhetorical devices (for emphasizing , for instance , being polite and firm; handling question and taking in criticism of self ; term taing strategies and effective intervention using body language.) .

Books Recommended

1. Fiske, John, “ Introduction to communication studies”, Rotledge London, 1990
2. Gartside, I “ Modal Business letter” , Pitman London, 1992
3. Nurnberg. Maxwell and Morris, Rosen Blum. “ All about words”, General book report, New Delhi, 1995
4. O. Cooner, JD. “ Better english pronunciation”, Oxford University press, 1992.

CE 122 ENVIRONMENTAL STUDIES 4(3-0-1)

Unit 1: The Multidisciplinary nature of environmental studies (2 lectures)

Definition, scope and importance

Need for public awareness

Unit 2; Natural Resources (8 lectures)

Renewable and non-renewable resources:

Natural resources and associated problems

- a) Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.
 - b) Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams benefits and problems.
 - c) Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.
 - d) Food resources: World food problems, changes caused by agricultural and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies.
 - e) Energy resources: Growing energy needs, renewable and non renewable energy sources, sue of alternate energy sources. Case studies.
 - f) Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification.
- Role of an individual in conserve of natural resources.
 - Equitable use of resources for sustainable lifestyles.

Unit 3: Ecosystems (6 lectures)

- Concept of an ecosystem.
- Structure and function of an ecosystem.
- Producers, consumers and decomposers.
- Energy flow in the ecosystem.
- Ecological succession.
- Food chains, food webs and ecological pyran.
- Introduction, types, characteristic features, Structure and function of the following ecosystem :-
 - a. Forest ecosystem
 - b. Grassland ecosystem
 - c. Desert ecosystem
 - d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

Unit 4 : Biodiversity and its conservation (8 lectures)

- Introduction- Definition: genetic, species and ecosystem diversity.

- Biogeographical classification of India.
- Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values.
- Biodiversity at global, National and local levels.
- India as a mega-diversity nation.
- Hot-spots of biodiversity.
- Threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts.
- Endangered and endemic species of India
- Conservation of biodiversity : In-situ and Ex-situ conservation, of biodiversity.

Unit 5: Environmental Pollution

(8 lectures)

Definition

- Causes, effects and control measures of
 - a. Air pollution
 - b. water pollution
 - c. Soil pollution
 - d. Marine pollution
 - e. Noise pollution
 - f. Thermal pollution
 - g. Nuclear hazards
- Solid waste management: Causes, effects and control measures of urban and industrial wastes.
- Role of an individual in prevention of pollution.
- Pollution case studies.
- Disaster management: Floods, earthquake, cyclone and landslides.

Unit 6: Social Issues and the Environment

(7 lectures)

- From Unsustainable to Sustainable development
- Urban problems related to energy
- Water conservation, rain water harvesting, water and management
- Resettlement and rehabilitation of people; its problems and concerns. Case studies.
- Environmental ethics : Issues and possible solutions.
- Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies.
- Wasteland reclamation.
- Consumerism and waste products.
- Environment Protection Act.
- Air (Prevention and Control of Pollution) Act.
- Water (Prevention and control of pollution) Act
- Wildlife Protection Act
- Forest Conservation Act
- Issues involved in enforcement of environmental legislation.
- Public awareness

Unit 7 : Human Population and the Environmental

(6 lectures)

- Population growth, variation among nations.
- Population explosion-Family Welfare Programme.
- Environmental and human health.
- Human Rights.
- Value Education.
- HIV/AIDS
- Women and Child Welfare
- Role of Information Technology in Environmental and human health
- Case Studies.

Unit 8 : Field work

(5 lectures)

- Visit to a local area to document environmental assets-rive/forest/grassland/hill mountain.
- Visit to a local pollution site-Urban/rural/Industrial/Agricultural.
- Study of common plants, insects, birds.
- Study of simple ecosystems-pond, river, hill slopes, etc. (Field work Equal to 5 lecture hours)

References:

1. Agarwal. K.C. 2001. Environmental Biology, Nibi Publ. Ltd. Bikaner.
2. Bharucha Erach, The Biodiversity of India. Mapin Publishing Pvt. Ltd. Ahmedabad-3080 013, India, Email : mapin@icenet.net (R)
3. Brunner R.C., 1989. Hazardous Waste Incineration. McGraw Hill Inc. 480p.

4. Clark R.S., Marine Pollution, Clarendon Press Oxford (TB)
5. Cunningham, W.P. Copper, T.H. Gorhani, E & Hepworth, M. T. 2001 Environmental Encyclopedia, Jaico Publ. House, Mumbai, 1196p
6. De. A.K., Environmental Chemistry, Wiley Eastern Ltd.
7. Down to Earth, Centre for Science and Environmental (R)
8. Gleick, H.P. 1993. Water in crisis, Pacific Institute for Studies in Dev., Environment & Security. Stockholm Env. Institute. Oxford Univ. Press 478p.
9. Hawkins R.E. Encyclopedia of India Natural History, Bombay natural history Society, Bombay (R)
10. Heywood, V.H. & Watson, R.T. 1995. Global Biodiversity Assessment. Cambridge Univ. Press 1140 p.
11. Jadhav, H. & Bhosale, V.m. 1995. Environmental Protection and Laws. Himalaya Pub. House, Delhi 284p.
12. McKinney, M.L. & Schoeb, R.M. 1996 Environmental Science system & Solutions, Web enhanced edition 639p.
13. Mhaskar A.K. Matter Hazardous. Techno-Science Publications (TB)
14. Miller T.G. Jr. Environmental Science, Wadsworth Publishing Co. (TB)
15. Odum, E.P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA, 574p.
16. Rao M.N. & Datta, A.K. 1987. Waste Water Treatment, Oxford & IBH Publ. Co. Pvt. Ltd. 345p.
17. Sharma B.K.; 2001. Environmental Chemistry. Goel Publ. House, Meerut.
18. Survey of the Environment, The Hindu (M)
19. Townsend C., Harper J, and Muirhead Begon, Essentials of Ecology, Blackwell Science (TB).
20. Trivedi R.K. Handbook of Environmental laws, Rules, Guidelines, Compliances and Standards Vol. I & II, Enviro Media (R)
21. Trivedi R.K. and P.K. Goel, Introduction to air pollution, Techno-Science Publications (TB)
22. Wagner K.D., 1998. Environmental Management n.B. Saunders Co. Philadelphia, USA 499p.
(M) Magazine (R) Reference (TB) Textbook

CS 121 INTRODUCTION TO COMPUTING 4(2-1-3)

Introduction

Introduction to the computer devices such as keyboard, mouse, printers, disk, files, floppies, etc. Concept of computing, contemporary, OSs such as DOS, Window 95, MAC-OS, UNIX, etc. (Only brief user level description). Introduction to the e-mail, ftp, rlogin and other network services, world wide web. Introduction to the typesetting softwares such as Microsoft office.

Introduction to Programming

Concept of algorithms, Example of Algorithms such as how to add ten numbers, roots of a quadratic equation. Concept of sequentially following up the steps of the algorithm. Notion of program, programmability and programming languages. Structure of programs, object codes, compilers. Introduction to the Editing tools such as vi or MS- VC editors. Concepts of the finite storage, bits, bytes, kilo, mega and gigabytes. Concepts of character representation. Languages for system programming: study of Basics, Fortran, Pascal, Cobol etc.

Computer Programming Lab

- Concepts of flow charts and decision tables, Examples and practice problems.
- Introduction to Digital computers and its components, Introduction to DOS and UNIX operating systems.
- Development of computer program for example
- Roots of quadratic and Cubic equations
- Summation of N natural numbers
- Arranging numbers in ascending and descending orders
- Separation of odd and even numbers, etc.

