Curriculum and Scheme for combined First and Second Semesters B. TECH
(Effective from 2006 admissions)

Code	Subject	Hrs / week			Sessional Marks	University Exam	
		L	T	P		Hrs	Marks
2K6 EN101	Engineering Mathematics I	2	1		50	3	100
2K6 EN102	Engineering Physics	2			50	3	100
2K6 EN103	Engineering Chemistry	2			50	3	100
2K6 EN104	Engineering Mechanics	2	1		50	3	100
2K6 EN105	Engineering Graphics	1		3	50	3	100
2K6 EN106	Basic Civil Engineering	2	1		50	3	100
2K6 EN107	Basic Mechanical Engineering	2	1		50	3	100
2K6 EN108	Basic Electrical Engineering	2	1		50	3	100
2K6 EN109	Basic Electronics and Computer Engineering	2	1		50	3	100
2K6 EN110 P	Basic Engineering Laboratory (Surveying, Fitting, Carpentry, Foundry, Smithy, Welding & Sheet metal)			2	50		
2K6 EN111 P	Basic Electrical & Electronics Work shop (Wiring, Soldering & Study of Basic Computer Hardware)			2	50		
		17	6	7	550		900

2K6 EN101: ENGINEERING MATHEMATICS I
(3 hrs/week)

Module I: Ordinary differential equations (16 hours)
A brief review of the method of solutions first order equations - Separable, homogeneous and linear types – Exact equations - Orthogonal trajectories – General linear second order equations - homogeneous linear equation of the second order with constant coefficients – Fundamental system of solutions – Method of variation of parameters – Cauchy's equation.
Module II: Laplace transforms (17 hours)
Gamma and Beta functions – Definition and simple properties – Laplace transform - Inverse transform – Laplace transform of derivatives and integrals – Shifting theorems – Differentiation and integration of transforms - Transforms of unit step function and impulse function – Transforms of periodic functions – Solutions of ordinary differential equations using Laplace transforms.
Module III: Vector differential calculus (18 hours)
Functions of more than one variable – Idea of partial differentiation – Euler's theorem for homogeneous functions – Chain rule of partial differentiation – Application in errors and approximations. Vector function of single variable – Differentiation of vector functions – Scalar and vector fields – Gradient of a scalar field – Divergence and curl of vector fields – Their physical meanings – Relation between the vector differential operators.
Module IV: Fourier series and harmonic analysis (15 hours)
Periodic functions – Trigonometric series – Euler formulae – Even and odd functions - Functions having arbitrary period – Half range expansions – Numerical method for determining Fourier coefficients - Harmonic analysis

Reference Books:

1. Piskunov N. , *Differential and Integral calculus*, MIR Publishers
2. Wylie C. R. , *Advanced Engineering Mathematics*, McGraw - Hill
3. B. S Grewal. , *Higher Engineering Mathematics*, Khanna publishers
4. Kreyszig E. , *Advanced Engineering Mathematics*, Wiley Eastern
5. Thomas G,B. , *Calculus and Analytic Geometry*, Addison Wesley
6. Spigel. , *Vector analysis*, Schume series, Mc Grawhill
7. Sastry S. S. Engineering Mathematics, Prentice Hall of India

University Examination Pattern
Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.
Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.
Q IV - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.
Q V - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)	– 30 marks
Assignment (min: 2)	– 15 marks
Attendance	– 5 marks
Total	– 50 marks

2K6 EN102: ENGINEERING PHYSICS

(2 hrs/week)

Module I (11 hours)

Interference of light: Interference from plane parallel thin films - Colours of thin films by reflected light - Newton's rings Measurement of wave length – Thin wedge shaped air film - Air wedge – Testing of optical planes of surfaces. **Diffraction of light** – Introduction to Fresnel and Fraunhofer diffraction – Distinction between the two diffractions – Simple theory of plane transmission grating. **Polarization of light** – Double refraction – Nicol prism – Quarter and half wave plates – Production and detection of elliptically and circularly polarized light – Rotatory polarization – Laurent's half shade polarimeter – Applications of polarized light.

