

MM 50
Time 2 Hrs
L T P
2 0 0

Sessional 15
Theory 35
Pass Marks 20

EHU 101
Vedic Engineering

Objective: To acquaint students with reservoir of knowledge available in Vedas and their utilities in all round of human life. It also aims to show some of the concepts of engineering available in Vedas.

NOTE : **Ten** questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Definition of Vedic literature, Importance of Vedic Literature, Brief overview of the subject matter of four Vedas. Spiritual education in Vedic literature (40th chapter of Yajurveda)

Unit II Geometry according to Sulba Sutra, Geometry before Sulba Sutra, Vedic Mathematics (Ekadhiken Pooren, Nikhil Navtascharaman Dashatah, Oordhavatriyagyabhyam)

Unit III Concepts of Agricultural, Textile, Mechanical and Aeronautical Engg. in Vedic literature

Unit IV Concepts of Chemical, Civil, Architectural and Earth Science Engg. In Vedic Literature

Unit V Concepts of Electrical, Electronics and Computer Engg. In Vedic literature

Prerequisite: Nil

References:

- 1 Mehta D.D., Positive Sciences in the Vedas, Arnold Heinemann Publishers, Delhi 1994
- 2 Acarya Vaidyanath Sshastri, Sciences in the Vedas, Sarvdeshek Arya Pratinidhi Sabha, Ramlila Ground, Ansari road, Delhi
- 3 Hansaraj, Sciences in the Vedas, Shakti Publications, Ludhiana
- 4 Geal,B.N., The positive Science of the ancient Hindus, Motilal Banarasi Das, New Delhi
- 5 Kulkarni R.P.,Geometry according to Sulba Sutra, Sansodhan Mandal Pune 1989
- 6 Swamisri BharatiKrishna Teeratha ji, Vedic Mathematics, Motilal Banarasidas,Delhi
- 7 Dr. Roop Kishore Shastri, Dharm Darshan Sanskritiy
- 8 Kshemkaran Vedalankar ,Vedic Bhasya

MM 50
Time 2 Hrs
L T P
2 0 0

Sessional 15
Theory 35
Pass Marks 20

ECS102

Introduction to Computers

Objective: To provide a base for computer literacy.

Note: **Ten** questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** **Computer Basics:** A simple model of a computer, Characteristics of a computer, Input and output units of a Computer.
- Unit II** **Computer Memory:** Primary Memory, Secondary Memory: Magnetic Hard Disk, Floppy Disk, CDROM and Magnetic tape.
- Unit III** **Number System:** Decimal, Binary, Octal, and Hexadecimal numbers and their arithmetic (addition, subtraction, multiplication, and division): 1's and 2's complements.
- Unit IV** **Concept of Computing,** contemporary OSs such as DOS, Window, MAC-OS , UNIX (only brief user level description); Files & Directories and their use in different operating system environments
Introduction to the typesetting softwares such as Microsoft office.
- Unit V** **Introduction to Internet:** Getting familiar with Browser programme netscape & explorer, Sending and receiving mail over Internet, Introduction to PINE and/ or ELM

References:

- 1 Rajaraman V.(3/e), Fundamental of Computers, PHI, New Delhi, 1999
- 2 Sanders,D.H., Computers Today, Mcgraw Hill, 1998
- 3 Kris Jamsa, DOS the complete reference, Tata McGraw Hill
- 4 J.Peek Tim O'reilly & M.Locekides, UNIX POWER TOOLS, BPB Publication

MM 50
Time 2 Hrs
L T P
2 0 0

Sessional 15
Theory 35
Pass Marks 20

EME 102/ EME 202

Basic Manufacturing Process

Objective: To acquaint students with fundamental manufacturing concepts and to make them understand the utility of this subject as a core course for Engineering graduates.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Classification of Manufacturing Process, Composition , Properties and uses of wrought iron , cast iron, Malleable iron ,Carbon and alloy steels, Copper, Aluminum, lead, brass, bronze, duralumin, bearing metals, high temperature metals , Properties of metals: Strength , Elasticity , Stiffness , Plasticity, Malleability , Ductility, Brittleness, Toughness, Hardness, Impact Strength, Fatigue.

Unit II **Metal Casting** : Scope of moulding, moulding sands, Principles of metal casting, pattern materials, types and allowances: classification of moulds, roles of gate, runner and riser, core, core box, and core print. Introduction of die casting, permanent mould casting, investment casting, casting defects.

Unit III **Metal Joining:** Welding Principles, Classification of welding techniques, oxy-acetylene gas welding, Arc welding, submerged and atomic hydrogen arc welding, Electric resistance welding, Spot, Seam, Butt welding, Flux: composition, properties and function, Brazing and soldering, types of joints

Unit IV **Machine Shop and Metal Cutting:** Brief description of Lathe, drilling, shaping, planning, milling machines, Cutting tools used and their materials and geometry. Introduction to CNC machines.

Unit V **Metal forming:** Hot and Cold working principles, forging operations, Press forging

Prerequisite: None

Reference:

- 1 Hazra and Chowdhary (11/e), Workshop Technology (Vol 1 and 2), Media, Mumbai, 2000
- 2 B.S.Raghuvanshi (9/e), Workshop Technology (Vol 1 and 2), Dhanapat Rai, Delhi, 2001
- 3 Lindeberg Ray A, (4/e), Process & Materials of Manufacturing, PHI, New Delhi, 1995
- 4 Degarmo, Materials and Processes in Manufacturing, PHI, New Delhi, 2000
- 5 Begmen , Manufacturing Processes

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EME 101/ EME 201

Fundamentals of Mechanical Engineering

Objective: To acquaint students with fundamental concepts in Mechanical Engineering as fundamental course. This includes knowledge about thermal Science and Engineering Mechanics.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt FIVE questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Thermodynamics:** Introduction to SI units, Definition of thermodynamic system, Surrounding and Universe, Quasi static process, Energy interaction Zeroth law, Concept of temperature First law of thermodynamics, Application to closed and open system, Concept of Enthalpy, steady flow energy equation, Throttling process.

Unit II **Thermodynamics:** Second law, reversible and irreversible process, Thermal reservoir, heat engines and thermal efficiency, COP of heat pump and refrigerator, Carnot cycle, Clausius inequality, Concept of entropy, Entropy change for ideal gases.

Unit III **Thermodynamics:** Generation of steam at constant pressure, Properties of steam, Use of property diagram, Process of vapor in closed and open system, Rankine cycle.

Stroke clearance ratio, Compression ratio, Definition and calculation of mean effective pressure (no proof) for air standard cycles (Otto and diesel cycles)

Unit IV **Mechanics:**
Trusses: Plane structure, (Method of Joints and Sections only)
Beams: Bending moment and shear force diagram for statically determinate beams.

Unit V **Strength of Materials:** Simple stresses and strain, strain energy, stress- strain diagram, elastic constants.

Compound stress and strain: state of stress at a point, Simple tension, pure shear, general two dimensional stress system, principal planes, principal stresses and strains, Mohr's stress circle, Poisson's ratio, maximum shear stress

Prerequisite: Fundamental Knowledge of physics up to 10+2 level

Reference:

- 1 Kumar DS (2/e), Thermal Science and Engineering, S.K.Kataria, New Delhi,2001
- 2 P.K.Nag (2/e), Engineering Thermodynamics, TMH, New Delhi,2001
- 3 R.Yadav(7/e), Thermal Engineering, Central Publishing House, Allahabad, 2000
- 4 Shames Irving H.(4/e), Engineering Mechanics, PHI, New Delhi, 1994
- 5 Hibler (1/e), Statics and Dynamics, Pearson Education, Singapore, 2000
- 6 Pytel & Singer (1/e), Strength of Materials, Addison Wesley, 1999

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EPH 101

Engineering Physics I

Objective: To acquaint students with fundamental concepts of Physics useful for engineering students.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Thermodynamics: First law of thermodynamics and its consequences, second law of thermodynamics, Reversible and irreversible processes, Carnot's theorem, Entropy, Conduction of heat, Conductivity of bad conductors, Maxwell-boltzmann statistics and its application, Bose-Einstein and Fermi-Dirac statistics (elementary idea only, no derivation).

Unit II Optics I: Interference: Interference of light, Coherence, Fresnel's Biprism, Interference in thin films & wedge shaped film, Newton's ring, Michelson interferometer.

Diffraction: Diffraction at single slit & Double slits, Plane diffraction grating, Resolving power of Telescope

Unit III Optics-II Polarization: Brewster's Law, Malus law, Double refraction, Nicol Prism, production and analysis of polarized light, Optical activity, Specific rotation, Lorantz Half Shade Polarimeter.

Laser: Spontaneous and stimulated emission of radiation, population inversion, Einstein's A and B coefficients, He-Ne laser.

Unit IV Electromagnetics: Gauss' law and its applications. Maxwell's equations, pointing theorem, electromagnetic wave equation. (elementary idea only, no derivation).

Magnetic induction, Magnetic field intensity, Magnetic permeability and susceptibility, Dia, Para, & ferromagnetic materials (Qualitative idea only) Langevins' theory of dia & paramagnetism, Hysteresis

Unit V Motion of charged particles: Field due to moving charge, Ampere's law, Magnetic force due to current carrying conductor, Motion of charged particle in electric and Magnetic field, Magnetic and electrostatic focusing, Function and block diagram of CRO, Mass spectrometer, Cyclotron.

Prerequisite: None

References:

- 1 Vasudeva AS ,Modern Engineering Physics SChand, New Delhi, 1998.
- 2 Ghatak Ajoy, Optics, TMH, New Delhi, 1999.
- 3 Satya Prakash, Optics, Ratan, New Delhi, 1999
- 4 Brijlal & Subramanayam, Text Books of optics SChand, New Delhi,2000.
- 5 Subramanyam N and Brij Lal(20/e), Text Book of Optics, SChand, New Delhi:, 2001
- 6 Brij Lal and Subramanyam N,(20/e) ,Heat and Thermodynamics, SChand, New Delhi, 2001.

- 7 O.P.Sinha, Text book of Electricity & Magnetism
 8 Arthur Kip, Electricity & Magnetism
 9 K.K.Tiwari, Text book of Electricity and Magnetism, S.Chand, New Delhi, 2001

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EEE101

Fundamentals of Electrical Engineering

Objective: To acquaint students with fundamental concepts in Electrical Engineering and make them able to use these in later courses of Electronics engineering.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I Electrical Circuits:**
 Kirchoff's Laws, Network Theorems (Thevenen, Norton, superposition, maximum power transfer), Sinusoidal voltage and currents average and rms value, form and peak factor. Phase or representation in different forms, concept of impedance , mesh and nodal analysis of D.C. and A.C. circuits, series and parallel resonance, introduction to balanced three phase circuits. Fourier series, analysis of simple circuits with non-sinusoidal excitation.
- Unit II Magnetic circuits:**
 Ampere turns, magnetomotive force, permeability reluctance, composite magnetic circuits, comparison between magnetic and electric circuits. Single phase transformers-principle of working, constructional details, equivalent circuit, open circuit and closed circuit tests, losses regulation and efficiency.
- Unit III DC Machines:**
 Generators and motors, production of voltage and torque, characteristics of dc generators and motors, speed control of dc shunt motors, application of dc generators and motors.
- Unit IV Induction motors:**
 Principle of working, starting, torque-slip curve and applications of three phase induction motors, introduction to single phase induction motors, stepper motors, principles and applications.
- Unit V Electrical Instruments:**
 Principle of working and constructional features of permanent magnet moving coil and moving iron ammeters and voltmeters, electrodynamic wattmeter, induction type single phase energy meter.

Prerequisite: Fundamental Knowledge of Physics up to +2 level.

References:

- 1 Deltro(2/e), Basic Electrical Engineering, PHI, New Delhi, 2001
- 2 W.H.Hayt, Engineering Circuit Analysis, TMH, New Delhi, 2001

3 Nagrath I.J., Basic Electrical Engineering , TMH, New Delhi, 20001

4 E.Huges, Electrical Technology

5 Cotton, Electrical Technology

6 P.Mukhopadhyay, A.K.Pant D.S.Chitore, and Vinod kumar, Elements of Electrical science

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EMA 101

Engineering Mathematics I

Objective: To provide essential Mathematical tools of Calculus to Engineering Students.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt FIVE questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Differential Calculus:** Successive differentiation, Leibnitz theorem, Taylor's & Maclaurin's Expansion, Indeterminate forms, Radius of curvature, Asymptotes, Double points and their classification, Tracing of curves.

Unit II **Partial Differentiation:** Normal to surfaces and tangent plane, Partial Differentiation of functions, Truncation errors, Change of variables, Chain rule, Jacobian, Extrema of function of two and more variables, Method of Lagrange's multipliers.

Unit III **Integral Calculus:** Fundamental Theorem of integral calculus, Differentiation under the integral sign, Double and triple integrals, Change of order of integration, change of variables. Application to arc length, area, volume, centroid and moment of inertia. Gamma and Beta functions, Dirichlet's integral

Unit IV **Differential Equation I:** Review of solution of First order differential equations, orthogonal trajectories, linear differential equations with constant coefficients, Euler- Cauchy equations, Equations of the form $y'' = f(y)$.

Unit V **Differential Equation II:** Solution of second order differential equations by change of dependent and independent variables, Method of variation of parameters for second order differential equations. Simple applications.