Suggested Text Books & References

1. Kernighan, B.W., "The Elements of Programming Style", McGraw-Hill.
2. Yourdon, E., "Techniques of Program Structures and Design", Prentice-Hall.
3. Press, W.H., Teukolsky, S.A., Vetterling, W.T., & Flannery, B.P., " Numerical Recipes in Fortran", Cambridge university press.
4. Gotterfried, B.S. " Schaum's Outline of Theory & Programming With Basic", McGraw Hill, New Delhi.
5. Schied, F.S., " Theory and Problems of Computers & Programming", McGraw Hill New Delhi.
6. Divakar Singh & Bajpayee, "Computer & Programming Language", New Age Publication.
7. Divakar Singh, "Foundation of Information Technology", New Age Publication.

CH 121 ENGINEERING CHEMISTRY II (ENVIRONMENT AND ECOLOGY) 3(2-1-0)

General

Introduction, components of the environment, environmental degradation.

Ecology

Elements of Ecology: Ecological balance and consequences of change, principles of environmental impact assessment.

Air Pollution and Control

Atmospheric composition, energy balance, climate, weather, dispersion, sources and effects of pollutants, primary and secondary pollutants, green house effect, depletion of ozone layer; standards and control measures.

Water Pollution and Control

Hydrosphere, natural water, pollutants their origin and effects, river/lake/ ground water pollution, standards and control.

Land Pollution

Lithosphere, pollutants (municipal, industrial, commercial, agricultural, hazardous solid wastes): their origin and effects, collection and disposal of solid waste, recovery and conversion methods.

Noise Pollution

Sources, effects, standards and control.

Books & References

1. Masters, G.M., "Introduction to Environmental Engineering and Science", Prentice-Hall of India Pvt. Ltd., 1991.
2. Nebel, B.J., "Environmental Science", Prentice-Hall Inc., 1987.
3. Odum, E.P, "Ecology: The Link Between The Natural and Social Sciences", IBH Publishing Com. Delhi.

PH 121**ENGINEERING PHYSICS-II****4(3-1-0)****Vector analysis**

Scalar and vector fields, gradient of a scalar field, Divergence and curl of a vector fields, Line integral of a vector field, Gauss- divergence theorem, Stoke's theorem

Electromagnetism

Quantization & conservation of charge, Coulomb's law (vectorial form) and superposition principle, Concept of electric field lines, flux of E-field, Gauss' law, Electric Potential energy and potential, Conductors, capacitors and dielectric materials, Magnetic field, Force on a moving charge in a magnetic field, Force on current element, Torque on current loop, Biot-Savart law, Ampere's law, Electromagnetic induction and Faraday's law, Magnetism in materials, Maxwell's, equations, Electromagnetic Waves.

Thermoelectricity

Seebeck effect, law of successive temperatures, law of intermediate metals, peltier effect, Thomson effect, Thermoelectric power, application of thermodynamics on thermocouple.

Modern Physics

Elements of wave properties of particles and particle properties of waves, Nuclear Energy, Lasers- spontaneous and stimulated emission of radiation, Einstein coefficient, Parts of laser, types of lasers and their application.

Solid State Devices

Energy band diagram; covalent bonds; bound and free electrons, holes; electron and hole mobilities; intrinsic and extrinsic semiconductors; Fermi and impurity levels; impurity compensation, charge neutrality equation and semiconductor conductivity; Einstein relation; drift and diffusion current; photo conductivity and Hall effect.

Suggested Text Books & References

1. Rangwala and Mahajan "Electricity and Magnetism", Tata McGraw Hill, 1998.
2. Verma, H.C., "Concepts of Physics, Part-2", Bharati Bhawan (P&D),.1998.
3. Beiser, "Modern Physics", McGraw-Hill Inc., New York, 1995.
4. Mani and Mehta, G.K., "Modern Physics", Affiliated East-West Press Pvt. Ltd,1998.

MA 121**MATHEMATICS – II****4(3-1-0)****Linear Algebra**

Vector spaces-linear independence and dependence of vectors, inner Products, linear transformations. Matrices and determinants. Systems of linear equations-consistency and inconsistency. Gauss elimination, rank of a matrix, inverse of a matrix. Eigenvalues and eigenvectors of a matrix, diagonalization of a matrix.

Ordinary Differential Equations

Formation of ODE's, definition of order, degree and solutions. ODE's of first order: separable variables, homogeneous and nonhomogeneous equations; exactness and integrating factors, linear equations and Bernoulli equations. General linear ODE's of nth order: solutions of homogenous and nonhomogenous equations, operator method, methods of undetermined coefficients and of variation of parameters. Solutions of simple simultaneous ODE's.

Laplace Transforms

Transforms of elementary functions, transforms of derivatives and derivatives of transforms, inverse transforms, transforms of periodic functions, unit step function, shifting theorems, solutions of ODE's using Laplace transforms.

Numerical Methods

Difference operators-forward, backward, central, shift and average operators and relations between them. Newton's forward and backward interpolation: Lagrange interpolation and the error formula for interpolation. Numerical differentiation and integration-Trapezoidal rule and Simpson's one-third rule including error formulas.

Suggested Text Books & References

1. Kreyszig, E., "Advanced Engineering Mathematics", 5th Ed., Wiley Eastern, 1985.
2. V. Krishnamurthy, V., Mainra, V.P., and Arora, J.L. "An Introduction to Linear Algebra", Affiliated East-West, 1976.
3. Boyce and DiPrima, R.C., "Elementary Differential Equations and Boundary Value Problems", 3rd Ed., Wiley, 1977.

ME 121 ENGINEERING THERMODYNAMICS 4(3-1-0)

Fundamentals and Definitions System, Control Volume, properties, state, state change, and diagram, Dimensions and units. Work Mechanics and Thermodynamics definitions, Displacement work at part of a system boundary, Engine Indicator, Displacement work in various quasi-static processes, shaft work, electrical work Heat Temperature, thermal equilibrium, Zeroth law of thermodynamics, sign convention for heat transfer. First Law of Thermodynamics Statement, Application to noncyclic process, Energy, modes of energy, Pure substance, Specific heats, First Law for Control Volumes. Second Law of Thermodynamics Direct and reversed heat engines, Kelvin-Planck and Clausius Statements and their equality, reversible and irreversible processes, Carnot cycle, Thermodynamic temperature scale. Entropy Definition, calculation through T ds relations, T -s diagrams, entropy as a measure of irreversibility Properties of pure substances - Use of steam Tables and Mollier Diagram. Ideal gas Properties of ideal gas and ideal gas mixtures with and without a condensable vapour-psychrometry. Real gas, Equations of state, generalised charts for compressibility, enthalpy changes and fugacity. Second Law Analysis of Engineering Processes Availability and irreversibility and their application in Thermal Engineering.

Suggested Text Books & References

1. Spalding, D. B. and Cole, E.H., "Engineering Thermodynamics", Edward Arnold, 1959.
2. Hawkins, G.A., "Engineering Thermodynamics", John Wiley and Sons, 1955.
3. Van Wylen, G. J. and Sonntag, R.E., "Fundamentals of Classical Thermodynamics", John Wiley and Sons, 4th edition, 1997.
4. Nag, P.K., "Engineering Thermodynamics", Tata McGraw Hill, 2nd edition, 1998.
5. Onkar Singh, & Chandra, "Introduction to Mechanical Engineering – Engineering Thermodynamics & Strength of Material", New Age Publication.