Module II (11 hours)

Quantum Mechanics - Newtonian Mechanics and quantum mechanics – Uncertainty principle - The wave functions – Shrodinger wave equation for free particle – Potentials in Shrodinger equation – Time independent Shrodinger equation - Time dependent Shrodinger equation - Expectation values – Derivation of Shrodinger equation - Application – Particle in a box (motion in one dimension)**NMR and ESR** – Basic principles of Nuclear Magnetic Resonance (NMR) and Electron Spin Resonance (ESR) – Experimental Method for detection of NMR and ESR – Applications

Module III (11 hours)

Laser Physics – Basic concepts of Laser – Spontaneous and stimulated emission – Absorption – Population inversion – Optical Pumping – Construction and components of Laser – Ruby Laser, Helium - Neon Laser and semiconductor laser – Applications – Basic principle of Holography and its application **Fibre Optics** – Basic Principles – Fiber Construction – Fiber Dimensions – Light propagation in fiber – Signal Distortion in optical fibers and transmission losses (Brief ideas only) – Light Wave communication using optical fibers and its advantages – Fiber Amplifiers and EDFAs –Applications of optical fibers. **Non Destructive Testing** –X - rays –Properties and production - X - ray radiography - Stereo radiography - CT scan - Ultrasonics - properties - NDT using ultrasonics - Electrical method - Magnetic method - ultrasound scanning - MRI scan

Module IV (13 hours)

Electron theory of solids. Classical free electron theory - drift velocity - conductivity – relaxation time – mean free path – temperature dependence of resistivity – relation between thermal and electrical conductivities (Weidman – Frenz law) – Quantum free electron theory - density of states - Fermi distribution function - Fermi energy Band theory of solids **(**Qualitative only) - Band structure of metals, semiconductors and insulators – Classifications of semiconductors on the basis of Fermi level and Fermi energy – Impurity levels in N - type and P - type semi conductors. **Hall Effect -** introduction – Measurement of Hall voltage and Hall coefficient – Importance of Hall effect. **Super conductivity** – Properties of superconductors – Josephson Effect and tunneling (qualitative) – B. C. S Theory of superconductivity (qualitative) – Applications of super - conductivity.

Reference Books:

1. Brijlal & Subrahmanyam. N. "Text Book of Optics", S. Chand
2. Rajendran and Marikani: Applied Physics for Engineers 3rd edition - TMH
3. A. S. Vasudeva S " Modern Engineering Physics", S. Chand
4. Jenkins F. A & White H. E. "Fundamentals of Optics", Mc Graw Hill.
5. M. Arumugam: Material science: Anuradha Publications
6. S. O. Pillai "Solid State Physics" New Age International.
7. Srivastva. C. M & Sreenivasan . C. "Science of Engineering Materials", New Age International

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.
Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.
Q IV - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.
Q V - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)	– 30 marks
Assignment (min: 2)	– 15 marks
Attendance	– 5 marks
Total	– 50 marks

2K6 EN 103: ENGINEERING CHEMISTRY

(2 hrs/week)

Module I High Polymers & Lubricants (13 hours)

Classification of polymers. Polymerization - chain polymerization, condensation polymerization, copolymerization, coordination polymerization, electrochemical polymerization, metathetical polymerization, group transfer polymerization. Mechanism of polymerization. Polymerization technique - bulk polymerization, solution polymerization, suspension polymerization, emulsion polymerization, melt polymerization, solution polycondensation, interfacial condensation, solid and gas phase condensation. Structure – property relationship of polymers. Compounding and moulding of polymers. Important plastics – their production, properties and uses. Thermoplastic resins (PE, PP, PVC, PVA, PMMA, PS), thermosetting resins (Bakelite, Urea formaldehyde, Silicones), fibers (nylon 6, nylon 66, cellulose fibers, Dacron, Kevlar) Elastomers - Natural rubber - production, structure, properties, compounding & vulcanization. Synthetic rubbers - (buna, neoprene, thiokols, polyurethane, silicon rubber) Lubricants: Theory of friction, mechanism of lubrication, classification of lubricants - liquid, semisolid, solid and synthetic lubricants. Properties of lubricants(viscosity index, cloud point, pour point, flash point, fire point, corrosion stability, emulsification, aniline point). Additives and their functions.