Prerequisite: Adequate knowledge of Mathematics of 10+2 level

References:

- 1 Prasad C., A first course in mathematics for Engineers, Prasad Mudranalaya
- 2 Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
- 3 Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
- 4 Gorakh Prasad, Differential Calculus, Pothishala, Allahabad, 1997
- 5 Gorakh Prasad, Integral calculus, Pothishala, Allahabad, 1997
- 6 Piaggio H.T.H., Differential Equations, CBS, New Delhi, 2000
- 7 Shanti Narayan, Differential Calculus, Shyam Lal, New Delhi, 1999
- 8 Srivastava R.S.L., Engineering Mathematics Vol.I

MM 50
Time 3 Hrs
L T P
0 0 3

Sessional 15
Viva Voce 35
Pass Marks 25

EME 151

Engineering Graphics I

Objective: To acquaint students with fundamental concepts in Engineering Graphics to develop the power of imagination leading to understanding of Detailed machine drawings. Also aimed to demonstrate use of Computers in the field of Graphics.

Graphics as a tool to communicate ideas, Lettering and dimensioning, Construction of geometrical figures.

Orthographic Projection: Principles of Orthographic projections, Principle and auxiliary planes, First and Third angle projections. Projections of points, Pictorial view, Projection of lines parallel to both the planes, parallel to one and inclined to other, inclined to both the planes, true length and traces of a line, Projection of planes, traces of planes, angles of inclinations of planes, parallel planes, Projection of solid in simple position, axis or slant edge inclined to one and parallel to other plane, solids lying on a face, Section of solids lying in various positions, true shape of the section, development of lateral surfaces.

Isometric Projection: Principle of isometric projection, Isometric projection using box and offset methods.

Computer aided drawing: Basic Concepts and application

Prerequisites: None

References:

- 1 N.D.Bhatt & V.M. Panchal (42/e), Engineering Drawing, Charotar, Anand, 2000
- 2 P.S.Gill(1/e), Engineering Graphics and Drafting, S.K. Kataria , New Delhi , 2001
- 3 Chandra & Chandra, Engineering Graphics, Narosa, New Delhi, 1999

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

EEE151

Basic Electrical Lab

List of Practical

- 1 Verification of network theorems.
Kirchoff's laws, Maximum power transfer theorem, Superposition theorem.
- 2 Study of Diode and transistor characteristics.
- 3 To study a half wave and full wave rectifier circuit with and without capacitor and filter and determine the ripple factor.
- 4 Measurement of power in three-phase circuit by two-wattmeter method.
- 5 Determination of efficiency of a single phase Xmer by load test.
- 6 Determination of parameters and losses in a single phase Xmer by OC and SC test.
- 7 DC generators characteristics.
(a) Shunt Generator
(b) Series Generator
(c) Compound Generator
- 8 Speed control of DC shunt motor.
- 9 Study running and reversing of a three-phase induction motor.
- 10 Study of a single-phase energy meter.
- 11 To study the various logic gates.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

EPH151

Engineering Physics Lab I

List of Practical

1. To determine the surface tension of liquids by Jaeger's method.
2. To determine the coefficient of viscosity of liquid by Poiseuille's method.
3. To determine the value of mechanical equivalent of heat by Callendar and Barne's method.
4. To determine the thermal conductivity of a bad conductor by Lee's method.
5. To determine the value of Stefan's constant.
6. To determine the focal points, principal points, and focal length of a combination of lenses by Newton's method and its verification.
7. To determine the focal length of a combination of lenses by Nodal method and to locate the position of cardinal points.
8. To determine the dispersive power of the material of the given prism.
9. To determine the wavelength of spectral lines by plane transmission grating.
10. To determine the wavelength of monochromatic light with the help of Newton's ring method.
11. To determine the wavelength of monochromatic light with the help of Fresnel's Biprism.
12. To determine the specific rotation of cane sugar solution by Polarimeter.
13. To determine the resolving power of a telescope.
14. To study the variation of magnetic field along the axis of the current carrying coil and then to estimate the radius of the coil.
15. Calibration of Ammeter and Voltmeter by Potentiometer.
16. To determine resistance per unit length of a C.F. bridge wire and
 - (i) To determine the specific resistance of the material of the given wire using C.F. bridge.
 - (ii) To prepare one ohm coil.
17. To study the Hysteresis curve.

Note: (i) Addition or deletion in the above list may be made by laboratory in-charge with

the approval of the Head of the Department / Principal in accordance with the facility available.

(ii) In practical examination the students shall be required to perform two experiments.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

EME 152/ EME 252

Mechanical Workshop

List of Practical

Carpentry Shop

- 1 To prepare a half T joint of given dimensions.
- 2 To prepare a square pulley of given dimensions.

Moulding Shop

- 3 To prepare a mould of half bearing.
- 4 To prepare a mould using core.

Metal Joining.

- 5 To prepare a butt joint of MS strips using Arc welding.
- 6 To prepare a T joint of MS strips using Oxy Acetylene gas welding.

Fitting Shop

- 7 To prepare a rectangular piece with slant edge of given size from MS flat.

Machine Shop

- 8 To prepare a job on Lathe machine of given shape and size.
- 9 To prepare a job on Shaper machine of given shape and size.
- 10 To prepare a job on Milling machine of given shape and size.
- 11 To prepare a job on CNC train master of given shape and size.

MM 50
Time 2 Hrs
L T P
2 0 0

Sessional 15
Theory 35
Pass Marks 20

EHU 103/ EHU 203 Technical Communication & English

Objective: To provide a base for technical communication.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** Study of Selected literacy texts:
Group A
Science & Human Life J.B.S. Haldane
The Heritage of India A.L.Basham
Water C.V.Raman
Group B
Of Studies Bacon
The civilization of today C.E.M. Joad
Making Writing Simple J.B. Priestley
Process of communication; Technical Written communication, Nature, origin and development of technical written communication, Salient features, Difference between technical writing and general writing.
- Unit II** **Common Errors:**
(I) Articles (II) Prepositions (III) Tenses (IV) Word order (V) Adjectival degrees (VI) Conjunction (VII) Subject Verb agreement
(Note: The question shall have ten sentences. The students shall attempt all the ten with minimum changes. One sentence will have only one error.)
Spoken English:
(1) Phonetic transcription of common English words
(Five words to be attempted out of eight)
(2) Primary stress placement on words
(10 words to be given, No choice, half a mark for each word)
- Unit III** Prerequisite of Scientific and Technical Communication; Fragmented sentences, Parallel construction, element of a series, squinting construction and split infinitive, Modifiers, connectives, antecedents and clause subordination, Dangling participles, gerunds and infinitives, Ellipsis, Coherence, Unity, chronological method, spatial method, inductive method, Linear method, deductive method, interrupted method.
- Unit IV** Business Correspondence: General principles of business correspondence, Ramification of business letters, Letters giving instructions, inquiries and answers to enquiry's, complaints and adjustments, letters urging action, employment letters, applications and resume
- Unit V** Proposal Writing: Proposal: Definition and kinds; Division of formal proposals (front matter, title page, summary/ abstract, table of contents); Statement of request, body statement of problem, background, scope, methodology, advantages and disadvantages; Writing of Scientific and Semi technical articles.
- References:**
- | | |
|---|-------------------------------------|
| 1 An Anthology of English Essays | R.P.Singh (Oxford University Press) |
| 2 Modern Technical Writing | Sherman, Theodore A.(New Jersey) |
| 3 Essentials of Grammar and Composition | Legget, Glenn (Macmillan) |
| 4 The elements of Style | Strunk Jr. (Macmillan) |

- 5 A Text book of Scientific and Technical writing Sharma S.D.(Vikas)
6 English Pronouncing Dictionary Daniel Jones
7 Technical Writing Process and Product Sharon J.Gerson, Steven M.Gerson
8 Business Correspondence and Report writing R.C.Sharma, Krishna Mohan

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EPH-201

ENGINEERING PHYSICS – II

Objective: To familiarize students with the basic principles of Quantum Mechanics and then apply them to areas such as atomic spectra, Laser, Solid state Physics.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Special theory of Relativity**

Michelson-Morley experiment, Inertial & non-inertial frames of reference, Postulates of special theory of relativity, Galilean transformation, Lorentz transformation equation of space and time, length contraction, time dilation, Addition of velocity, Mass energy equivalence.

Quantum Theory : Quantum theory of radiations, Black body spectrum, Planck's law of radiation, Derivation of Wien's law and Rayleigh Jean's law from Planck's law, Photoelectric effect, de-Broglie concept of matter waves, Davisson and Germer experiment, Heisenberg uncertainty principle and its applications, Schrodinger wave equation and its solution for a particle in box.

Unit II **Atomic Models, X-rays**

Rutherford atomic model, Bohr's atomic model and energy level diagram, Vector atom model, Franck-Hertz experiment, Quantum numbers, Production and properties of X-ray absorption, characteristics of X-ray spectra, Moseley law.

Unit III **Nuclear Physics**

Radioactivity, nature of nuclear radiations, law of radioactive disintegration, half life period and mean life time, structure of nucleus, general properties of nucleus, mass defect and packing fraction, nuclear binding energy, semi-empirical mass formula.

Unit IV **Solid State Physics**

Crystal structure, miller indices, separation between lattice planes, different kind of crystal bonding, diffraction of X-rays, Bragg's law & Study of crystal structure by Bragg's spectrometer, formation of energy bands in solids (energy level approach), classification of solids, basic idea of conduction mechanism in semiconductors, fermi energy and origin of band gap (no derivation), Hall effect.

Unit V **Electronics**

Intrinsic and extrinsic semiconductors, characteristics of p-n junction and Zener diode, Diode as rectifier, transistor (NPN and PNP) characteristics, transistor amplifier, current and voltage gain, number systems and logic gates, binary to decimal conversion and vice versa, De-morgan's theorem, Boolean algebra.

Prerequisite: EPH101

References:

- 1 Rajam JB., Atomic Physics, SChand, New Delhi:, 2000.
- 2 Theraja BL ,Basic Electronics Solid State, SChand, New Delhi:,2000
- 3 Beiser Arthur, Concepts of Modern Physics, TMH New Delhi:,1999
- 4 Mani HS, Modern Physics, New Delhi, 1999
- 5 Kittel Charles (7/e) Introduction to Solid State Physics, John Wiley, Singapore, 1996
- 6 Murugesan R(8/e), Modern Physics SChand, New Delhi, 2001
- 7 Kalpan Irving , Nuclear Physics, Narosa, New Delhi, 1998
- 8 Schiff(3/e), Quantum Mechanics, McGraw, Auckland
- 9 P.W.Anderson, Elements of Quantum Mechanics

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EEC 201

Basic Electronics

Objective: To acquaint students with fundamental concepts in Electronics prepare them for their effective uses in advanced courses.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Conduction in semiconductors, Conductivity of a semiconductor, donor and acceptor, impurities, charge densities in a semiconductor, Fermi level in semiconductor having impurities, Diffusion, The continuity equation, Semiconductor diode characteristics, p-n junction as a diode, diode equation and its resistance and capacitance, Zener diode

Unit II Transistor Characteristics: the junction transistor, Common base, common emitter and common collector configurations and their various properties, Transistor Biasing and thermal stabilities, operating point, bias stability, various bias circuits to fix the operating point, compensation techniques

Unit III Small signal low frequency transistor models, two port devices and hybrid models of transistor analysis of transistor amplifier circuits, using h- parameters. Feedback amplifiers and oscillators, Feedback concept in amplifiers, effect of negative feedback on output, input resistance, and band width of an amplifier, Barkhausen criteria.

Oscillators, conditions of oscillations and various oscillator circuits
Unit IV Large signal amplifiers: Class A, Class B, Class C types, transformer coupled power amplified and push pull amplified class B type.

Unit V Rectifiers and power supplies, Half wave and full wave rectifiers, bridge rectifier, ripple factor, Various measuring equipments, C.R.O. and Multimeters.

Prerequisite: Basic Knowledge of Physics up to +2 level.

References:

- 1 Millman J. and Halkins C.C., Electronic Devices and Circuits, McGraw Hill, 1976
- 2 Boylstad and Neshalky, (6/e), Electronic Devices and Circuits Theory, PHI, New Delhi, 2000
- 3 Schilling D.L. and Belove C., Electronic Circuits, McGraw Hill

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS 202

Programming in C

Objective: To introduce the students to the basics of programming with the help of C language.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt FIVE questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Programming Language:** Classification machine code, assembly language, higher level language, fourth generation languages. Importance of C; Basic structure of C programs

Constants, Variables and Data Types: Character set, Keyword and identifiers, constants, data types variables its declaration and assignment, defining symbolic constants.

Unit II **Operators and Expressions:** Arithmetic, Relation, Logical, assignment, Increment and Decrement, Conditional, Comma, Size of operators, Arithmetic Expression and evaluation, Type Conversion, Operator precedence.

Input and Output operation: Reading a character, Writing a character, formatted input, formatted output

Unit III **Decision Making and Branching and Looping:** IF Statement, IF ELSE Statement, Nesting of IF ELSE, SWITCH Statement, GOTO Statement, WHILE Statement, DO Statement, FOR Statement.

Arrays: One-dimensional arrays: declaration, initialization and application. Two-dimensional array: declaration, initialization and application, Multidimensional arrays.

Unit IV **Handling of Character Strings:** Declaring and initializing string variables, Reading strings, Writing strings, Arithmetic operation on strings, comparison of two strings and string handling functions. **Structures:** Structures definition, giving value to members, structure initialization, array of structures, array within structures, structures within structures, structures and functions. **User Defined Functions:** Need for user defined function, Return value and its type, function calls, No argument and No return values function, Argument and No return values functions, argument and return value functions. Handling of non integer function, Recursive, Scope and life time of variable in functions.

Unit V **Pointers:** Accessing the address of the variable, Declaring and initializing pointers, accessing a variable through its pointer expression, pointer increment and scale factor, pointers and array, pointers and character strings. **Preprocessor:** Introduction, Macro Substitution, File inclusion. **File Management in C:** Defining and opening a file, Closing a file, Input/ operation on files, error handling during I/O Operation.