EC 121 BASIC ELECTRONICS 5(3-1-3)

Semiconductor Diodes Introduction, Ideal diode, PN semiconductor diode, Diode equivalent circuits, Zener diode, Light diodes. Bipolar Junction Transistor Introduction, Transistor construction, Transistor operation, Common-base configuration, common emitter and common collector configuration. Field Effect Transistor Introduction, Construction, and characteristics of JFETs, Transfer characteristics, Depletion type MOSFET, Enhancement type MOSFET. Operational Amplifier Introduction, Differential and common mode operation, Constant gain' multiplier, voltage summing, voltage buffer. Semiconductor Devices Introduction of silicon controlled rectifier, GTO, TRIAC, DIAC, .injunction transistors: IGBT. Cathode Ray Oscilloscope Introduction, Cathode ray tube- theory& construction. Electronic Instruments Introduction, Electronic voltmeters, Vacuum type voltmeters, Differential amplifiers, D.C. Voltmeter with direct coupled amplifier, Electronic multimeter. Transducers Introduction, classification and types of electrical transducers. Display Devices and Recorders Introduction, Digital instruments, Digital V s Analog instruments, Recorders- Analog recorders, graphic recorders, strip chart recorders. Data Acquisition Systems Introduction, Components and uses.

BASIC ELECTRONICS LAB

- Characteristics Curve for common base emmitter & common collector transducers.
- Characteristics of field effect transistors.
- Verification of properties of operational amplifiers.
- Study of CRO.
- Study of working of data acquisition system.

Suggested Text Books and References

1. Robert Boylestad & Louis Nashelsky, "Electronic Devices & Circuit Theory", Prentice Hall of India.
2. Milliman & Halkias, "Basic Electronics Principle".
3. Sawhney, A. K., "Electrical & Electronics Measurement and Instrumentation", Dhanpat Rai & Sons.

ME 121 ENGINEERING GRAPHICS-II (M/C DRAWING) 2(0-0-3)

Basic Concepts

I. S. drawing-conventions, line symbols, kinds of line, drawing sheet lay-out, rules of printing, preferred scales.

Projections

Perspective, orthographic, isometric and oblique projections, isometric scale, isometric drawing. Technical sketching.

Shape Description (External)

Multiplanar representation in first- and third angle systems of projections, glass-box concept, sketching of orthographic views from pictorial views, precedence of lines.

Sketching of pictorial (isometric and oblique) views from Multiplanar orthographic views. Reading exercises. Missing line and missing view exercises.

Shape Description (Internal)

Importance of sectioning, principles of sectioning, types of -sections, cutting plane representation, section lines, conventional practices.

Size Description

Dimensioning, tools of dimensioning. Size and location dimensions. Principles and conventions of dimensioning. Dimensioning exercises.

Computer Aided Drafting

Basic concepts and use.

Suggested Text Books & References

1. French and Vireck, "The fundamental of Engineering Drawing and Graphic Technology", McGraw Hill, 4th Ed., 1978.
2. "IS: 696 (1972) Code of Practice for General Engineering Drawing", ISI New Delhi.
3. P.S. Gill, "A Text Book of Machine Drawing", Katson Publishing House, Ludhiana, 1980.
4. Giesecke, Mitchell, Spener, Hill and Dygon, "Technical Drawing", McMillan & Co., 7th Ed., 1980.
5. George Omura, "Mastering AUTOCAD", B.P.B. Publication; New Delhi, 1994.

ME 122 WORKSHOP PRACTICE II 2(1-0-2)

Carpentry

Timber, seasoning and preservation, plywood and ply boards. Engineering applications.

Foundry

Moulding sands, constituents and characteristics, pattern, materials, types, core prints. Role of gate, runner, riser, core and chaplets, causes & remedies of some common casting defects like blow holes, cavities and inclusions.

Metal Joining

Definitions of welding, brazing & soldering processes; and their applications. Oxy-acetylene gas welding processes, equipments, techniques, type of flames; and their applications. Manual metal arc welding technique and equipment, AC and DC welding electrodes, constituents and functions of electrode coating. Welding positions. Type of welding joints. Common welding defects such as cracks, undercutting, slag inclusions, porosity.

Metal Cutting

Introduction to machining and common machining operations. Cutting tool material. Definitions of machine tools, specification and block diagram of lathe, shaper, drilling machine and grinder. Quick return mechanism of shaper. Difference between drilling and boring. Files material and classification.

Forging

Forging principle, materials, operations like drawing, upsetting, bending and forge welding, use of forge parts.

List of Practical

Carpentry Shop

- Preparation of cross lap joints.
- Preparation of bridle joints.

Fitting Shop

Simple exercising involving filing, drilling, tapping and dieing.

Foundry Shop

- Mould of any pattern.
- Casting of any simple pattern.

Machine Shop

Job on lathe with plane turning, taper turning, step turning, chamfering, threading. Study of drilling, grinding; and shaping machine.

Welding Shop

- Preparation of square butt joints by MMA welding.
- Prepare lap joint MMA welding.

COMPUTER PROGRAMMING

Overview of computer components and their function, computer languages, problem analysis, flow charts, decision tables, pseudocodes algorithms, stepwise refinement.

Algorithmic Programming Language

Representation of integers, reals, characters, constants and variables, arithmetic expression and their evaluation using rules of hierarchy. Assignment Statements, Logical constants variables and expression. Control Structures-sequencing alternation, iteration. Arrays Procedures and functions manipulating vectors and matrices. Subroutines and linkages, Data Management. Sample I/O statements, Documentation, debugging. Storage and execution time estimation.

Example from numerical methods like solutions of linear algebraic equations; integration and solutions of differential equations. Also from non-numerical methods like searching, simple string pattern, machining etc.

Suggested Text Books & References

- Sastry SS. "Introductory method of Numerical Analysis", Prentice Hall of India.
- Gerald, C. F "Applied Numerical Analysis", Edition Wesley.
- Gonway, R.Cries D.and Eimerman, R.C. "A Primer on Pascal", Winthrop Publ. Co. Cambridge.
- Rajaraman, V. "Computer Programming in Pacal", Prentice Hall of India.
- Jenson, K. & Wirth, N "PASCAL user Manual and Report", Narusa Publ. House.
- Schneider, G.M. & Bruell, S.c. "Advanced programming and Problem Solving with PASCAL, Wiley Inter Science", McGraw Hill New York.

ENGINEERING ECONOMICS

Microeconomics

Demand Theory & Demand Forecasting, Production Theory, Cost Theory, X-Inefficiency.

Market Dynamics

Forms of Market, Elements of Competition, Perfect Competition, Monopoly & Price Discrimination, Imperfect Competition Oligopoly.

Pricing Policies

Profit Concepts & Measurement, Entry Deterrence Pricing, Predatory Pricing, Implicit Price Fixing, Multiproduct Pricing, Peak Load Pricing, Two part Tariff, Product Life Cycle, Information Problems and Associated Cost.

Firm as an Organization

Objectives of the Firm, Types of the Firm, Firm versus markets, Uncertainty and Risk, Vertical and Horizontal Integration, Diversification, Merges and Takeovers.

Macroeconomics

Macroeconomic Aggregates and Concepts, Simple macroeconomic Models, Business Cycle, Inflation, Unemployment, Input Output Analysis.

Suggested Text Books & References

- Gupta G.S. "Managerial Economics"
- Davis, H. "Managerial Economics", ELBS - Pitman.
- Mote, V.N. Samuel Paul & G.S. Gupta "Managerial Economics: Concepts and Cases", Tata McGraw Hill Co. Ltd. New Delhi.
- Ramakrishnan Rao T.V.S. "Theory of firms: Economic and Managerial Aspects", Affiliated East West Press Pvt. Ltd. New Delhi.
- Joel Dean, "Managerial Economics", Prentice hall.

COMPUTER ORGANISATION

Representation of information

Number systems, integer and floating point representation, character codes (ASCII, EBCDIC), Error detection & correction codes.

Basic Building Block

Boolean Algebra, Combinational logic design, flip-flops, registers, counters, ALU, Arithmetic and Logic Operations, Faster algorithms and their implementation. Organisation of Central Units (Hardwired and Microprogrammed), Microprogramming organisation. Memory types and Organisation. Address decoding and selecting.