Prerequisites: ECS102

References:

- 1 Byron S.Gottfried , Programming with “C”, TMH, New Delhi, 1997
- 2 Kerighan and Ritchie (2/e), The C Programming language, PHI, New Delhi, 2000

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECH101/ ECH 201

Engineering Chemistry

Objective: To acquaint students with fundamental concepts of Chemistry and to provide information about various application of it in human life in the form of Fuels, Lubricants and water treatment etc.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Chemical Bonding & Periodic properties: Hybridization & shape of molecules involving s, p & d orbitals, partial ionic character dipole moment and its application, H-bond and Vander Waals forces. M.O Theory & its application to diatomic molecules of 1st & 2nd period elements, lattice energy and born haber cycle. Atomic radii, ionization potential, electro negativity, electropositive, electronegativity & their Periodicity.

Solid State and Phase rule: Elements of Symmetry, space lattice and unit cells (for cubic systems only). Types of crystals (Covalent molecular, ionic and metallic). Phase, component and degree of freedom. Applications of phase rule to one component systems (H₂O and S) and two component systems (KI-H₂O system).

Unit II Chemical Kinetics & Photochemistry : Rate, specific rate, molecularity and order of reactions. Pseudo order reactions. Zero and first order reaction. Determination of order, factors influencing rate, rate constant and order, effect of temperature, Arrhenius equation.

Laws of Photochemistry, Quantum yield, Fluorescence, Phosphorescence Chemiluminescence.

Surface Chemistry: Homo and Heterogeneous catalysis and its industrial applications, adsorption of gases on solids, Freundlich adsorption isotherm.

Unit III Lubricants: Principle of lubricants, Types, Lubricating oil, Fraction of crude oil, de-waxing of oil fraction, acid and solvent, refining of lubricating oils, Properties of refined oils (Viscosity, viscosity index, acid value, saponification value, iodine value, pour point, and cloud point, flash point, fire point, slide oxidation number, specific gravity) and their determination, Lubricating greases (semi solids) and their penetration and drop point tests, solid lubricants

Corrosion: Definition and type of corrosion, law of oxide film, growth, different theory of corrosion, Atmospheric corrosion, stress corrosion, soil corrosion

Unit IV Water and Water analysis: Specification of water, Analysis of water alkalinity,

hardness (ETDA method only) of water for domestic use, Water softening-Soda-Lime Process, Ion exchanger (Cation and Anion Exchanger), Numerical problems on Alkalinity, hardness.

Turbidity, Conductance, Solids (filterable, nonfilterable, fixed and volatile) pH, B.O.D., C.O.D., D.O.

Environmental Chemistry: Water pollution, Pollution sources of water, effect of water pollution, air pollution, sources, important air pollutants and their effects. Industrial pollution: Pollutant and their effect, noise, radiation, thermal and agricultural pollution.

Unit V

Fuels: Definition and classification, Combustion and chemical principles involved in it. Calorific value, gross and net calorific value and their determination by Bomb calorimeter.

Solid Fuels: Coke-it's production by Otto Hofmann oven and uses.

Liquid Fuels: Conversion of coal into liquid fuels, Petroleum –it's chemical composition and fractional distillation, Cracking (Thermal and catalytic), Knocking and antiknocking agent, Octane and cetane number.

Gaseous Fuels: Natural gas, Producer gas, water gas, Carburetted water gas, Coal gas, and oil gas.

Nuclear Fuels: Nuclear reactions, Nuclear fission and fusion, Nuclear reactor

Polymers, Plastics and Rubbers: Basic concept and terminology such as monomer, polymers, functionality, thermoplastic, thermosetting plastic, linear, branched cross linked polymers etc. Different definition of molecular weights, industrial application of polymers, addition, condensation and ionic polymerizations.

Prerequisite: None

References:

1. Puri & Sharma(38/e), Principles of Physical Chemistry, Shobhan Lal Nagin Chand & Co., Jalandhar, 2001
2. Bahal & Tuli(24/e), Principles of Physical Chemistry, SChand, New Delhi, 2000
3. Samuel Glastone, Principles of Physical Chemistry
4. S.S.Dara(9/e), Engineering Chemistry, SChand, New Delhi, 2001
5. S.K.Jain(13/e), Engineering Chemistry, Dhanpat Rai, 1999
6. S.S.Dara(3/e), Pollution Control & Environmental Science, SChand, New Delhi, 2000

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EMA 201

Engineering Mathematics II

Objective: To provide essential Mathematical tools of three Dimensional Geometry, Vector Spaces and Infinite series to Engineering Students.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Three Dimensional Gemetry:** Equation of plane, Straight line, Intersection of planes(two and three palnes), Equation of sphere, cylinder, cone, and central conicoids and their simple properties (as far as possible vectors may be used).

Unit II **Vector Spaces and Matrices I:** Definition and elementary properties of vector spaces, Linear dependence and linear independence, bases, subspaces, elementary row/ column operations, Rank of a matrix and its applications.

Unit III **Vector Spaces and Matrices II:** Eigen-values and Eign vectors, Cayley-Hamilton theorem, Diagonalisation of Matrices, Reduction to diagonal form, Reduction of quadratic form to canonical form, Orthogonal, Hermitian, Skew-Hermitian, and Normal matrices.

Unit IV **Solution in Series:** solution in series of second order linear differential equations with polynomial coefficients, Bessel's and Legendre's equations and their solutions, Properties of Bessel function and Legendre's polynomials, Recurrence relations, Generating functions, Jacobi series, Integral representation of Bessel's functions.

Unit V **Convergence of Series:** Ratio, Integral, comparison, Root, Raabe's, Logarithmic, Demorgan, Bertrand and Leibnitz's tests, Absolute and uniform convergence (Weirstrass', Abel and Dirichlet- Abel test). Continuity, Differentiation and Integration of infinite series.

Prerequisite: Adequate knowledge of Mathematics of 10+2 level.

References:

- 1 Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
- 2 Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
- 3 Prasad C., Mathematics for Engineers
- 4 Prasad C., Advanced Mathematics for Engineers
- 5 Shanti Narayan , Text Book of Matrices
- 6 Thomas and Finney, Calculus & Analytical Geometry, Addison Wesley, New York 1998
- 7 Ayres F, Vector Analysis

MM 50
Time 3 Hrs
L T P
0 0 3

Sessional 15
Viva Voce 35
Pass Marks 25

EME 251

Engineering Graphics II

Objective: To apply the concepts of graphics for understanding of machine parts.

- 1 Introduction: Graphic language, classification of drawings, Principles of Drawing: IS codes for machine drawing
- 2 Orthogonal Projections: Drawing and sketching of machine element in orthographic projections, Spacing of views
- 3 Screwed fasteners: Introduction, screw thread nomenclature, Forms of threads, Representation of threads, Bolted joints, Locking arrangements for nuts, Foundation bolts.
- 4 Keys and cotters: Keys, cotter joints
- 5 Shaft Coupling: Rigid and flexible coupling.
- 6 Riveted Joints: Rivets and riveting, Rivet heads, classification of riveted joints
- 7 Conventional Representation: Representation and identification of common machine elements and features. Materials specification
- 8 Blue print reading
- 9 Assembly Drawing: Simple machine assembly, 2 examples
- 10 Computer aided drawing: Drawing of various views and Isometric views

Prerequisites: EME151

References:

- 1 N.Siddeshwar, P.Kannaiah, V.V.S. Shastry, Machine Drawing, TMH, New Delhi, 2001
- 2 K.L.Narayana, P.Kannaiah, K.Venkat Reddy, Machine Drawing, New Age, New Delhi, 1999

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

EPH 251

Engineering Physics lab II

List of Practical

1. To determine the mechanical equivalent of heat by Joule's calorimeter.
2. To determine ECE of Cu using Tangent / Helmholtz galvanometer and reduction factor of the Tangent / Helmholtz galvanometer.
3. To study the series and parallel LCR resonant circuits.
4. To determine the Ultrasonic velocity in liquid.
5. To determine the e/m by magnetron method.
6. To determine the Susceptibility measurement by Quink's method.
7. To study the characteristics of a photocell.
8. To determine the value of Planck's constant by photoelectric effect.
9. To study the Energy band gap.
10. To study the Hall effect.
11. To study the characteristics of PN junction and Zener diode.
12. To study the half wave and fullwave rectifier.
13. To study the regulated power supply.
14. To study the Transistor (PNP and NPN) characteristics.
15. To study the single stage RC coupled amplifier (with and without feedback).
16. To study the nature of polarization of laser light and to verify Malus law.
17. To determine the wavelength of laser light.

- Note:**
- (i) Addition or deletion in the above list may be made by laboratory in-charge with the approval of the Head of the Department / Principal in accordance with the facility available.
 - (ii) In practical examination the students shall be required to perform two experiments.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS252

Basic Computer Lab

List of Practicals

- 1 Practice of all internal and external DOS commands.
- 2 Write simple batch programme.
- 3 Giving exposure to Windows environment.
- 4 File and program management in windows.
- 5 Practice of all UNIX commands.
- 6 Write simple shell script
- 7 Introduction to text editing and word processing.
- 8 Exposure to advance features supported by some editors.
- 9 Write small program using C language like
 - a. Roots of quadratic and cubic equations
 - b. Summation of N natural numbers
 - c. Arranging numbers in ascending and descending orders
 - d. Separation of odd and even numbers etc.

Note: List may be modified according to new software available.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECH151/ ECH251

Engineering Chemistry Lab

List of Practical

- 1 Find out surface tension/ viscosity of given liquid by Stalagmometer/ viscometer.
- 2 Find out percentage composition of Ethanol water mixture by Stalagmometer/ viscometer.
- 3 Find out critical solution temperature of water phenol system.
- 4 Determine the refractive index of given liquid by using Abbe's refractrometer.
- 5 Determine the angle of rotation by polarimeter.
- 6 Find out pH value / normality of given acid by pH meter.
- 7 Find out cell constant / normality of given acid/ base solution by conductivity meter.
- 8 Determine the turbidity of given solution / water sample by turbidity meter.
- 9 Determine the Na⁺ and K⁺ concentration using flame photometer.
- 10 Separate components of ink by column/T.L.C./Paper chromatography.
- 11 Determination of acid value, iodine value, saponification value and specific gravity of oil.
- 12 Determination strength of Oxalic acid/ Mohr salt by KMnO₄/ K₂Cr₂O₇.
- 13 Determination of D.O. by Wrinkler's Method.
- 14 Determination of total, temporary and permanent hardness of water by EDTA.
- 15 Determination of the available chlorine in bleaching powder and to find out the chlorine demand in the given water sample.

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EMA301

Engineering Mathematics III

Objective: To provide essential Mathematical tools of Fourier Series, Integral Transforms, Discrete Transforms, Vector Calculus and Statistics to Engineering students.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Fourier Series:** Fourier series, Dirichlet's condition and convergence. Half range series, Harmonic analysis. Laplace Transform: Laplace transform of elementary functions. Shifting theorems. Transform of derivatives. Differentiation and Integration of transforms. Heavisides' unit step and Dirac Delta functions. Convolution theorem. Solution of ordinary linear differential equations used in Mechanics, Electric circuits and Bending of beams.

Unit II **Fourier Transforms:** Definition of Fourier transform, Fourier sine and cosine transforms. Fourier integral formula. Applications to solutions of boundary value problems.

Unit III **Z- transform:** Definition, Linearity property, Z-transform of elementary functions, Shifting theorems, Initial and final value theorem, Convolution theorem, Inversion of Z-transforms, Solution of difference equations by Z transforms.

Unit IV **Vector Calculus:** Differentiation of a vector. Scalar and vector fields. Gradient, Divergence, Curl and their physical meanings. Differential operator and identities. Line, Surface and Volume integral. Green's theorem in plane. Gauss and Stokes theorems. Simple applications.

Unit V **Statistics:** Axiomatic definition. Mathematical expectation. Moment generating functions. Binomial, Poisson and Normal distributions. Correlation and Regression.

Prerequisite: None

References:

- 1 Prasad C., A first course in Mathematics for Engineers,
- 2 Prasad C., Advanced mathematics for Engineers
- 3 Schaum outline Series, Integral Transform, TMH
- 4 Grewal B.S., Higher Engineering Mathematics, Khanna, New Delhi, 2000
- 5 Brancewel, Fourier Transforms and their applications, McGraw
- 6 Kreyszig E., Advanced Engineering Mathematics, John Wiley, New York, 1999
- 7 Ayres F., Vector Analysis
- 8 Kapur & Saxena , Mathematical Statistics

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EMA302

Discrete Mathematical Structure

Objective: To introduce the students to the basic concepts of Discrete Mathematics.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Sets and propositions:** Introduction. Combination of sets, Finite and Infinite sets, Uncountably Infinite sets, Mathematical Induction, Principle of Inclusion and Exclusion. Propositions.

Unit II **Relations and Functions:** Introduction. Relation, Properties of primary relations, Equivalence relations and partitions, Partial ordering relations and lattices. Functions and the Pigeonhole principle.

Unit III **Graphs and Planer Graphs:** Basic terminology, Multigraphs and weighted graphs, Paths and circuits, Shortest paths in weighted graphs. Eulerian Paths and circuits, Hamiltonian paths and circuits, Planer Graphs.

Unit IV **Trees and Cut sets:** Trees, Rooted trees, Path lengths in rooted trees, Prefix codes, Spanning trees and cut sets. Minimum spanning trees.

Unit V **Generating Functions and Recurrence Relations:** Introduction. Manipulation of numeric Functions, Generating functions, Recurrence relations, Linear Recurrence relations with constant coefficients. Homogeneous solutions, Particular solutions, Total solutions. Solution by the method of generating functions.

Prerequisite: None

References:

- 1 Liu,C.L(2/e)., Elements of Discrete Mathematics, TMH, New Delhi, 2000
- 2 J.P.Tremblay and R.Manohar , Discrete Mathematical structures with application to Computer Science, McGraw, Singapore, 1988
- 3 Kolman & Busby(3/e), Discrete Mathematical structures for Computer Science, PHI, New Delhi, 2001

MM 100
Time 3 Hrs

Sessional 30
Theory 70

EEC-303 ELECTRONIC DEVICES AND CIRCUITS

Objective: The objective of this course is to expose the students to the working principles of various semiconductor devices and their circuit application.

NOTE- Ten questions are to be set taking two questions from each unit. The student has to attempt FIVE questions selecting *one question from each unit*. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT-I

Basic material properties of semi-conductors; Governing factors for Fermi-Level; Carrier concentration and carrier mobility; Recombination and carrier life time; Carrier drift; Diffusion and continuity equation.

UNIT-II

Quantitative analysis of p-n diode characteristics and equivalent circuit; Schottky barrier diode; Ohmic contact; BJT models-low-frequency and high frequency hybrid models, Ebers-Mill model.

UNIT-III

Transients in diodes and transistors; low and high frequency models of JFET; MOS devices NMOS, PMOS and CMOS.

UNIT-IV

Transistor biasing schemes and operating point stabilization; coupling schemes for multistage amplifiers; Wide band amplifiers; Power amplifier.

UNIT- V

Feedback concepts; Analysis of negative feedback amplifiers; Condition for oscillation; Analysis of various oscillators.

BOOKS RECOMMENDED :

1. Millman. J, and Halkies, c.c.---Integrated Electronics-McGraw Hill.
2. Ryder, J.D.---Electronic Fundamentals & Applications-Prentice Hall.
3. Millman J., and Taub H.---Pulse, Digital and Switching Waveforms-McGraw Hill.
4. Robert Boylestad & Louis Nashelsky (6/e), Electronic Devices and Circuit Theory, Prentice Hall of India, New Delhi,2001

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EEC-304

DIGITAL ELECTRONICS

OBJECTIVE : To course is intended to acquaint the student with the fundamental principles of two-valued logic and various devices that are used to electronically implement operations on variables adhering to the laws of this two-valued logic. At the end of the course, the students should be able to comprehend the various building blocks in the design of a microprocessor/ digital computer.

NOTE- Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT-I

Introduction to Boolean Algebra, Identities logic functions, Truth table verification of various gates, Realization of Switching functions with gates.

UNIT-II

K. Map representation upto 4 variables simplification and realization of various functions using various gates, Combinational logic and design procedure.

UNIT-III

Combinational logic with MSI and LSI: Magnitude Comparator, Decoder, Multiplexer's, demultiplexers Encoders.

UNIT-IV

Flip Flops and Timing Circuits, S-R latch gated latches, Edge triggered Flip flops, Master-slave Flip flops, Conversion of flip flops, shift registers.

UNIT-V

Counters: Asynchronous and Synchronous Counters, Two bits and four bits up and down counters and their design, Design of asynchrony counters.

References:

- 1 M.Morris Mano, (2/e), Digital Design, Prentice Hall, New Delhi, 1998
- 2 A.Anand Kumar, Fundamentals of Digital Circuits
- 3 Taub H. & Schilling B., Digital Integrated Electronics, Mc Graw, Singapore, 2001
- 4 Greenfield J.D., Practical Digital Design using ICs, JohnWiley
- 5 Z.Khoavr, Switching and finite Automata Theory

MM 100
Time 3 Hrs

Sessional 30
Theory 70

EEE 301/ECS301 Control System Engineering

Objective: This course is designed to introduce the concepts of modeling, analysis and design of simple linear and nonlinear systems.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Historical Development, Introduction to system concepts, Model classification, Basic concepts of open and closed loop control system and their properties, Types of feedback and their properties.

Introduction to linear and non-linear mathematical modeling of physical system, Transfer function and block diagram algebra, Properties of transfer function, Signal flow graph and mason's gain formula

Unit II State space representation of physical systems and their properties, Diagonalization, Solution of State equations, Concept of controllability and Observability state variables and linear discrete time system.

Unit III Time response analysis, Test signals, Time response of first and second order system, Steady State Error, Design specification of second and third order system, Time response analysis of discrete data system, Steady state error analysis, relation between characteristics equation and transient response.

Unit IV Introduction to stability of continuous and discrete data system, Routh and Hurwitz stability criterion, root locus technique, bode plot, relation between time response and frequency response, Nyquist stability criterion controller, compensator and design of control system.

Unit V Optimization Concept, Introduction to search techniques linear Programming, Introduction to nonlinear and optimal control systems.

Prerequisite: None

References:

1 Nagrath and Gopal,(3/e), Control System Engineering, New Age, New Delhi, 2001

2 Ogata, Modern Control Engineering, PHI, New Delhi, 2001

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS302/ ECS404

Data Structure

Objective: To prepare the students towards the use of object oriented design using complex data structures in programming.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Introduction to Algorithm Design and Data Structure:** Design & analysis of algorithm, Top-down and Bottom-up approaches to algorithm design, Analysis of Algorithm, Frequency count, Complexity measures in terms of time and space
Arrays, Stacks and Queues : Representation of Array (Single & Multi Dimensional Arrays), Address Calculation using column & row major Ordering, Representation of Stacks & Queues Using Arrays and their operations, Circular Queues, Applications of Arrays, Stacks & Queues; Conversion from Infix to Postfix & Prefix and Evaluation of Prefix expressions using Stack.

Unit II **Linked List :** Singly linked list (operations on list), Linked stacks and queue, Polynomial representation and manipulation using linked list; **Applications :** Reading and Writing polynomials, Polynomial addition. Circular Linked list and doubly linked list, Generalized list.

Unit – III **Trees :** Logical level of binary search tree, BST traversal methods (Preorder, Postorder and Inorder), Recursive and non- recursive algorithms for traverse methods, Insertion into and deletion from a BST and their implementation. Height balanced (AVL) trees: Definition, Insertion of a node, Deletion of a node, The height of an AVL tree; B- tree (Insertion and Deletion algorithms).

Unit IV **Searching and Sorting :** Sequential & binary searches;
Hashing schemes: hashing, Hash functions, Collision functions, Open addressing (Linear probing and modification), Chaining; Sorting methods (Insertion, selection, Bubble, Quick, Merge and Heap sorts).

Unit V **Removal of Recursion :**General Method of removal of recursion; Recursion removal by folding Nonrecursive quick sort; Stackless recursion removal: merge sort **Threaded binary tree :** Introduction, Threads, Inorder, preorder and postorder traversal, Insertion in Threaded tree; **File System :** Files, File Organizations, File Operations, File system, File Directories; Various approaches of File Organization : Sequential file, Relative file and Indexed sequential file organizations.

Prerequisite: Knowledge of Programming in C

References:

- 1 Kruse, Leung and Tondo, Data Structures and Program Design in 'C', PHI, New Delhi, 1994
- 2 Ellis Horowitz and Sartaj Sahani, Fundamentals of Data Structures, Galgotia, New Delhi, 1998

MM 50

Sessional 15

Time 2 Hrs
L T P
0 0 2

Practical 35
Pass Marks 25

EEEC351

Advanced Electronics Lab

List of Practical

- 1 To study the characteristics of FET/ MOSFET/ UJT.
- 2 To study 8 bit and 4 bit analog to digital and digital to analog converter.
- 3 To study the characteristics and parameter of op-amp.
- 4 To study the op-amp as a comparator, Schmitt trigger and as a active Filters.
- 5 To study op-amp as a V to F and F to V converter and as a differentiaton.
- 6 To study the op-amp as a Voltage to current and current to voltage converter.
- 7 To study the op-amp as a buffer amplifier and a difference amplifier.
- 8 To study op-amp as multi vibratos.
- 9 To study op-amp as a pulse generator.
- 10 To study the UJT relaxation oscillator.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS 351/ ECS454

Data Structure Lab

The in charge of lab will decide the programs to be made based on the theory of the subject.

MM 50
Time 2 Hrs
L T P
0 0 2

Pass Marks 25

ECS 360

Seminar

Objective: To increase the communication ability of students and to prepare them for presenting seminars on advanced topics of their branch.

The students will be required to deliver a seminar on a topic of general interest in or any advanced topics related to the theory papers studied. The topic will be decided by mutual concern of faculty in charge and student.

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EMA401/ EMA501

Numerical Analysis

Objective: To expose the students to various Numerical methods for solving a variety of problems and to develop their skills in numerical computation by working on numerical examples with the awareness of different types of errors involved.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** **Errors in numerical computations:** Absolute, relative, round-off and truncation errors. Significant digits.
Algebraic and Transcendental Equations, Numerical solution, Method of bisection, Newton-Raphson iteration, Direct iterative method, convergence.
- Unit II** **Interpolation:** Finite differences operators, and other operators, Gregory-Newton, Stirling and Bessel and Lagrange's formula. Errors in interpolation. Divided differences.
- Unit III** **Numerical Differentiation and Integration:** Newton- Cotes formula, Gaussian Quadrature formula. Extension of Trapezoidal and Simpson, rules to multiple integration.
- Unit IV** **Linear Simultaneous Algebraic Equations:** Gauss elimination, Jacobi's and Gauss- Seidal methods, Largest eigen value and corresponding eigen vector. Relaxation techniques
- Unit V** **Ordinary Differential Equations:** Taylor, Eulers, Picard, Runge-kutta, Adams-bash Forth and Milne's method. System of ordinary differential equation, Partial Differential Equations: Numerical solutions by difference Laplace Equations, Laplace and poisson equations by finite difference method.

Prerequisite: Nil

References:

- 1 Jain, Iyengar , Numerical Methods for scientific & Engineering Computation, Wiley ,1987
- 2 Grewal, B.S., Numerical Methods in Engineering & Sciences, Khanna, New Delhi,
- 3 Balaguruswamy, Numerical Methods, TMH
- 4 Sastry, Introductory Method of Numerical Analysis, PHI
- 5 Vendamurthy , Numerical Methods, Vikas
- 6 Flowers, Numerical Methods in C++, Oxford
- 7 C.F.Gerald (5/e), Applied Numerical Analysis, Addison Wesley, 1994

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EEC407/ EEC603

Switching Theory and Logic Design

Objective: To develop the skill of logic and design studied in digital electronics.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt FIVE questions selecting *one question from each unit*. The previous year papers/ mode paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper. _ _

UNIT-I

Arithmetic circuits, Half and Full adder and circuits, parallel binary adder, IC 7483-4 bit parallel binary adder, and 4 bit parallel binary subtractor, 4 bit serial adder/subtractor, BDC adder, Binary multiplier, and Binary divider.

UNIT-II

4 bit magnitude comparator (IC-7485), Cascading of IC 7485, Synchronous Sequential logic, analysis of clocked sequential circuits, state reduction and assignment, Design procedure of counters, using IC's, Design with state equations.

UNIT-III

Sequential Machines, Finite state model, memory elements, D,T, S-R, J,K, F.F., Synthesis of Synchronous Sequential circuits, serial binary adders sequential detectors, Counters, iterative networks, analogy between iterative networks, and sequential machines, design of sequence detector using iterative networks.

UNIT-IV

A synchronous sequential circuits, design of fundamental mode Asynchronous sequential circuits, and realization using D Flip Flops, T,K, f, F, Design of Pulse Mode Asynchronous Sequential circuits.

UNIT- V

Algorithmic State Machines (ASM) ASM chart, Timing consideration, control implementation, Design with multiplexer, Asynchronous, Sequential logic circuits

Prerequisite: EEC302

References:

- 1 Shiva S.S, Introduction to Logic Design, Scott Foresman and Company
- 2 Hill F.J. and Peterson, GR, Introduction to Switching Theory and Logic design, John Wiley
- 3 Friedman, A.D. & Memon, F.R., Theory and Design of Switching Circuits, computer Science
- 4 D.Lewin, Logic Design of Switching Circuits, ELBL and Nelson
- 5 Lee S.C, Modern Switching Theory and Digital design, PHI
- 6 M.Morris Mano, Digital Design, PHI
- 7 Zvi Kohavi, Switching & Finite Automate Theory, PHI

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS 405

Computer Architecture and Organization

Objective: To introduce students to the basics of computer architecture and the organization of the various parts of the computer system.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT-I

Basic Computer System, Architecture, Architecture and advanced Architecture, inter register data transfer, Arithmetic, logic and shift micro instructions, control function.

UNIT-II

Introduction, Assembly language, addressing methods, Computer instructions, Codes, timing, Control and execution, stack handling.

UNIT-III

CPU organization, Processor bus organization, ALU multi bus control unit-sequencing of control signals.

UNIT- IV

Control memory, Micro programs, and instructions, peripheral devices, I/O interfaces, synchronous and asynchronous data transfers, synchronous and asynchronous data transfers, I/O processors, multiprocessors, and data communication systems.

UNIT- V

Hardwired and Micro program control Main memory organization, Hierarchical structures, Virtual memory, Memory management, Hardware, CISC and RISC machines.

Prerequisite: Introduction to Programming

References:

1. M. M. Mano ,Computer Architecture, PHI 1998.
2. William Stallings, Computer Organization and Architecture, PHI, 1998.
3. Hamachar V.C.etal (4/e), Computer Organization, McGraw Hill,1996

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS 402

System Software

Objective: The objective of this course is to familiarize students with basic functioning of System software provided with the machine.

NOTE: **Ten questions** are to be set taking **two questions from each unit**. The student has to attempt FIVE questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Introduction: Classification of software, classification of system software on the basis of purpose; Machine structure: Von Neumann machine structure, Machine architecture-memory, registers, data formats, Instruction formats, addressing modes, Instruction set, Input & output etc.; architecture of real machines- SIC, RISC, CISC.