Peripheral Devices: I/O devices (tape and disks). Programmed & Interrupt control mechanisms. I/O controllers, Bus bandwidths. Assembly Language Programming. Programmers model of a machine. Example of a typical 16 to 32 bit processor. Registers, Addressing modes, instruction set, use of an assembly language for specific programs for typical programs like: Table Search, subroutines Symbolic and numeric manipulations, and I/O.

Suggested Text Books & References

- Gear, C.W. "Computer Organisation and Programming", McGraw Hill, 1975.
- Tannenbaum, A.S. "Structured Computer Organisation", Prentice-Hall of India.
- Mano, M.M "Computer System Architecture", Prentice-Hall of India, 1983.
- Langholz, G., Grancioni, J. and Kandel, A.L. "Elements of Computer Organisation", Prentice-Hall International, 1988.
- Assembler "Manual for the Chosen Machine".
- Hayes "Computer Architecture and Organisation", McGraw-Hill International Edition.
- Sloan, "F.E. Computer Hardware and Organisation 2nd Edn, Galgotia Publications, Pvt. Ltd.

ELECTRONICS – II

Review of d.c. analysis biasing and bias stability for BJTS: small signal equivalent circuit; linear analysis, multiple stage circuits, biasing of FETS, FET equivalent circuit and amplifiers.

Feedback And Amplifier Classification

Effect of feedback on gain and impedance; emitter and source follower; step response of amplifiers; low frequency response; high frequency equivalent circuit; high frequency response, gain-BW product; effect of feedback on frequency response single and double pole representation; high impedance circuits.

Differential Amplifiers

CMRR; operational amplifiers; applications-summer, integrator, current converter; instrumentation amplifiers, active filters; comparators, Schmidt trigger, square and triangular wave generation. Monostable; Wien bridge and tuned oscillators, OP-amp bias currents and offset voltages, frequency response, measurement of OP-amp parameters, coupled amplifier.

Voltage regulators; regulators in a regulator design; protection circuits; fixed and adjustable regulators; switching regulators.

Class A and Class B power amplifiers; push-pull amplifiers; audio power amplifier ICs like LM 380, distortion in Class AB push-pull amplifiers; Class C amplifiers; power OP-amps and MOSFETS.

Voltage controlled oscillators; IC timer 555; applications .

Suggested Text Books & References

- Millman, J. "Microelectronics", McGraw Hill.
- Taub H. and Shilling, J., "Digital Integrated Circuits", McGraw Hill.
- Millman J. and Halkias, c.c. "Integrated Electronics: Analog and Digital Circuits", Tata McGraw Hill
- Millman J. and Grabel, A. "Microelectronics", McGraw Hill.

MATHEMATICS - III

Complex Variable

Complex number, Argand diagram, complex functions, limit, continuity and differentiability Cauchy-Reimann equations, harmonic functions, construction of analytic functions, by Milne-Thomson method, conformal mapping, transformations $W=Z$, $W=1/Z$, $e^{az+b}/cz+d$.

Fourier Series

Periodic functions, Fourier series of functions with period 2 change of interval, Half range sine and cosine series.

Laplace Transform

Laplace transform, existence theorem, first shifting theorem, multiplication and division by T, Laplace transform of deviated Inverse Laplace transform, Application to solve Linear differential equations.

Unit step function, Dirac delta function - their Laplace transforms, second shifting theorem,

Laplace transform of periodic function, Applications.

Series Solution of Differential Equation

Series solution. Frobenius method, Legendre and Bessels equations.

Partial Differential Equation

Linear and non-linear partial differential equations of first order. four standard forms.

Suggested Text Books & References

- Kreyszig E. "Advanced Engineering Mathematics".
- Prasad C. "Advanced Engineering Mathematics".
- Pati T. "Functions of Complex Variable".

STRENGTH OF MATERIALS

Analysis of Stress: Plane Stress, Stress components associated with arbitrary oriented Faces in plane stress, principal stresses, Maximum shearing stress, Mohr's circle representation of plane stress.

Analysis Strain: Strain components. Strain-displacement relation. Strain components associated with arbitrary sets of axes, Principal strains, Maximum shearing strain, Mohr's circle representation of plane strain, Strain rosettes.

Stress-Strain relations: The tensile test, Elastic stress-strain relations, Thermal Strain, Strain energy in an elastic body, stress-strain relations for composite materials, Poissons ratio, Relations between various elastic constants, Yield criteria.

Statically indeterminate Problems: Composite bars and thermal stresses.

Thin-walled Pressure Vessels: Stresses and deformations in thin cylindrical and spherical vessels.

Torsion: Geometry of deformation of a twisted circular shaft Stress and deformation in twisted circular solid and hollow shafts, Strain Energy due to torsion, Power transmitted by circular shaft.

Shear Force and Bending Moment Diagrams

Stresses due to Bending: Geometry of deformation of asymmetrical beam subjected to pure bending. Bending stress and deformation in symmetrical elastic beams subjected to pure bending, Shear stress in Symmetrical elastic beams transmitting both shear and bending moment, Combined stresses, Short columns.

Deflections due to bending: The moment curvature relation, Integration of the moment curvature relation, Superposition, The load deflection differential equation, Moment-area method, Castigliano's theorem.

Stability of Columns: Elastic stability of flexible columns, Euler's formula, Instability as a mode of failure, Rankine's formula.

Springs: Types of springs. Close-coiled and open-coiled springs.

Suggested Text Books & References

- Crandall, S. H. Dahl N.C. & Lardner, T.J. "An introduction to the Mechanics of Solids", McGraw-Hill Books Co.
- Sharmes, L.H. "Introduction to Solid Mechanics", Prentice Hall of India Ltd.
- Popova, E. "Engineering Mechanics of Solids".
- Singer, "Strength of Materials".
- Gere and Timoshenko, "Mechanics of materials" CBS Publishers.

DISCRETE MATHEMATICS

Formal Logic

Introduction to formal logic, formulas of propositional logic, boolean valuations and truth sets, predicate calculus, quantification, Notion of interpretation, validity, consistency and completeness.

Sets

Sets, operations on sets.

Functions

Ordered pairs, functions and sequences, recursive definitions.

Relations

Relations, partially ordered sets, equivalence relations, composition of relations, closures.

Algebraic Structures

Lattices, semigroups, groups, rings, fields, etc.

Graph Theory

Incidence, degrees, walks, paths, circuits, Euler graphs, hamiltonian paths, trees, spanning tree, network flow, cut-sets, planar graphs, etc.

Combinatorics

Counting techniques -pigeon-hole principle, infinite sets, mathematical induction. Permutations (with repetitions, etc.). Generating functions. Recurrence relations and their solutions.

Suggested Text Books & References

- Mott, J.L., Kandel A. and Baker, T.P. "Discrete mathematics for computer scientists and Mathematicians", Second Edition, Prentice Hall 1986.
- Smullyan, R.M. "First Order Logic", Springer Verlag. 1968.
- Fraleigh, J.B. "A First Course in Abstract Algebra", Narosa 1990.
- Deo, N. "Graph Theory with Applications to Engineering and Computer Science", Prentice Hall of India, 1980.
- Liu, CL. "Introduction to Combinatorial Mathematics", McGraw Hill, 1968.
- Tremblay J.P. and Manohar, R. "Discrete Mathematical Structures with Applications to Computer Science", McGraw Hill, 1975.
- Kolamn, B., Busby R.C. and Ross., S.C., "Discrete Mathematical Structures", Third Edition, Prentice Hall, 1996.

SYSTEM ANALYSIS & DESIGN

Overview

Overview of system analysis and design, Business systems concepts, systems development life cycle, project selection, feasibility analysis, design implementation, testing and evaluation.