Unit II Compiler: Functions (tasks) of a compiler; general idea of compiler phases; Machine dependent/Independent features; Statement of problems: recognize basic elements, recognizing Syntactic Units and Interpreting Meaning, Intermediate form, storage allocation, code generation; Generate- tokens, symbol table, parse tree, Intermediate code, quadruples, triples; Compiler design options- division into passes, Interpreters, P-code compilers, compiler-compilers.

Unit III Assemblers: Basic assembler functions; a simple assembly scheme; assembler design data-structure; Machine dependent/Independent features; assembler design options- one pass assembler, algorithm on first pass, two pass assemblers; discussion of real machine assembler- MASM, SPARC, AIX.

Unit IV Macro Processors: Need of macros, definition of macro & call, basic macro processor functions; Machine dependent/ Independent features; Features of a macro facility-arguments, nested macros etc; design of macro processor and its data structure; single-pass and two pass macro processors; Implementation within assembler.

Unit V Loaders: Basic loader functions; Machine Independent features; loader schemes- compile & go, general , absolute, direct-linking; other loader schemes- binders, linking, loaders, overlays, dynamic binders.

Prerequisite: Fundamentals of computer; general idea of operating system.

References:

- 1 Beck L.L. (3/e), System Software, Addison Wesley, 1997.
- 2 Calinagaert, P., Assemblers, Compilers & Program Translators, Pitman Publications, 1979.
- 3 Donovan J.J. System programming, McGraw Hill.
- 4 D.M. Dhamdhare (2/e), system Programming & Operating Systems, TMH, 1999.
- 5 Aho Ullman, Principles of Compiler Design, 1999.
- 6 Rajaraman V., Radhakrishnan T., Assembly Language Programming for the IBM PC, 1998.

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS 403/ ECS505

Object Oriented Programming Using C++

Objective: To make the students learn object oriented style of computer programming and using it with help of C++.

NOTE: Ten questions are to be set taking two questions from each unit. The student has to attempt FIVE questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Objects, relating to other paradigms (functional, data decomposition), basic terms and ideas (abstraction, encapsulation, inheritance, polymorphism)

Review of C, Difference between C and C++, Cin, Cout, new deleted operators.

Unit II Encapsulation, information hiding, abstract data types, object & classes, attribute methods. C++ class declaration, state identity and behaviour of an object, constructors and destructors, instantiation of objects, default parameter value, Object types, C++ garbage collection, dynamic memory allocation, metaclass/ abstract classes.

Unit III Inheritance, Class hierarchy, derivation-public, private & protected; aggregation, composition Vs classification hierarchies, polymorphism, categorization of polymorphic techniques

Unit IV Method polymorphism, polymorphism by parameter, operator overloading parametric polymorphism, generic function- template function, function name overloading, overriding inheritance methods, run time polymorphism

Unit V Standard C++ classes, using multiple inheritance, persistent objects, stream and files namespace, exception handling, generic classes.

Prerequisite: Nil

References:

- 1 C++ Primer S.B.Lippman & J.Lajoie (Addison Wesley)
- 2 Object Oriented Programming with C++ E.Balagurusamy (TMH)
- 3 Object Oriented Programming using C++ R.Lafore (Galgotia)
- 4 G.Booch (2/e), Object Oriented Design & Applications, (Bengamin, Cummings)

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

EHU401/EHU502/EHU801
INDUSTRIAL ECONOMICS AND MANAGEMENT

OBJECTIVE: The course aims at knowing 1)How the micro and macro economic principles are useful for firms' decision making purposes, 2)The latest trends in banking, 3)The maintenance of accounts by business firms and also countries engaged in international trade, 4)and also how the basic & general management concepts (with emphasis on marketing and personnel) are helpful for managerial purposes.

Note : **Ten** questions are to be set taking two questions from each unit. The student has to attempt FIVE questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I INDUSTRIAL ECONOMICS :
Elasticity of demand and supply -Demand forecasting methods -consumption laws -Types of competitions -Time elements -Break even analysis -National income accounting -Keyenesion employment theory -Multiplier and accelerator -Trends in industrialisation in India -Economics of sale -Production, planning and control.

Unit II MONEY ,BANKING AND FINANCIAL MANAGEMENT
Nature and functions of money -Functions of commercial and central banking -Credit creation in the banks " Balance of payment and trade -The problem of foreign exchange -Exchange control - Devaluation and Revaluation -Source of industrial finance -Principles of accounting -Preparation of balance sheet - Cash flow statement - Management accounting.

Unit III PRINCIPLES OF MANAGEMENT
Managerial functions -Scientific management -Merits and demerits of different types of business organization - Advanced techniques in management: MBE,MBO,MBC,MBP ,MIS -Quantitative techniques in management.

Unit IV MARKETING MANAGEMENT
Marketing definition -Market research -Need for marketing -Sales forecasting -Product life cycle Market segmentation.

Unit V PERSONNEL MANAGEMENT AND INDUSTRIAL PSYCHOLOGY
Selection and recruitment -Training and development ..Job evaluation and merit rating -Fatigue - Accidents -causes and prevention -The concepts of industrial relations and causes of industrial disputes -Worker participation -QWL -Quality work life.

References:

1. Dewtt. K.K., 'Modern Economic Theory" S.Chand & Co (r)Ltd(r) 1999 Edn.
2. Burtoon Genie, Thankur Manab(r), 'Management Today', TMH-1996 Edn.
3. Nair N.G., Latha Nair, 'Personnel Management and Industrial Relations', S. Chand & Co. Ltd., 1999 Edn,
4. Craig Peterson H & Cris Lewis W, 'Managerial Economics' PHI-1996(r) Edn.
5. Kooutsnnis, 'Modern Economic Theory', PHI, 1996 Edn.
6. Maheswari S.N.: 'An Introduction to Accountancy' Vikas Publishing House Pvt (r) Ltd 1999 Edn.
7. Robbins(r) P .Stephen, Coutter Mary, 'Management' PHI 1998 Edn..

8. Koontz Harold, O Donnel Cyril, Weihirch Heinz, 'Management', TMH-1983 Edn.

9. Cascaio F.Wayne, 'Managing Human Resources', Mc Graw Hill, Inc(r) 1995 Edn.

MM 50

Time 2 Hrs

L T P

0 0 2

Sessional 15

Practical 35

Pass Marks 25

ECS451

Numerical Analysis Lab

Write Programs in C

- 1 To deduce errors involved in polynomial interpolation.
- 2 Algebraic and transcendental equations using bisection, iterative, method of false position, also give rate of conversions of roots in tabular form for each of these methods.
- 3 To implement Bessels function, Newtons, Striling, Langranges.
- 4 To implement method of least square curve fitting.
- 5 Implement numerical differential using trapezoidal, Simpson 3/8 rules.
- 6 To show frequency chart, regression analysis. Linear square fit and polynomial fit.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

EEC 451

Digital Electronics Lab

List of Practical

- 1 To verify the truth tables of various types of gates(IC7400,7402,7404,7408,7432,7486,LED etc.)
- 2 To design and observe the output of TTL clock circuit for high and low frequencies using NAND gates.
- 3 Design and test the switch- debounce using NAND gates.
- 4 To study a mono stable multi vibrator(IC74121 and IC74123) circuit design and test its performance.
- 5 To design and test various circuit using IC 555 timer (Astable multi vibrator).
- 6 To design and test a S-R flip flop using NOR/ NAND gates and to verify the truth table of J-K flip flop(IC7476).
- 7 To design and test D flip flop using gates and S-R flip flops.
- 8 To study the operation of 7490 and 7493 counters and construct a mod-6 counter using IC7493.
- 9 To verify the truth table of multiplexer(IC 74150).
- 10 To verify the truth table of demultiplexer(IC 74154).
- 11 To verify the table foe decoder driver 7447/ 7448 and to operate a 7- segment display through a counter using a low frequency clock.
- 12 To fabricate & test half and full (IC74831) adder and verify their truth tables.
- 13 To verify the truth tables of ALU using IC 74181.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS 453/ ECS554

Object Oriented Programming Lab

Programming exercise on the following topics.

Functions in C++, parameter passing, call and return by reference, friend functions, inline functions, function overloading.

Classes and objects: arrays within a class, memory allocation for objects, static members, returning objects, constructor and destructors, operator overloading.

Inheritance: derived classes, single and multiple inheritance, hierarchical inheritance, constructors in derived classes, classes containing objects of other classes.

Polymorphism: pointers to objects, this pointer, pointer to derived classes, virtual functions.

Templates: class and function templates, template arguments, exception handling; use of files, learning to use Visual C++ environment.

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS 501/ ECS608

Theory of Automata & Formal Languages

Objective: To expose the students to the concepts of theory of computations.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** **Introduction:** Sequential machine and automata, abstract, machine and languages, Deterministic and non deterministic finite automata, Finite state machine as transducer, static tables & diagrams, Mealy & Moore automata, pumping lemma closure properties, Myhill – Nerode theorem, Formal grammars and their classification, ambiguity.
- Unit II** **Finite State Acceptors:** Regular sets and regular expressions, deterministic & non deterministic FSA. Properties of finite state languages. Limitations of finite automata. Two way acceptors. Context Free Grammars: Derivation trees simplification forms.
- Unit III** **Push Down and Linear Bounded Automata:** Definitions, relationships between PDA and context free language, properties of CFLS, decision algorithms.
- Unit IV** **Turning Machines:** The turning machine model, complete languages and functions, modification of turning machines, Church's machines undecidability
Properties of recursive and recursively enumerable languages, universal turning machines, post correspondence problems, introduction to recursive function theory.
- Unit V** **Chomsky Hierarchy:** Regular grammars, unrestricted grammars, context sensitive language, relation between classes of languages.

Prerequisites: Discrete Structures

References:

1. Cohen, Daniel I.A., Introduction to Computer Theory, John Wiley & Sons, 1986
- 2 Hopcroft, J.E. & Ullman, J.D, Introduction to Automata Theory, Languages and Computation Narosa Publishing House, 18th print, 1998
- 3 Lewis, H.R., Papadilypriou, C.H.: Elements of the Theory of Computation, PHI, 1981
- 4 Salomon, A.K.: Formal languages, Academic Press, 1973.
- 5 R.J.Nelson, Introduction to Automata John Wiley & Sons

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS502/ ECS607

Operating System

Objective: To introduce basic concepts of operating system and its design.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Introduction:** Operating System and function, evolution of operating systems, Batch, interactive, time sharing and real time system, System protection, distributed systems, methodologies for implementation of O/S service system calls, system programs, Interrupt mechanism.

Unit II **Concurrent Processes:** Process concept, Principle of concurrency, Product/ Consumer problem, Critical section problem, Semaphores, Classical problems in concurrency, Inter processes communication, Process generation, Process scheduling
CPU Scheduling: Scheduling concept, Levels of scheduling, Performance criteria, scheduling algorithm, Evolution, multiprocessor scheduling.

Unit III **Memory Management:** Base machine, resident monitor, multiprogramming with fixed partition, Multiprogramming with variable partition, Multiple base register, Paging, Segmentation, paged segmentation, Virtual memory concept, Demand paging, Performance, paged replaced algorithm, allocation of frames, thrashing. Cache memory organization, Impact on Performance

Unit IV **Device Management:** Hardware organization, devices scheduling policies
Deadlock: System model, Deadlock characterization, prevention, avoidance and detection, Recovery from deadlock combined approach.

Unit V **I/O Management and Disk Scheduling:** I/O devices and the organization of I/O function, I/O buffering, disk I/O, operating system design issues
Protection: Mechanisms and policies, implementation
File system: File concept, file organization and access mechanism, file directories, file sharing, implementation issues: hierarchy and device management.

Prerequisite: Computer Organization

References:

- 1 Silberschatz & Galvin(5/e), Operating System Concepts, Addison Wesley, 1998
- 2 Madnick & Donovan, Operating Systems, Mcgraw Hill,1996
- 3 Tanenbaum, A.S ., Modern Operating System, PHI , 1997
- 4 A.S. Godbole , Operating Systems, TMH, 1997
- 5 Deitel H.M.(2/e), An introduction to operating system concepts, Addison Wesley,1989

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EEC 508

Microprocessors & Interfacing

Objective: To introduce the students to the architecture and programming of 16-bit Microprocessors and their successors, and the techniques for their interfacing to various I/O devices.

NOTE : **Ten** questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting *one question from each unit*. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

UNIT-I

Microcomputers and microprocessors; 8-bit microprocessors; Instructions and timings, 8085 instruction set and programming, stacks subroutines.

UNIT-II

Interrupt structure and I/O techniques; Interfacing concepts and devices; Programmable interfacing devices; Serial I/O; 16-bit microprocessors.

UNIT-III

Architecture of 8086, Addressing modes, overview of arithmetic and looping instructions in 8086; Micro controllers and their applications.

UNIT- IV

Simple experiments on 8085 programming using kit; Interfacing of switches and LED's; Interfacing of ADC and DAC; Use of programmable peripheral interfaces.

UNIT- V

Use of counters and timer chips; Interfacing of keyboard and display controller; Serial communication; Interfacing of printer; Programming of 8086 using kit.

Prerequisite: Computer system organization

References:

- 1 Barry B. Brey(4/e), An introduction to Microprocessor Architecture, Programmng and Interfacing, PHI,1999
- 2 Peter & J.Socha, Peter Norton's Assembly Language Book, PHI, 1992
- 3 Liu & Gibson(2/e) , Microcomputer Systems The 8086/ 8088 Family, PHI, 1994
- 4 Peter Abel ,IBM PC Assembly Language and Programming, PHI,1997
- 5 Gaonkar R.S.(2/e), Microprocessor architecture programming and application, Wiley Eastern

- 6 Ram B., Fundamentals of microprocessor and microcomputer

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EEEC502

Principles of Analog & Digital Communication

Objective: To expose the students fundamental principles of analog and digital communication techniques.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Introduction:** Elements of a communication system and its fundamental limitations, Advantage of digital communication over analog communication, Digital and Analog signals and systems, Base band signals and voice band pass communication, Matched filter principle, Typical functions and their transforms, Spectral Analysis.

Unit II Simple Communication System, Modulation and Demodulation, Spectral Analysis, Fourier Series, Fourier Transform, Base band and Radio frequency, Pulse functions
Signal transmission, transfer function, Ideal frequency domain filter, Pulse transmission, Energy and power spectra transmission, Amplitude Modulation (A-M) methods, detection of DSB and SSB, envelop detection, A.M.Transmitter and receivers.

Unit III Angle modulation, Frequency Modulation, Multiplexing pulse modulation PAM, PDM, PPM, PCM, data modulation, Comparison of AM & FM.
Information theory and source coding, Channel capacity,
Baseband Pulse: Sampling; Instantaneous, natural, flat flop, Uniform and nonuniform quantization techniques, quantization noise and PCM performance, bandwidth of PCM, Compression standards, Compression with PAM.

Unit IV **Digital Systems:** Brief introduction to DPCM & DM, Binary line coding, generating repeaters, Multilevel signaling, Pulse duration and pulse position modulation, Synchronous, asynchronous and statistical IDM.

Unit V **Bandpass Digital System:** Binary Modulation: OOK, BPSK, PSK, DPSK, multilevel DPSK, MPSK, QAM, Generation and deduction of digital modulation signal bitrate and transmission bandwidth, comparison of baseband width and bandpass transmission rates.

Prerequisite: Signals and Systems

References:

- 1 G.Kennedy , Electronics Communication Systems, McGraw
- 2 Roden H.S., Digital and Dass Comm.System, Prentice Hall
- 3 K.S.Shanmugham , Digital Analog Communication systems, John Wiley, 1996
- 4 Couch Leon W., Digital and Analog Communication System, Maxwell
- 5 Schwartz Mischa, Information, transmission, Modulation and Noise, McGraw

6 B.P.Lathi (3/e), Modern Digital and Analog Communication Systems, Oxford Univ., 1998

7 S.Haykin (3/e), Communication Systems, John Wiley, 1994

MM 100

Time 3 Hrs

L T P

3 1 0

Sessional 30

Theory 70

Pass Marks 40

ECS504

Interactive Computer Graphics

Objective: The objective of the course is to give an overview of Graphics system, various, input and output methods and the relevant fundamental algorithms for development of lines, curves, which finally extends to 2-D and 3-D Graphics and ultimately to visual realism.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Line Generation :** Points, lines, Plains, Vectors, Pixels and frame buffers, Vector and character generation

Graphics Primitives: Display devices, Primitive operations, Display-file structure, Display control text

Unit II **Polygons:** Polygons representation, Entering polygons, Filling polygons.

Transformations: Matrices Transformations, transformation routines, Display procedures.

Unit III **Segments:** Segments table, Creating, Deleting and Renaming a segment
Visibility, Image transformation.

Windowing and Clipping: Viewing transformation, Clipping, Generalised clipping Multiple windowing.

Unit IV **Interaction :** Hardware Input device handling algorithms, Event handling
Echoing, Interactive techniques

Three Dimensions: 3 D Geometry Primitives, Transformations, Projection ,
Clipping.

Unit V **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

Prerequisite: Programming and Graphics

References:

1 Rogers, "Procedural Elements of Computer Graphics" McGraw Hill,

2 Newman & Sproule, " Principles of Interactive Computer Graphics", McGraw Hill, 1987

3 Harringtons.S.(2/e), "Computer Graphics", A programming Approach, McGraw Hill, 1987

4 Rogers & Adams (2/e), "Mathematical Elements of Computer Graphics" McGraw Hill

5 Heny Baper, "Computer Graphics"

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS551

Operating System Lab

Programming exercise in operating systems commands/ system calls, CPU scheduling, memory paging and segmentation, Semaphore and message- passing solution to producer consumers and dining philosophers problems, design of simple multiprocessing operating systems. a

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS552

Computer Graphics Lab

The in charge of lab will decide the programs to be made based on the theory of the subject.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

EEEC551

Microprocessor Lab

List of Practicals

- 1 Study of 8086 kit.
- 2 Programming of addition, subtraction, multiplication & division.
- 3 Programming of String operation and I/O operation.
- 4 Programming for A/D and D/A conversion.
- 5 Communication between PC and 8086 microprocessor.
- 6 Programming for control of DC motor and stepper motor.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

EEEC552

Communication Lab

Practical exercises based on

Generation and detection of AM including DSB/AM, Multiplier Applications, F.M. generation, PLL-FM demodulation and other applications, Generation and demodulation of PWM and PPM, PCM and Delta Modulator implementation, Line code generation, Hamming code generation and decoding, PSK and FSK generation and detection.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS553

Assembly Language Programming Lab

Study of 8086 Assembly language. Simple programming exercises to compute expressions with register and memory operands using various addressing modes. Sorting and searching with arrays. Multiprecision operations; Subroutines Recursion. String Operations.

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS601/ ECS706

Computer Networks

Objective: To familiarize students with basic concepts of Computer Networks.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Introduction :** Uses of networks (goals and applications), OSI reference model, TCP/IP Reference Model, Example Network – ARPANET, NSFNET, The Internet .

The Physical Layer : Transmission media : Twisted pair, Baseband and Broadband coaxial cable, Fiber optics; Wireless Transmission : Radio transmission, Microwave transmission, Infrared and light wave transmission; Narrowband ISDN: services. architecture, interface; Communication Satellite: Geosynchronous Satellites, Low Orbit Satellites.

Unit II **The Data Link Layer :** Design Issues: Services provided to the Network Layer, Framing, Error control, Flow control; Error detection and Correction; Simplex , Sliding window protocol, Using Go-Back n, Example : The Data Link Layer in the Internet.

The Medium Access Sub layer : Static and Dynamic Channel Allocation in LANs and MANs; IEEE standard 802.3 and Ethernet; IEEE standard 802.4 and Token Bus, IEEE standard 802.4 and Token Ring; Bridges : Bridges from 802.x to 802.y, Transparent Bridges, Source Routing Bridges.

Unit – III **The Network Layer :** Network layer design issues, shortest path routing, Flooding, Flow- based routing, Broadcast routing, Congestion control and prevention policies; Internetworking : connectionless Interworking, Firewalls, IP protocols, IP address, Internet control protocols.

Unit – IV **The Transport Layer :** QOS, The transport service; Transport protocols : Addressing, Establishing and releasing a connection; TCP/UDP : Standards, Definitions, Specification of header, Fields in header. Session Layer-RPC, Synchronization, dialog management

Unit V **The Application Layer :** Network Security, FTP, SNMP, Telnet, E- mail, X.400, X.500, Multimedia, WWW, DNS.
Presentation layer: ASN, data compression, encryption.

References:

- 1 Andrew S. Tanenbaum (3/e), Computer Networks, PHI, 1997
- 2 James Martin ,Computer Networks & Distributed Processing, PHI
- 3 W.Stallings (5/e), Data and Computer Communications, PHI, 1999
- 4 Douglas E. Comer (3/e), Interworking with TCP/IP, Principles, Protocols and Architecture,

PHI, 1996

5 D.Minoli, Internet & Intranet Engineering, TMH,1999

MM 100
Time 3Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS604

Software Engineering

Objective: To acquaint students with fundamental concepts in Software Engineering.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Introduction:** The Software Problem, Software Engineering Problem, The Software Engineering Approach
Software Process: Software Processes, Characteristics of Software Process, Software Development Process, Project Management Process, Software Configuration Management Process, Process Management Process.

Unit II **Software Requirements Analysis and Specification:** Software Requirements, Problem Analysis, Requirement Specification, Validation, Metrics.
Planning: Cost Estimation, Project Scheduling, Staffing and Personnel Planning, Software Configuration Management plan, Quality Management Plan, Project Monitoring Plans, Risk Management.

Unit III **Functional Oriented Design:** Design Principles, Module Level Concept, Design Notation and Specification, Structured Design Methodology, Verification, Metrics.

Object Oriented Design: OOA, OOD, Concepts, Design Notation and Specification, Design Methodology, Metrics.

Unit IV Detailed Design: Module Specification, Detailed Design, Verification, Metrics.

Coding: Programming Practice, Verification, Metrics

Unit V **Testing:** Testing Fundamentals, Functional Testing, Structural testing, Testing Object Oriented Programs, Testing Process, Metrics

Prerequisites: Nil

References:

- 1 Ghezzi C., Jazayeri M., & Madrioli D., Fundamentals of Software Engineering, PHI, 1994
- 2 Pressman, R.S.(4/e), Software Engineering – A Practitioner's Approach, McGraw Hill, 1997
- 3 Sommerwille I.(5/e), Software Engineering, Addison Wesley, 1996
- 4 Jalote Pankaj, An Integrated Approach to Software Engineering, Narosa Publishing House, 1995
- 5 Shooman, M, Software Engineering, McGraw Hill, 1983

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS 605

E-Commerce

Objective: To introduce the students to principles of e commerce.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper

Unit I **Electronic Commerce:** Frameworks, E-Commerce and Convergence, Anatomy of E-Commerce Applications, Consumer Applications, Organization Applications.

Network Infrastructure For E-Commerce: Market forces influencing, Components of I- Way, Network Access Equipment, Global Information Distribution Network.

Internet as Network Infrastructure: Internet Terminology, History of Internet, NSFNET, National Research and Educational Network, Globalization of Academic Internet, Internet Applications.

Unit II **E-Commerce and WWW:** Architectural Framework of E-Commerce, WWW as the Architecture, Hypertext Publishing, Technology and Security of Web

Consumer Oriented E-Commerce: Consumer Oriented Application, Mercantile Process Model, Mercantile Model from consumer and Merchant's Perspective.

Electronic Payment System: Types of EPS, Digital Token-Based EPS, Smart Cards and EPS, Credit card based EPS, Risk and EPS, Designing EPS.

Unit III **Inter Organizational Commerce and EDI:** EDI, EDI Applications in Business, EDI: Legal, Security and Privacy Issue, EDI and E-Commerce, Standardization and EDI, EDI Software implementation, EDI Envelop for Message Transport, Value Added Networks, Internet Based EDIs.

Intra Organizational E-Commerce: Internal Information System, Macroforces and Internal Commerce, Work-Flow Automation and Coordination, Customization and Internal Commerce.

Unit IV **Supply Chain Management:** SCM Fundamentals, Managing Retail Supply Chain, Supply Chain Application Software, Future of Supply Chain Software

E-Commerce and Banking: Changing Dynamics in Banking industry, Home Banking History and Implementation Approaches, Open Versus Closed Models, Management Issues in Online Banking.

Network Security and Firewalls: Client-Server Network Security, Emerging Client Server Security Threats, Firewalls and Network Security, Data and Message Security, Challenge Response System, Encrypted Documents and E-Mail.

Unit V **Advertising and Marketing on the Internet:** Information based Marketing, Advertising on Internet, Charting on-Line Marketing Process.

Consumer Search and Resource Discovery: Search and Resource Discovery Paradigms, Information Search and retrieval, E-Commerce Catalogs, Information Filtering, Consumer-Data Interface.

Software Agents: History, Characteristics and Properties of Software Agents, Technology behind Software Agents, Telescript Agent Language, Safe-Tcl, Applets, Browser and Software Agents.

References:

1. Frontiers of Electronic Commerce Ravi Kalokaota and A.B. Whinston (Addison-Wesley 2000).
2. Electronic Commerce A Manager's Guide Ravi Kalokaota and A.B. Whinston(Addison-Wesley).

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS 603

Database Management System

Objective: To introduce the students to principles of Data Base Management System and its application.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I **Introduction**, Characteristic of Database approach, Database users, Advantages of DBMS, Implications of Database approach, Data models, Schema and Instances, DBMS architecture and Data independence, Database Languages and Interfaces, Data Modeling using Entity-Relationship Model.

Unit II Relational Model Concepts, Relational constraints and Relational database schema, Update operations and dealing with constraint violations. Data definition constraints, and schema changes in SQL2, queries in SQL Insert, Delete and Update statements in SQL, Views in SQL

Unit III Functional Dependencies, Normal Forms based on Primary keys, General Definition of Second and Third normal forms, Boyce-Codd normal form. Relational decomposition, Decomposition and dependency Preservation, Decomposition and Loss-less Joins

Unit IV Transaction processing, Transaction and system concepts, desirable properties of transactions, Schedule of transaction, Serializability of schedules, view equivalence and view serializability, Transaction support in SQL. Locking techniques for concurrency control, Dealing with deadlock, Concurrency control based on Timestamp ordering. Recovery concepts, recovery techniques based on Deferred and Immediate update, Shadow paging.

Unit V Concepts of Object-Oriented Databases, Object database standards, Languages, and design. Object Relational Database Systems. Object-relational Features of Oracle8

Prerequisites: Nil

References:

- 1 Elmasari and Navathe (2/e), Fundamentals of Database Systems, Addison – Wesley, 1994
- 2 Bipin C. Desai, An Introduction to Database Systems, Galgotia, 1998
- 3 Korth & Silberschatz (3/e), Database System concepts, McGraw, 1994
- 4 Date C.J.(6/e), An Introduction to Database Systems, Addison Wesley, 1994

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS 602

Java Programming

Objective: To develop the skill of programming using Java and to introduce its application.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Java History, Java Features; Java Environments, Hardware & Software requirements; Constants, Variables, & data types, Operators & Expressions, Decision making, Branching & looping; Classes & Objects : Classes, Objects & methods, Inheritance, Arrays; Interfaces; Packages; String handling; File Handling & I/O.