Project Selection

Sources of project requests, managing project review and selection, preliminary investigation.

Feasibility Studies

Technical and Economical feasibility, cost and benefit analysis.

System requirement specification and analysis, fact finding techniques, Data flow diagrams, data dictionaries, process organization and interaction, decision trees and tables structural English advanced Modelling methods, ER Diagram & DFDS, Entity relationship model.

Detailed Design

Modularization, module specification, file design, system development involving database. Program Design, Practical Design.

System control and quality assurance, system administration and training, conversion and operation plans, Hardware and Software selection.

Suggested Text Books & References

- Rajaraman, V. "System Analysis and Design", Prentice-Hall.
- Murdic, R.G., Rose, J.E. & Claggett, JR. "Information systems for Modern Management", Prentice-Hall India.
- Wigardes, K., Svensson, A., Sehong, L, A. & Dahlgren, G. "Structured Analysis and Design of Information System", McGraw-Hill Book Company.
- Thomas, R. & Prince "Information systems for Planning & Control".
- Aktas, "Structure Analysis and Design of Information System", Prentice-Hall International.
- Hawrylski, Zbiewy LT. "Introduction to System Analysis & Design", Prentice Hall of India
- Sern J.A. "Analysis & Design of Information System", McGraw Hill.

DIGITAL CIRCUITS DESIGN

Mixed logic representation, design of machine on ROMs and PLANS, interactive networks Digital System structure, pipe lined and serial structure, Process interface design such as numerical control, PLCs, control sequencing use sequencers.

Hardware description languages, programming using HPLs. Firmware based design, design of control units, microprogram design.

Algorithm implementation with digital systems.

Suggested Text Books & References

- J.P. Hayes, "Computer Architecture and Organisation". Iled.
- J.P. Hayes, "Digital System Design and Microprocessor".
- W.I. Fletcher, "Engineering Approach to Digital Design".
- Peatman "Digital System".

DATA COMMUNICATION

Fundamentals of Digital Communication. Communication channel, Measure of information, Encoding of source output, Shannon's Encoding algorithms, Discrete and continuous channel, Entropy coding, Variable length codes, Data compression, Shannon-Hantly Theorem.

Baseband data transmission, Baseband pulse shaping, Inter Symbol Interface (ISI), Binary Baseband PAM, System Many signalling schemes, Equalisation, Synchronisation Scrambler and Unscramble.

Band-pass data transmission system ASK, PSK, FSK, DPSK & PSK, MSK, Modulation schemes coherent and Non Coherent detector, Probability of Error, (PE), Performance Analysis and Comparison.

Error detection and correction codes, Linear Block Encoding, Algebraic Codes, Cyclic Codes, Convolution codes, Best Error, Correcting Codes performance of Codes.

Synchronous and Asynchronous transmission, Modem, serial interface Circuit switching packet, switching, Hybrid switching, Architecture of computer network, OSI model, data communication protocols.

Suggested Text Books & References

- Shanmavgaon, K.S. "Digital and Analog Communication System", John Wiley and Sons.
- Roden, M.S. "Analog and Digital Communication System", P.H.I.
- Scheber, W.L. "Data Communication", MGH.
- Tanenbaum, "Computer Networks".

DATA STRUCTURE & PROG. METHODOLOGY**Programming in C.****Elementary data structures**

Arrays and strings; packing; space arrays; algorithm development; complexity; simple example of algorithm development; recursion.

Sequential Search

Divide and conquer binary search; selection and insertion sort; merge-sort; quicksort; complexity of sorting.

Linear lists - stacks; stack use-postfix notation recursion removal. queues-circular queues.

Linked list-definition on Pascal and C; creation and deletion of nodes; circular and deletion of nodes; circular and doubly linked lists; applications of list.

Graphs and representation sets-UNION and FIND operations; graph algorithms; optimisation and greedy method; minimum spanning tree, shortest path.

Trees, AVL trees; threaded trees; heapsort; tries and B-trees; external search.

Tables and information retrieval; hashing; depth first and breadth first search; examples of backtracking.

String algorithms-pattern search and text editing.

Structured approach to programming step wise refinement approach.

Reasoning about programs, program specification, pre-and post condition, weakest pre-conditions, program assertions, loop invariants.

Programming style-documentation, basic concepts of program testing.

Suggested Text Books & References

- Wirth Niclaus, "Algorithms +Data Structures = Programs", Prentice Hall International, 1978.
- Horwitz, E., and Sahni, S. "Fundamentals of data structures", Computer Science Press. 1978.
- Knuth, D. "The art of computer programming", Vols. 1-2, Addison-Wesley, 1970-80.
- Aho A.V., Hopcroft, and Ullman; J.E, "Data Structures and Algorithms", Addison Wesley, 1982.
- Tanonbaum, A.M. and Augenstein, M.J., "Data Structures with Pascal", Prentice Hall International, 1985.
- Trembley and Sorenson, "Data Structures using Pascal McGraw Hill", 1985.
- Stubbas, D., "Data Structures with Abstract Data Types and Modula 2", Brooks & Cole publications Compo 1987.

SYSTEM SOFTWARE

Machine architecture, instruction set, addressing modes of the chosen machine, arithmetic & logic operations, floating point operations.

C Programming: Review of syntax of C with emphasis on features like pointers. Bit operations, Pre-processors, files.

Assemblers, Cross Assemblers: Two pass assembler design, data structures and algorithms.

Macro Processors: Definitions, nested macro-definitions, macro expansion, conditional macro-expansions.

Linking, Loading, and Relocation, Static and Dynamic linking. Loading and Relocations.

Editors, debuggers, interactive programming environments.

DOS: Introduction to interrupts, structure of the interrupt vector table, interrupt types, software interrupts, Hardware interrupts, interrupts, at a glance, interrupt calls from C, internal structure of DOS, Booting DOS, COM & EXE Programs, BIOS, Memory resident programs. Running Batch files.

Programming Examples of text handling, file management, interface and device driver, programming in C.

Suggested Text Books & References

1. Donovan, J.J., "System Programming", Tata-McGraw Hill.
2. Dhamdhare, D.M., "Introduction to System Software", Tata McGraw Hill publishers. Comp.1986.
3. Michael Tischer "PC System Programming", Abacus.
4. Cooper Mullish "The spirit of C, An Introduction to Modem programming", Jaico Publication, New Delhi, 1987.
5. Dhamdhare, "System Programming and operating system", Tata McGraw Hill.
6. Gottfried, "Programming with C, Schaum series", Tata McGraw Hill.

MANAGEMENT SCIENCE

Principles of Management

Definition and concept of management. Evolution of management thought. Systems approach and Decision Theory approach to management. Process of decision-making.

Functions of Management

Planning: types of plans, major steps in managerial planning. Strategies, MBO. Organisation; nature and purpose, Process of Organisation. Basic Departmentation. Co-ordinating; supervision, communication and direction. Leadership, Motivation. Controlling; nature and purpose, control techniques and information technology. International Management: Japanese Management Vs. U.S. Management Managerial functions in International Business.

Organisation Theory

Group Dynamics: Defining and classifying groups, Group Processes. Group task. Group Cohesiveness.

Conflict Management: Discovery of conflicts, Processing of grievances, conflicts resolution, conflict and intergroup relations.

Stress Management: Nature of stress. Potential Sources of Stress. Consequences strategies.

Suggested Text Books & References

- Koontz, H. and Weihrich, H., "Essential of Management".
- Mathur, S. S., "Principles of Management".
- Agarwal, R.D., "Organisation and Management".
- Robbin. S.P., "Organisational Behaviour".
- Hicks & Gullet, "Organisations: Theory and Behaviour".
- Allen, "Management and Organisation".