Unit II Exception Handling Fundamentals, Exception types, Uncaught exceptions, Using try & catch, Multiple catch clauses, Nested try statements, throw, throws, finally, Java's built- in exceptions, User defined exception subclasses; Multithreaded Programming: Java thread model, Main thread, Creating thread, Creating multiple threads, Thread priorities, Synchronization, Interthread communication, Suspending, Resuming, and stopping threads.

Unit III String Handling: I/O , Java I/O Classes, & interface File, Stream Classes, Byte Stream, Character Stream, Serialization .
Applet Class: Applet basics, applet architecture, applet skeleton, Applet Display Methods, Passing Parameters to applets.

Unit IV Event Handling: Delegation Event Model, Event Classes, Sources of Events, Events Listener interfaces, Handling Mouse and Keyboard Event.
Networking : Networking basis, Java and the Net, InetAddress, TCP/IP client sockets, URL, URLconnection, TCP/IP server sockets;

Unit V Servlets : Background, Life cycle of a servlet, Java servlet development kit, Servlet API, javax.servlet package, Reading servlet parameters, Reading initialization parameters.
AWT: Working with Windows, Graphics, Text; Control and Layout Manager

Prerequisites: Nil

References:

- 1 E.Balaguruswamy (2/e), Programming with Java, TMH, 2000
- 2 P. Naughton & H.Schildt (3/e), The Complete Reference Java2, TMH
- 3 C. S. Hostmann & G. Cornell , Core Java 2 Vol I & Vol II, Pearson

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

EMA 601/EMA501

Optimization Techniques

Objective: To acquaint students with various optimizing techniques.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Linear Programming : Introduction, Construction of LP Model, Graphical LP Solution. **Simplex Method:** Introduction, Standard LP Form and its basic Solutions, Simplex Algorithm, Artificial Starting Solution, Special cases in Simplex Method, Applications. **Duality:** Introduction, Definition of Dual Problems, Relationship between the Optimal Primal and Dual Solutions, Economic Interpretation of Duality, Dual Simplex Method, Primal Dual Computation.

Integer Programming : Methods of Integer Programming, Cutting-Plane Method: Fractional (Pure Integer) Method, Mixed-Cut method, Branch and Bound Technique.

Unit II Transportation and Assignment Model: Definition of Transportation Model, Non Traditional Transportation Model, Transportation Algorithms, Assignments Model.

Deterministic Dynamic Programming: Introduction, Recursive Nature of Computing, Forward and Backward Recursion, Applications of Dynamic Programming in Shortest Route Problem, Cargo Loading Problem, Work Force Size Model.

Unit III Game Theory*: Minimax-Maximin pure strategies, Mixed strategies and Expected Payoff, Concept of Dominance, Graphical Solution of $m \times 2$ and $2 \times n$ Games.

PERT/CPM: Arrow (Network) Diagram Representation, Time Estimates for Activities, Earliest Expected Completion Time of Events (ET), Latest Allowable Event Completion Time (TL), Critical Path and Critical Path Calculations, PERT: Probability Consideration in Project Scheduling, PERT calculations.

Unit IV Queuing Theory: Definition of Queuing System, Characteristics of Queuing Models, Notation, Transient and Steady State of Queuing System, Birth-Death process, Pure birth & Pure Death processes, $(M/M/1):(FIFO/\infty/\infty)$; $(M/M/s):(FIFO/\infty/\infty)$ $(M/M/1):(FIFO/N/\infty)$ Models, Their Characteristics and State Transition Sate Diagrams.

Unit V Steepest Descent and Conyngate Gradient Method, Convex Programming Problems, Penalty function Method for mixed equality and Inequality constraints.

References:

- 1 Operations Research, Taha, Hamdy A. (Maxwell Macmillan)
- 2 Operations Research, Kanti Swarup, P.K. Gupta, Man Mohan (Sultan Chand & Sons)
- 3 Introduction to Operations Research, A Computer Oriented Algorithmic Approach Gillet, Billy E. (TMH)

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS653

Computer Network Lab

Program development for transmission error control. Hamming codes; CRC generation and checking. Simulation of MAC sublayer protocols, and sliding window data link protocols. File Transfer between nodes on a network. Implementation of routing algorithms security mechanisms and protocols.

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS653

Java Programming Lab

The in charge of lab will decide the programs to be made based on the theory of the subject

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS654

DBMS Lab

The in charge of lab will decide the programs to be made based on the theory of the subject. All programs are to developed in C/C++.

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS701

Language Processor

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I	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
Unit II	Syntax Analysis: CFGs, Ambiguity, Associativity, precedence, TOP down parsing, recursive descent parsing, transformation on the grammars, predictive parsing, bottom up parsing, operator precedence grammar, LR parses (SLR, LALR, LR), YACC
Unit III	Syntax directed Definitions: Inherited and synthesized attributes, dependency graphs, Evaluation order, bottom up and top down evaluation of attributes, I- and S- attributed definitions
Unit IV	Type Checking: Type system, type expression, structural and name equivalence of types, type conversion, overloaded functions and operators, polymorphic functions. Run Time System: Storage organizations, activation tree, activation record, parameter passing, symbol table, dynamic storage allocation
Unit V	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 programmes, code generation from dags, peep hole optimization.

References:

1. Principles of Compiler Design A.V.Aho, R.Sethi & J.D. Ullman(Narosa)
- 2 Compilers - Principles, Techniques & Tools
A.V.Aho, R.Sethi & J.D.Ullman (Addison)
- 3 The Theory & Practice of Compiler Writing J.Trembley & P.G. Sorenson (McGraw)

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS702

Design and Analysis of Algorithms

Objective: To generate appreciation for algorithm importance; study of design strategies and bounds on the performance of algorithms.

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** **Introduction :** Definition and characteristics of Algorithms; Analyzing algorithms; Program performance: time and space complexity, Asymptotic notation, complexity analysis. Recurrence equations and their solutions
- Unit II** **Algorithmic Techniques:** Algorithm design strategies such as recursion, Divide and conquer, greedy method, dynamic programming, back tracking, branch and bound examples, applications and analysis
- Unit III** **Search Trees:** Balanced trees – AVL and 2-3 trees, Algorithms for building and maintaining these trees; B-trees- m-way search trees, insertions and deletion for B-trees, optimal search trees- optimality Criterion, insertion deletions, analysis.
- Unit IV** **Graph Algorithms:** Search methods- DFS and BFS, Spanning trees, Biconnectivity, Minimum cost spanning trees- Kruskal's , Prime's and Sollin's algorithms; path finding and shortest path algorithms; topological sorting; Bipartite graphs
- Unit V** **Infeasibility :** P and NP classes; NP-hard problems
Parallel algorithms: Introduction, data and control parallelism, parallel algorithms for matrix multiplication; embedding of problems graphs into processor graphs, load balancing and scheduling problems

Prerequisites: Courses in Data structure

References:

1. Sahni S, Data structures, Algorithms and applications in C++ , McGraw Hill, 1998
2. Aho, A.V., Hopcroft, J.E. & Ullman, J.D, The Design and Analysis of Computer Algorithms , PHI, 1984
3. McHugh J.A., Algorithmic Graph Theory, PHI, 1990
4. Quinn M.J., Parallel Computing Theory & Practice, McGraw Hill, 1994
5. Goodman, S.E. & Hedetniemi, Introduction to the Design and Analysis of Algorithms, Mc-Graw Hill, 1985
6. Brassard & Bratley, Algorithms, PHI, 1985

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS703

Visual Programming

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Creating Window, menus, File handling in Window

Unit II Dialogue boxes, scroll bars, list boxes, mouse techniques

Unit III Reading key strokes in windows, window messages

Unit IV Debugging in Visual C++, multi document interface(MDI), Object linking and embedding (OLE)

Unit V Writing X applications, constructing geographical user interface with X.

References:

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

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS704

Artificial Intelligence

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** **Introduction** : Definition and scope of Artificial Intelligence (A.I.), A.I. Techniques and its characteristics.
- Unit II** **Problem Solving** : Problems and problem spaces, Problems as state space search, Production systems, Control Strategies, Heuristic search, Problem characteristics, Production system characteristics.
- Unit III** **Problem Solving Methods** : Forward versus backward reasoning, Problem Trees versus Problem graphs, Knowledge representation and the frame problem, Generate-and-test, Hill Climbing, Breadth-First-Search, Problem Reduction, Constraint satisfaction, Means-End analysis.
- Unit IV** **Game Playing** : Minimax search, Alpha-beta pruning, Secondary search. Knowledge Representation using Predicate Logic: Representing simple facts using logic, Resolution, Conversion to clause form, Resolution in clause form, Unification algorithm.
- Unit V** **Structured Knowledge Representation** : Introduction, Semantic Nets, Frames. Introduction to Expert Systems and Programming in Prolog (Standard Prolog)

References:

1. Artificial Intelligence: Elaine R. (McGraw Hill)
2. Artificial Intelligence Winston, P.H. (Addison Wesley)
- 3 Programming in Prolog Clockskin, W.F. and Mellish, C.S.(Narosa)
- 4 Artificial Intelligence Petterson

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS705

Modeling and Simulation

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** Concept of System, System Environment, Stochastic Activities, Continuous and Discrete System, System Modeling, Types of Model, Static Physical Models, Dynamic Physical Models, Static Mathematical Models, Dynamic Mathematical Models, Principles used in Modeling
- Unit II** Derivation of models from Physical relations, model determination from input-output observation, Case studies
- Unit III** Simulation Introduction, Uses and Purposes, Simulation of an Inventory Problem, Basic Nature of Simulation, When to Simulate, Steps involved in Simulation Studies. Technique of Simulation, Monte Carlo Method, Comparison of Simulation and Analytical Methods, Types of System Simulation, Numerical Computation Technique for Continuous and Discrete Models.
- Unit IV** Simulation of Continuous and Discrete System, Stochastic Variables, Discrete Probability Functions, Continuous Probability Functions, Measure of Probability Functions, Numerical Evaluation of Continuous Probability Functions
- Unit V** Continuous Uniformly Distributed Random Numbers, Computer Generation of Random Numbers, A Uniform Random Number Generator, Generating Discrete Distributions, Non-Uniform Continuously Distributed Random Numbers.
- Simulation Languages:** Continuous and Discrete Simulation Languages, Block-Structured Continuous Simulation Language, Expression Based Languages, Discrete-System based Simulation Languages.

References:

- | | |
|---|----------------------|
| 1 System Simulation with Digital Computer | Narsingh Deo(PHI) |
| 2 System Simulation | Geoffrey Gordon(PHI) |

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS751

Language Processor Lab

The in charge of lab will decide the programs to be made based on the theory of the subject

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS752

Artificial Intelligence Lab

The in charge of lab will decide the programs to be made based on the theory of the subject

MM 50
Time 2 Hrs
L T P
0 0 2

Sessional 15
Practical 35
Pass Marks 25

ECS753

Visual Programming Lab

The in charge of lab will decide the programs to be made based on the theory of the subject

MM 100
Time 3 Hrs
L T P
0 0 3

Sessional 30
Practical 70
Pass Marks 50

ECS760

Minor Project and Seminar

The student has to take one project and required to present a seminar on it for final evaluation.

MM 100
Time 3 Hrs
L T P
3 1 0

Sessional 30
Theory 70
Pass Marks 40

ECS801

Artificial Neural Networks & Fuzzy Systems

Objective: To impart a knowledge of fundamentals of Fuzzy systems .

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

Unit I Introduction, Artificial neuron models, Neural learning, Supervised Learning: Single layer networks, Multilayer networks. Back propagation algorithm, Prediction Networks, Unsupervised Learning, Associated Learning, Optimization using Hopfield Networks, application of Neural algorithm

Unit II Different faces of imprecision -inexactness, Ambiguity, Undecidability, Fuzziness and certainty, Fuzzy sets and crisp sets, Probability & Fuzzy logic, Fuzzy control and knowledge based systems.

Unit III FUZZY SETS AND OPERATIONS

Imprecise concepts, Fuzziness & imprecision, Properties of Fuzzy sets, Fuzzy representations, Conventional set operations, Intersections of Fuzzy sets, Union of Fuzzy sets, the complement of Fuzzy sets.

Unit IV FUZZY REASONING

Linguistic variables, Fuzzy propositions, Fuzzy compositional rules of inference- the Min-Max rules implication and fuzzy additive rules of implication, Methods of decompositions and defuzzification-composite moments, composite maximum, average of maximum values and centre of maximums.

Unit V METHODOLOGY OF FUZZY DESIGN

Direct & Indirect methods with single and multiple experts, Construction from sample data- Least square method, Adaptive Fuzzy controllers-Membership function tuning using gradient descent

References:

- 1 Elements of Artificial Neural network, Kishan Mehrotra, Chilukuri K.Mohan, S.Ranka (Penram Int.)
- 2 Introduction to Artificial Neural Systems J.M.Zurada (JAICO)
- 3 Zimmermann, H.J. 'Fuzzy set theory and its applications', Allied publishers limited, Madras,1966
- 4 Klir, G.I., and Folger, T. 'Fuzzy sets, uncertainty and information', PHI, New Delhi,1991.
- 5 EarlCox,'The Fuzzy Systems Harldbook', AP professional Cambridge, MA 02139, 1994 6
- D. Driankov , H. Hellendoon , M. Reintfank: An introduction to Fuzzy Control', Narosa Publishing House, New Delhi,1996

MM 350
L T P
0 0 15

*Sessional 100**
*Final 250***
Pass Marks 175

ECS860

Major Project

The student is required to undergo a project work for which the topic will be decided with mutual concern of faculty in charge (guide) and student. The report of the work is required to submit in the form of Dissertation. The student will be required to submit his Dissertation work till 10th April of the concerned year.

Faculty in charge for each student will be notified within one week of start of Seventh Semester. After that topic should be finalized and a copy of that decision must be submitted to the office of Head of the department within 15 days of notification of Faculty in charge.

Evaluation : Routine progress monitoring of the project will take place by departmental committee. The project Sessional marks to be awarded on the basis of presentation and demonstration by departmental committee.

Final examination will take place at the end of eighth semester, when complete presentation of project need to be done.

*Sessional 100 from Routine presentation

** Final 250 includes 100 marks of dissertation, 75 marks of demonstration and 75 marks of viva-voce.

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

EMA802

Graph Theory

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** **Introduction:** Applications of Graphs; Finite and Infinite Graphs; Incidence and Degree; Isolated and Pendant Vertex; Isomorphism; Sub Graph, Walks, Paths and Circuits; Connected and Disconnected Graphs; Components of A Graph; Euler Graphs; Hamiltonian Paths and Circuits; The Traveling Salesman Problem.
- Unit II** **Trees, Circuits and Cut-sets:** Properties of Trees; Pendant Vertices In A Tree; Center of A Tree; Rooted and Binary Trees; Spanning Tree, Spanning Trees In A Weighted Graph, Algorithm For Shortest Spanning Tree, Fundamental Circuits, Cut-sets and Cut Vertices; Fundamental Cut-sets, Connectivity and Separativity
- Unit III** **Planar Graphs :** Combinatorial Vs Geometric Graphs; Planar Graph; Kuratowski's Graphs; Detection of Planarity; Geometric Dual; Thickness and Crossings.
Matrix representation and coloring : Path Matrix, Cut- Set Matrix, Circuit Matrix, Incidence Matrix, Adjacency Matrix and Their Properties.
- Unit IV** Chromatic Number, Chromatic Polynomial, Chromatic Partitioning, Matchings, Covering and Four Colour Problem; Directed Graphs; Digraphs and Binary Relations; Directed Path and Connectedness; Adjacency Matrix of Digraph; Directed Tree: Arborecence; Paired Comparison and Tournaments; Counting Labeled and Unlabeled Trees.
- Unit V** **Algorithms :** Shortest path, minimal spanning tree, Connectedness and components, Fundamental circuits, Cut- vertices and separability, Isomorphism.

References:

- 1 Graph Theory with Applications to Engineering and Computer Science N. Deo (PHI),
- 2 Graphs, Networks and Algorithms M. N. S. Swamy and K. Thulasiraman (Wiley)

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

ECS 802

Parallel Processing

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** **Introduction to Parallel Processing**, Minsky's conjecture, Amdahl's law;
Introduction to Static Networks : tree, mesh, linear array, ring, star, hypercube, chordal ring, cube connected cycles, Perfect shuffle network ILLIAC-4, torus, PM2I, Butterfly, mesh of tree, pyramid, generalized hypercube.
- Unit II** **Computational Models** : Introduction to PRAM, CRCW, CREW, EREW; PRAM Algorithms - List ranking, parallel prefix on a list, finding roots of trees in a forest etc; **Introduction to Parallel Algorithms** : addition on tree, cube, mesh, linear array, Matrix multiplication on mesh, cube, torus.
- Unit III** **Parallel Sorting** on linear array, Merge splitting sorting, Bitonic Sorting on PSN, Mesh, and requirement for Bitonic Sorting; **Associative Processing**: Examples systems STARAN, PEPE, associative algorithms such as pattern matching, finding maximum and minimum elements, not smaller than search, summation of vector components etc.
- Unit IV** **Introduction to Distributed Network Systems**: LAN, WAN, NOS, DOS, Distributed file servers, distributed real time systems, client-server computing. Procedure call mechanism and message passing example: DOS systems such as ACCENT OS and SODS/OS.
- Unit V** **File server and Example Systems**: XEROX, CAMBRIDGE, ELECTRONIC MAIL, servers and example systems such as Grapevine.

References:

- 1 Designing Efficient Algorithms for Parallel Computers Quinn, Michael J.(MH)
- 2.An Introduction to Distributed and Parallel Computing Crichlow, Joel M.(PHI)
- 3 Computer Architecture and Parallel Processing Hwang, Kai & Briggs, F.A.(MH)

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

ECS805

Network Programming

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** Communication Protocol, Internet Protocols, Novell Network Systems, System Network Architecture, UUCP/IPX/SPX for LANs, Protocol Comparisons.
- Unit II** Berkeley Sockets: Overview, Unix Domain Protocols, Socket Addresses, Socket System Calls, Reserved Ports, Passing File Descriptor I/O Asynchronous and Multiplexing, Socket Implementation.
- Unit III** Winsock Programming: Using the Windows Socket, API Window Socket and Blocking I/O, Other Window Extensions, Network Dependent UNRI() DLL, Sending Data over Connections, Terminations.
- Unit IV** Novel IPX/SPX: Novel Windows Drivers, Netware C Interface for Windows, IPX/SPX Procedure, Datagram Communication, Connection Orientation Communication with SPX, IPX/SPX implementation of DLL.
- Unit V** Programming Application: Time and Date Routine, Ping, Trivial File Transfer Protocol, Remote Login.

References:

- | | |
|-------------------------------|----------------------------|
| 1 Windows Network Programming | Davis, R. (Addison Wesley) |
| 2 Unix Network Programming | Steven, R. (PHI) |

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

ECS 804

Advanced Computer Networks

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** Review of reference models- OSI and TCP/IP, layered architecture, layer interfaces, services and protocols, Asynchronous transfer mode, ATM layer mode.
- Unit II** ATM switching- input, output and central queuing, switching fabrics network layer- routing algorithms like shortest path, distance vector routing, link routing, link state routing, multicast routing etc.
- Unit III** Congestion control: Traffic shaping- leaky, bucket, token bucket, choke packets, load shedding, etc. Internetworking: - connection oriented and connectionless, fragmentation Internet architecture and addressing
- Unit IV** The IP protocol, ICMP, ARP, RARP, OSPF, BGP, CIDR, IPv6. Network layer in ATM networks. Routing , traffic shaping and policing. Transport layer-transport service. Quality of Service
- Unit V** Connection Management, addressing. Flow control and buffering. Multiplexing. The Internet transport protocols- TCP and UDP. ATM ALL layer structure and protocols. Session layer: dialog management. Synchronization. Remote procedure call. Presentation layer- data representation , data compression. Networking security and cryptography. Cryptographic protocols. Application layer- DNS, SNMP, TELNET, FTP, TFTP, NFS , Electronic mail, SMTP, USENET news. World Wide Web

References:

- 1 Computer Networks , Andrew S.Tanenbaum (PHI)
- 2 Computer Networks & Distributed Processing, James Martin(PHI)
- 3 Data Communications, Prakash C.Gupta
- 4 Interworking with TCP/IP, Principles, Protocols and Architecture,Douglas E.Comer (PHI)

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

ECS 806

Management Information System

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** Introduction to MIS, role of IT in management, business and technology, Trends- personnel productivity and business operations, communications, organizing resources
- Unit II** Object oriented design, testing and quality control, operations and transactions, design level, data quality, electronic data interchange
Role of accounting, human resources and transaction processing.
- Unit III** Databases and spread sheets, Commercial databases and query processing
- Unit IV** Networks and telecommunications, Internet access, location and security, integration of information, work group integration, dataware house.
- Unit V** Decision support system, complex decision using artificial intelligence, Strategic analysis. Designing and maintaining information system, Information system and society.

References:

- 1 Management Information Systems James O,Brien(Galgotia)
- 2 Information system for modern managers Mudick Robert G.etal (PHI)

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

ECS 809

Digital Image Processing

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** **Introduction:** Background, Digital Image Representation, Steps in Image Processing, Elements of Digital Image Processing Systems; **Digital Image Fundamentals:** Elements of Visual perception, A simple Image model, Sampling and Quantization, Basic Relationships between pixels, Imaging Geometry, Photographic film.
- Unit II** **Image Transforms:** Introduction to Fourier Transform, Discrete Fourier Transform, Properties of the Two- Dimensional Fourier Transform, The Fast Fourier Transform, Separable Image Transform, The Hotelling Transform.
- Unit III** **Image Enhancement:** Background, Enhancement by Point Processing, Spatial Filtering, Enhancement in the Frequency Domain, Generation of Spatial Masks from Frequency Domain Specifications, Color Image Processing.
- Unit IV** **Image Restoration:** Degradation Model, diagonalisation of Circulate and Block Circulate Matrices, Algebraic Approach to Restoration, Inverse Filtering, Least Mean Square (Wiener) Filter, Constrained Least Squares Restoration, Interactive Restoration; **Image Compression:** Fundamentals, Image Compression Models, Elements of Information Theory, Error-Free Compression, Lossy Compression, Image Compression Standards.
- Unit V** **Image Segmentation:** Detection of Discontinuities, Edge Linking and Boundary Detection, Thresholding, Region-Oriented Segmentation, Use of Motion in Segmentation; **Representation and Description:** Representation Schemes, Boundary Descriptors, Regional Descriptors, Morphology, Relational Description.

References:

- 1 Digital Image Processing, Rafael C. Gonzalez and Richard E. Woods:, (Addison- Wesley)
- 2 Fundamentals of Digital Image Processing, A.K.Jain (PHI)

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

ECS807

Multimedia Technology

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** Introduction to multimedia, presentation, storage, information, transmission modes, data streams.
- Unit II** Computer representation of sound and audio, MIDI standards, Speech generation, analysis, compression Image capture
- Unit III** CCD camera, scanner, digital representation and processing, graphic animation. Video from grapher, full motion video picture compression, basic compression technique
- Unit IV** Multimedia operating System, real time systems resource and process management, Multimedia communication and networks, transport and session management, ISDN & ATM quality of service
Multimedia databases using relational and object oriented models.
- Unit V** Multimedia authoring and user interface, hyper text and hypermedia, integrated document management, Multimedia synchronization, reference model, case studies. Multimedia abstraction libraries, tool kits, web based programming, Application in communication and document services.

References:

- 1 Multimedia Power Tools Peter Jerron and Michael Gosney (Macintosh)
- 2 Multimedia MAKING IT WORK Tay Vaughan (TMH)
3. Halsall, Fred---Multimedia Communication.
4. Stalling, William---ISDN, Broadband-ATM.
5. Handel, Rainer---ATM Networks, Concepts, Protocol, Applications.
6. Atul Puri, Tsuhan chen---Multimedia Systems Standards & Networks, Marcel Kekker, Inc.-Signal Processing & Communication Sons.

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

ECS 810

Advanced Computer Architecture

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** Pipelining: principles of linear pipelining; instruction pipelines- speedup, data dependency hazards, remedy measures, branch handling; Arithmetic pipelines; pipeline control- job sequencing and collision prevention, pipeline chaining; case studies of pipelined systems
- Unit II** Vector Processing: Characteristics and requirements; pipelined vector processing; vectorization methods; vector processing in some systems
Array Processing: SIMD array processors; communications; SIMD interconnection networks some algorithms for array processing.
- Unit III** Parallel Processing: Introduction, data and control parallelism, concurrency, scalability, speedup, Amdahl's law, PRAM model of parallel computation, parallel algorithms multiprocessors and multicomputers: Processor organizations- mesh, binary tree, hypercube etc.
- Unit IV** Shared memory and message passing systems- loosely and tightly coupled systems. Mapping and scheduling: Embedding of tasks graphs in processor graphs, dilation and loading; load balancing on multicomputers; deterministic and nondeterministic models for static scheduling
- Unit V** Dynamic scheduling: prevention of deadlocks. Parallel programming languages: creation and programming of parallel processes; synchronization among processes; languages offering features for data parallelism such as C, FORTRAN 90; general MIMD programming languages.

References:

- 1 Advanced Computer Architecture Hwang K.(McGraw Hill).
- 2 Computer Architecture, A modern synthesis Dasgupta, Subrata (John wiley)
- 3 Introduction to Computer Architecture Stone, H.S. (McGraw Hill)
- 4 Computer Architecture and Parallel Processing Hwang K., Briggs, F.A.(McGraw Hill)

MM 100
Time 3 Hrs
L T P
3 0 0

Sessional 30
Theory 70
Pass Marks 40

ECS807

Natural Language Processing

NOTE : Ten questions are to be set taking two questions from each unit. The student has to attempt **FIVE** questions selecting **one question from each unit**. The previous year papers/ model paper can be used as a guideline and the following syllabus should be strictly followed while setting the question paper.

- Unit I** Introduction to NLP and its Major Goals, Introduction to Language Structure, Overview of Language Analyzer, Requirement of Computational Grammar.
- Unit II** Words and their Analyzer: Introduction, Morphological Analysis, Morphological Generation and Analysis using Paradigms.
Local Word Grouping: Introduction, Verb Group, Noun Group, Strategy for Grammar Development, Semantics in Stages.
- Unit III** Paninian Grammar: Introduction, Semantic Model, Free Word Order and Vibhakti, Paninian Theory, Active Passive, Control.
Paninian Parser: Introduction, Core Parser, Constraint Parser using Integer Programming and Matching and Assignment, Preferences over Parses, Lakshan Charts for Sense Disambiguation.
- Unit IV** Machine Translation: Survey, Language Accessor.
Lexical Functional Grammar(LFG): Introduction, Overview of LFG, LFG Formalism, Well-formedness Conditions, Handling Wh-movement in Questions, Computational Aspects.
- Unit V** LFG and Indian Languages: Context Free Grammar(CFG) and Indian Languages, Functional Specification.
Tree Adjoining Grammar(TAG): Lexicalized Grammar and Locality, Lexicalized Tree Substitution Grammar, Lexicalized Tree Adjoining Grammar, Features Structures, Mathematical Aspects

References:

1. Natural Language Processing A Paninian Perspective, Akshar Bharti, V Chaitanya, R. Sangal (PHI)