FORMAL LANGUAGE AND AUTOMATA THEORY**Finite Automata and Regular Expressions**

Deterministic and non-deterministic finite automata Regular expression, Two-way finite Automata, Finite automata with output, Properties of Regular sets, Pumping lemma, closure properties, Myhill-Nerode theorem.

Context free Grammars (CFG): Derivation trees, Simplification Normal Forms.

Push Down Automata (PDA) : Definitions, Relationship between PDA and Context free Languages (CFL) properties of CFLs properties of CFLs, Decision Algorithms.

Turing Machines: The Turing machine model, Computable languages and functions.

Modification of Turing machines, Church's Hypothesis, Undesirability.

Properties of recursive and recursively enumerable languages, Universal Turing machines, Post correspondence problem, introduction to recursive function theory.

Chomsky Hierarchy: Regular grammars, Unrestricted grammars, Context sensitive languages, Relation between classes of languages.

Suggested Text Books & References

- Hopcroft and Ullman, "Introduction to Automata theory Languages and Computation", Narosa,
- Mishra & Chandra Shekaran, "Theory of Computer Science", Prentice Hall.
- Kohan, "Theory of Computer Science".
- Korral, "Theory of Computer Science".

COMPUTER NETWORKING

Overview of OS I reference model, topology design, Media Access Control Level, Services, Problems and protocols, Practical local area network design and implementation. IEEE LAN Standards, Logical Link Control protocols, HDLC, ALOHA, Slotted ALOHA, FDDI, Client Server model and related software's.

Network Layer level services, problems and protocols. WAN, MAN, interconnection networks related software's TCP/IP, Novel NetWare, Routers, Bridges and Gateways their Practical implementation aspects. X.25, Internet and related software's NETSCAPE and MOSAIC.

Transport layer, services, problems and their protocol.

Brief functioning of upper layers E-mail and other application.

Suggested Text Books & References

Black, "Computer Networks".

Schwartz, "Communication Networks".

Stevens, "UNIX Network Programming".

Dugglas, "TCP/IP and internetworking".

RELATIONAL DATA BASE SYSTEM**Introduction**

Data Base System Concepts and architecture, Data models, scheme and instances, Data independence Data base language and Interface.

Data Modelling Using the Entity-Relationship Model

ER model concepts, Notations for ER diagram, Extended E.R. model, Relation-ships of higher degree.

Relational Data Model and Languages

Relational data Model concepts, constraints, relational algebra. Relational Calculus, Tuple and Domain calculus.

SQL, data definitions queries and up-dates in SQL, QBE, Data definitions, queries and up-dates in QBE.

Example DBMS System (ORACLE/INGRESS/SYBASE)

Basic architecture. Data definitions Data Manipulation.

Database Design

Functional dependencies, Normal forms, First, second, and third functional normal forms. BCNF.

Multivalued dependencies Fourth Normal form. Join Dependencies and fifth Normal form, Inclusion Dependencies.

Query Processing and Optimisation

Algorithms for executing query operations, Heuristics for query optimisations.

Transaction Processing Concepts

Transaction and system concepts, schedules and Recoverability serializability of schedules.

Concurrency Control Techniques

Locking Techniques for concurrency control Time stamping and concurrency control.

Suggested Text Books & References

- Elmasri, Ramex Shamkant B. Navathe, "Fundamentals of Data base Systems".
- Jeffry D. Ulman, "Principles of Data Base Systems", Second Edition Galgotia Pub.
- Date, C.J. "An Introduction to Database System", Vol. I, II & IIIrd, Addison-Welsey.
- Prakash, Naveen., "Introduction to Database Management", Tata McGraw Hill.

OPERATING SYSTEM - I

Introduction

Operating System objective and function. The Evaluation of Operating Systems. Batch, interactive, time-sharing and real time systems. Protection.

Operating System Structure

System components, operating system service, System structure.

Concurrent Processes

Process concept, Principles of concurrency. The Producer/consumer problem, The critical section problem, Semaphores, Classical problems in concurrency, Interprocesses Communication, Process generation, Process Scheduling.

CPU Scheduling

Scheduling concepts, Performance criteria, Scheduling algorithms. Algorithm evaluation, Multiprocessor scheduling.

Dead locks

System model. Dead lock characterization. Prevention, avoidance and detection. Recovery from dead lock Combined approach.

Memory Management

Base machine, Resident Monitor, Multiprogramming with fixed partitions. Multiprogramming with variable partitions. Multiple Base Registers. Paging, segmentation. Paged segmentation, Virtual Memory concept, Demand Paging, Performance, Page Replacement algorithms, Allocation of frames, Thrashing, cache memory organisation impact on performance.

I/O management & Disk Scheduling

I/O Devices and the organisation of the I/O function. I/O Buffering, Disk I/O, Operating System Design issues.

File System

File concept- File organisation and Access mechanism, File Directories, File sharing. Implementation issues.

Suggested Text Books & References

1. Milenkovic M., " Operating System: Concept & Design", McGraw Hill.
2. Tanenbaum, A.S., "Operating System Design & Implementation", Prentice Hall NJ.
3. Silberschatz A. and Peterson, J.L. "Operating System Concepts", Wiley.
4. Stalling, William "Operating Systems", Maxwell McMillan International Editions, 1992.
5. Dietel, R.N. "An Introduction to Operating Systems", Addison Wesley.

MICRO COMPUTER BASED SYSTEM DESIGN

Architecture of 16 and 32 bit microprocessors such as Intel 8086/ 186/1186/ 386/ 486 Motorola 68600/68010/68020 etc.

Comparative studies of the architectures, instruction types, addressing modes, interrupt structure.

Assembly language Programming on available 16/32 bit machine.

Hardware and software interrupt management.

Controllers such as key board, diskette and DMA.

Serial communication controller.

Dynamic RAM and its controller, Back up power for semiconductor memories.

Multiprocessor configurations, Numeric Processor I/O processor.

I/O standards RS 232C, centronics, SCSI, VIME, Ethernet LAN etc.

Suggested Text Books & References

- Hall, V. "Microprocessor and Interfacing", McGraw Hill Publ. Compo
- Lin and Gibson, "Microprocessor System", The 8086/8088 family, Prentice-Hall India.
- Rajalu Govind, IBM PC 4 Clones, "Harware, Trouble shooting and Maintenance", Tata McGraw Hill.
- Norton, "Assembly Language Programming on on PC", BPB Publication.
- Miller, "Assembly Language Programming on PC", BPB Publication.

INTERNET FUNDAMENTAL & APPLICATION

Overview of OSI reference model, topology design, Media access control level, Services, Problems and Protocols, Practical local area network design and implementation, IEEE LAN Standards, Logical link control protocols, HDLC, ALOHA, Slotted ALOHA, FDDI, Client Server model and related software's.

Network layer level services, problems and protocols, WAN, MAN, Interconnection networks and related software's TCP/IP protocol suite, Novel NETWARE, Routers, Bridges and Gateways their practical implementation aspects. X.25, Internet and related software's NETSCAPE and MOSAIC. Transport layer, services, problems and their protocol.

Brief functioning of upper layers E-mail and other applications.

Suggested Text Books & References

- Black, "Computer Networks".
- Stevens, "Unix Network Programming", Second edition.

INTERACTIVE COMPUTER GRAPHICS

Line Generation

Points, lines, Planes, Vectors, Pixels and frame buffers, Vector and character generation.

Graphics Primitives

Display devices. Primitive operations. Display-file structure. Display control text.

Polygons

Polygons representation, Entering polygons, Filling Polygons.

Transformations

Matrices Transformations, transformation routines. Display procedures.

Segments

Segments table. Creating, Deleting and Renaming a segment Visibility, Image transformation.

Windowing and Clipping

Viewing transformation. Clipping. Generalised clipping Multiple windowing.

Interaction

Hardware Input device handling algorithms. Eventhandling Echoing. Interactive techniques.

Three Dimensions

3-D Geometry Primitives, Transformations, Projection, Clipping.

Hidden line and surfaces

Back-face Removal Algorithms, Hiddenline methods.

Rendering and Illumination

Introduction to curve generation. Bezier. Hermite and B-spline algorithms and their comparisons.

Suggested Text Books & References

- Rogers, "Procedural Elements of Computer Graphics", McGraw Hill.
- Newman & Sproule, "Principles of Interactive Computer Graphics", McGraw Hill 1987.
- Harringtons. S., "Computer Graphics", A programming Approach Second Edition McGraw Hill 1987.
- Rogers & Adams, "Mathematical Elements of Computers Graphics", Second Edition McGraw Hill.
- Henary Baper, "Computer Graphics".

LANGUAGE PROCESSORS

Compiler Structure

Analysis - Synthesis model of compilation, various phases of a compiler, Tool based approach to compiler construction.

Lexical Analysis

Interface with input, parser and symbol table, Token, lexeme and patterns. Difficulties in lexical analysis. Error reporting. Implementation. Regular definition. Transition diagrams, LEX.

Syntax Analysis

CFGs, Ambiguity, associativity, precedence, Top down parsing, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence grammars, LR parses (SLR,LALR,LR), Y ACe.

Syntax Directed Definitions

Inherited and synthesised attributes, dependency graph, Evaluation order, bottom up and top down evaluation of attributes, I-and S-attributed definitions.

Type Checking

Type system, type expressions, structural and name equivalence of types, type conversion, overloaded functions and operators, polymorphic functions.

Run Time System

Storage organisation, activation tree, activation record, parameter passing, symbol table, dynamic storage allocation.

Intermediate Code Generation

Intermediate representations, translation of declarations, assignments, control flow, boolean expressions and procedure calls. Implementation issues. .

Code Generation and Instruction Selection

Issues, basic blocks and flow graphs, register allocation, code generation, dag representation of programs, code generation from dags, peep hole optimisation.

Suggested Text Books & References

- Aho, A. V. Sethi R. and Ullman, J.D. "Compilers Principles, Techniques and Tools", Addison-Wesley, 1988.
- Fischer C. and LeBlanc, R.J. "Crafting a Compiler with C, Benjamin Commings", 1991.
- Holub, A. C. "Compiler Design in C", Prentice Hall of India, 1993.

COMPUTER ARCHITECTURE

Prerequisites: Computer Organisation

Review of Pipe lining, Examples of some pipeline in modem processors, pipeline hazards, data hazards, control hazards. Techniques to handle hazards, performance improvement with pipelines and effect of hazards on the performance.

Vector processors- Use and effectiveness, memory to memory vector architectures, vector register architecture, vector length and stride issues, compiler effectiveness in vector processors.

Single instruction multiple data stream (SIMD) architectures, Array processors, comparison with vector processors, example of array processors such as MMX technology.

Advanced pipeline techniques, interaction level parallelism, basic instruction scheduling to avoid conflicts, dynamic scheduling, effect of loop unrolling, branch prediction and their effectiveness in instruction level parallelism, issues of cache design.

Memory hierarchy. Cache Introduction, Techniques to reduce cache misses, techniques to reduce cache penalties, techniques to reduce cache hit times. Effect of main memory bandwidth, effect of bus width, memory access time, virtual memory etc.

RISC architectures, addressing modes, instructions formats, effect of simplification on the performance, example processors such as MIPS, PA-RISC, SP ARC, Power PC etc.

MIMD Multiprocessors, Centralised shared architectures, distributed shared memory architectures, synchronisation and memory consistency models, message passing architectures, comelier issues. Dataflow architectures. Interconnection networks.

World - wide parallel processing projects; Architecture of multiprocessor and multi-computer machines like hypercube, MMS, mesh, CM*, CMP Illiac IV, Monsoon machine;

Dataflow architecture; CM machine; Teraflop computers.

Suggested Text Books & References

- Hwang, K. "Advanced computer architecture with parallel programming", McGraw Hill, 1993.
- Patterson D. A. and Hennessy, J.L. "Computer architecture a quantitative approach", Second Edition, Morgan Kaufmann, 1996.
- Stone, H.S. "Advanced Computer Architecture" , Addison Wecley, 1989,
- Siegel, H.J. "Interconnection Network for Large Scale Parallel Processing", Second Edition, McGraw Hill, 1990.

OPERATING SYSTEM II

(System Administration)

Understand configuration of Hardware, Configuration of Kernel, Setting up of serial Hardware, Configuration of TCP/IP Networking, Name service & Resolve Configuration, Understanding of various Network Application, Management of NIS, Understanding NFS and AFS, Configuration of Mail, Configuration of NNTP/TIN, File System & Quota Management

Reference

LINUX Administration

HPUX Administration Manual

DELALPHA Administration Manual

Tanbaum : Modem Operating System.

ANALYSIS & DESIGN OF ALGORITHMS

Divide and Conquer:

Binary search, Merge sort, Quick sort. Selection-sort.

Greedy Method:

Knapsack Problem, Job sequencing, Optimal merge patterns, Minimum Spanning trees.

Dynamic Programming:

All pairs shortest paths, optimal binary search trees. 0/1 Knapsack Problem, Travelling Sales person problem, Flow shop scheduling.

Search Techniques:

Code optimisation, Depth-first search, Breadth-first-searching.

Backtracking:

The 8-queen problem, Graph Colouring, Hamiltonian cycles.

Branch and Bound:

0/1 Knapsack Problem, travelling Sales person, problem, efficiency.

NP Hard and NP-Complete Problems:

Basic concepts, Cook's theorem, Simple NP-Hard problems.

Suggested Text Books & References

- Horowitz E.& Sahni, S, "Fundamentals of Computer Algorithms", Galgotia.
- Aho, Hopcroft & Ullman, "The Design and Analysis of Algorithms", Addison-Wesley.
- Sedgewick, "Algorithms in C".

SOFTWARE ENGINEERING

Introduction

What is Software Engineering.

Software Development Life-cycle

Requirements analysis, software design, coding, testing, maintenance, etc.

Software Requirements Specification

Waterfall model, prototyping, interactive enhancement, spiral model. Role of Management in software development.

Role of metrics and measurement.

Software Requirements Specification '

Problem analysis, requirement specification, validation, metrics, monitoring and control.

System Design

Problem partitioning, abstraction, top-down and bottom-up design, Structured approach. Functional versus object-oriented .approach, design specification and verification metrics, monitoring and control.

Coding

Top-down and bottom-up, structured programming, information hiding, programming style, internal documentation. Verification. Metrics, monitoring and control.

Testing

Levels of testing functional testing, structural testing, test plane, test casesi6peCiicication, reliability assessment.

Software Project Management

Cost estimation, Project scheduling, Staffing, Software configuration management, Quality assurance, Project Monitoring, Risk management, etc.

Suggested Text Books & References

- Jalote, Pankaj "Integrated Approach to Software Engineering", Narosa 1993.
- Pressman. R. "Software Engineering A Practitioner's Approach". Fourth Edition, McGraw Hill 1997.
- Rumbaugh, I., Blaha, M. Premeralani, W. Eddy F. and Lorensen, W'1'Ql>~t-Oriented Modelling and Design", Prentice Hall of India, 1991, (Reprinted 1997)
- Ghezzi, C. Jazayeri M. and Mandrioli, D. "Fundamentals of Software Engineering", Prentice Hall of India, 1992, (Reprinted 1994)
- Pfleerger, S. L. "Software Engineering", MacMillan, 1987.

OBJECT ORIENTED PROGRAMMING & METHODOLOGY

Object Modelling: Objects, class, Links and associations, Generalisation and inheritance. aggregation, abstract class, multiple inheritance, meta data.

Dynamic Modelling: Events and stages operations, Nest and state diagra trurrency.

Functional Modelling: Data flow diagrams, specifying functions and constraints.

OMT (Object Modelling Technique) Methodology, examples and case studies to demonstrate methodology.

Object Oriented Language C++ (or any other available language such as SIMULA SMALL TALK etc.

Translating object oriented Design into an implementation, examples.

Comparison of Methodologies SAISD, JSD, etc.

Suggested Text Books & References

- Rumbaugh, James Michael Blaha William Premerlani, Frederick, Eddy and William Lorensen, "Object Oriented Modelling and Design", Prentiece Hall India, 1993.
- Dillon T. and Tan, Poh Lee "Object Oriented Conceptual Modelling", Prentice Hall 1993.
- Bergin, Joseph "Data Abstraction: The object oriented approach using C++, McGraw Hill Int. Ed. 1994.

DATA BASE APPLICATION DESIGN

Design Theory for Relational Database

Functional Dependencies, Decomposition of Relation Schemes, Normal for Relations Schemes, Normal Forms for Relations Scheme, Multi valued and other kinds of Dependencies.

Query Optimization

Basic Optimization strategies, Algebraic Manipulation, Optimization of Selections in System, Exact optimization under weak equivalence.

Database Protection

Integrity, Integrity constraints in query-by-example, Security, Security in Query-by example, Security in Statistical Databases.

Concurrent Operations on the Database

Basic concepts, A simple transaction model, A model with Read -and Write-only model, Concurrency for Hierarchical structured items, protecting against crashes, optimistic concurrency control.

Distributed Database Systems

Fragments of relations, Optimization transmission cost by semi joins, Distributed concurrency control, The Optimistic approach, Management of Deadlocks and crashes.

Suggested Text Books & References

- Ullman, I.O., "Principles of Database Systems", 2nd Edn., Galgotia Publications.
- Whittington, R.P., "Database Systems Engineering", Clarendon Press, Oxford.
- Rishe, "Database Design Fundamentals", Prentice Hall Inc.
- Wiederhold, "Database Design", McGraw Hill Book Company.

WEB TECHNOLOGY

History of the web, growth of the web in past decade, protocols governing the web, web applications, security aspects on the web, computational features, encompassing the web. Development of web in India, creating web sites for individuals and corporate world.

Creating window, menus, file handling in window, dialogue boxes, scroll bars, list boxes, mouse techniques, reading key strokes in windows, windows messages, debugging in visual C++, multi document interface (MDI), object linking and embedding (OLE), writing X applications, constructing geographical user interface with X.

Suggested Text Books & References

- Barkakati, N." X window system programming", Prentice-Hall.
- Holzener, Steven "Visual C++ programming", Prentice-Hall.
- Murray and Pappas, "The visual C++ handbook".

VISUAL PROGRAMMING

Foundations of Information Technology

Information concept & Processing

Definition of Information, Need for Information, Quality of Information, Value of Information, Categories and Levels of Information in Business Organization. Data concepts and Data Processing, data Representation-Number System.

Computer Appreciation

Definition of an Electronic Digital Computer, History, Generations, Characteristics and applications of computers, Classification of computers.

Elements of Computers Processing System

Hardware CPU, Peripherals, Storage Media, Software Definition, Role and Categories, Firmware and Human ware.

Computer & Communication

Need for Data Transmission Over Distances, Types of Data Transmission, Media for Data Transmission, Networking of Computers-Introduction of LAN ~ WAN, Client-Server Architecture.

Programming Language Classification

Computer Languages, Generation of Languages, Translators-Interpreters, Compilers, Assembles, Introduction to 4GLS.

Information Technology Applications in India

Scientific, Business, Educational and Entertainment Applications, Industry Automation, Weather Forecasting, Awareness of Ongoing IT Projects in India NICNET ERNET etc.

Suggested Text Books & References

- Rajaraman, V. "Introduction to Computer".

- Morris, "Computer Organization".
- Hamacher, "Computer Organization".
- Kanter, "Managing Information System".

**LIST OF SUGGESTED OPEN ELECTIVES
&
PROFESSIONAL ELECTIVES**

Open Elective

1. Enterprise Resource Management
2. E-Commerce, Strategic IT Management
3. Technology Management
4. Decision Support and Executive information system
5. Software Technology
6. Knowledge Management
7. IT in Marketing Management
8. IT in HR Management
9. IT in Finance Management
10. Project Management and Software Tools
11. Human Values
12. Science Technology and Society

Professional Electives

1. Network Management
2. Enterprise Network Management
3. Distributed Computing
4. Client Server Architecture
5. Relational Data Base System
6. JAVA Programming
7. RISC Architecture
8. Object Oriented Data Base Systems
9. Adv. Microprocessor Architecture
10. Data ware housing & meaning
11. Image Processing
12. Computer Vision & Robotics
13. Real time system
14. CADVLSI
15. GIS and Remote Sensing
16. High Speed Network, Client Server
17. Client Server Computing
18. Mobile Computing
19. Fuzzy and Neural Network
20. Multimedia Application
21. A.I. & Application

Note: The Institutions can frame syllabi of professional electives and p[en electives to be offered by them in the particular area

Open Electives**HUMAN VALUES**

The objective of the course is an exploration of human. values which go into making a "good' human being, a 'good' human society and a 'good life. The context is the work life a nd the personal life of modern Indian professionals.

1. The value—clisis in the contemporary Indian Society.
2. The nature of values: the value spectrum for a ' good 'life
3. The Indian system of values.
4. Material development and its values: the challenge of science and technology .
5. Psychological values: integrated personality; mental health
6. Societal values: the modern search for a 'good' society; justice, democracy, rule of law; values in the Indian constitution.
7. Aesthetic values: perception and enjoyment of beauty
8. Moral and ethical values; nature of moral judgments; canons of ethics; ethics of virtue; ethics of duty; ethics of responsibility.
9. Work ethics; professional ethics.
10. Spiritual values; different concepts; secular spirituality.
11. Relative and absolute values.
12. Human values: humanism and human values; human rights; human values as freedom, creativity, love and wisdom.
13. Management by values: professional excellence; inter-personal relationships at work place; leader ship and team building; conflict resolution and stress management; management of power.

SCIENCE TECHNOLOGY AND SOCIETY

It will be innovative course dealing with social, human and ethical implications of engineering and technology, with special reference to the Indian situation. Its three main components are:

- (i) Social and Cultural history of technology,
- (ii) Social and Human critiques of technology,
- (iii) Engineering Ethics and Professional Ethics.

The proposed course- structure is as follow:

1. Science, Technology and Engineering, as knowledge and as social and professional activities.
2. Inter-relationship of technology growth and social, economic and cultural growth; historical perspective.
3. Ancient, medieval and modern technology/Industrial revolution and its impact. The Indian Science and Technology.
4. Social and human critiques of technology? Mumford and Ellul.
5. Rapid technological growth and depletion of resources. Reports of the club of Rome. Limits to growth; sustainable development.
6. Energy crisis; renewable energy resources.
7. Environmental degradation and pollution. Eco-friendly technologies. Environmental regulations. Environmental ethics.
8. Technology and the arms race. The nuclear threat.
9. Appropriate technology movement Schumacher; later developments.
10. Technology and the developing nations. Problems of technology transfer. Technology assessment impact analysis.
11. Human operator in engineering projects and industries Problems of man machine interaction. Impact of assembly line and automation. Human centred technology.
12. Industrial hazards and safety. Safety regulations. Safety engineering.
13. Politics and technology. Authoritarian versus democratic control of technology. Social and 'ethical audit of industrial organisations.
14. Engineering profession. Ethical issues in engineering- practice. Conflicts between business demands and professional ideals. Social and Ethical responsibilities of the engineer. Codes of professional ethics. Whistle blowing and beyond. Case studies.