Module II Electrochemistry (11 hours)

Electrode potential and electromotive force. Nernst equation for electrode potential. Measurement of EMF and electrode potential. Types of electrodes. Primary and secondary reference electrodes. Electrochemical series. Galvanic cells and concentration cells. Determination of pH using glass electrode. Secondary cells - lead acid cells, Ni – Cd cell, Edisson cell. Fuel cell - hydrogen – oxygen fuel cell. Acid and bases. Lowry - Bronsted and Lewis concepts. Concept of pH – pH measurements. (Instrumental details required) Dissociation constants - potentiometric titrations. Buffer solutions. Henderson equation for calculation of pH.

Module III Corrosion (11 hours)

Corrosion and its control – Theories of corrosion. Different types of corrosion. Factors affecting corrosion. Protective coatings. Self protecting corrosion products. Pretreatment of surfaces. Coating - organic, inorganic coatings - galvanizing, tinning, electroplating, electroless plating, anodisation, passivation by chemical treatment, cathodic protection. Properties and functions of ingredients in paints, varnishes and enamels.

Module IV Fuels & Environmental Pollution: (11 hours)

Classification of fuels - solids, liquid & gaseous fuels, Determination of calorific value. Solid fuels - wood, peat, lignite, coal, Proximate analysis, Petroleum and its refining, fractions and their uses. Cracking and reforming. Petrol knock and octane number. Gaseous fuels - Natural gas, coal gas, acetylene. Combustion calculation. Air - fuel ratio. Pollution - Classification (global, regional and local with examples). Air pollution - Primary and Secondary pollutants. Source, effects and control of air pollution. Water pollution - Pollutant classification - organic, inorganic, suspended, metals and their monitoring. Domestic sewage and industrial wastes. Control of water pollution. Hazardous wastes. Hard and soft water. Analysis of hardness. Quality of water for domestic use and boiler feed. Problem with hard water in boilers. Softening of water - internal and external conditioning of water.

Reference Books

1. V. Raghavan (2000) Material Science and Engineering - A first course, Prentice Hall of India Pvt. Ltd. New Delhi.
2. J. C. Kuriakose & J. Rajaram. Chemistry of Engineering & Technology. Vol. I & II Tata McGraw Hill, New Delhi.
3. A K De (1996) Environmental Chemistry. NewAge International Pvt. Ltd. New Delhi.
4. B R Gowariker etal (2000) Polymer science. New Age international Pvt. Ltd. New Delhi

5. S. Glasstone (1997) Text book of Physical Chemistry. MacMillian, New Delhi.
6. Shashi chawla A text book of Engineering Chemistry. Dhanpath Rai & Co. Pvt. Ltd. New Delhi

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.
Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.
Q IV - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.
Q V - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)	– 30 marks
Assignment (min: 2)	– 15 marks
Attendance	– 5 marks
Total	– 50 marks

2K6EN104: ENGINEERING MECHANICS

(3 hrs/week)

Module I (15 hours)

Principles of statics – Free body diagrams – Coplanar forces and Force systems – Resultant and equilibrium conditions for concurrent, parallel and general system of forces – Solution of problems by scalar approach. Introduction to vector approach (Application to simple problems only) – Concurrent forces in space – Resultant – Equilibrium of a particle in space – Non - concurrent forces in space - Resultant of force systems.

Module II (17 hours)

Friction – Laws of friction – Simple contact friction problems – Wedge. Properties of surfaces – First moment and centroid of curve and area – Centroid of composite plane figures – Theorems of Pappus - guldinus - Second moments of plane figures and composite sections – Transfer theorems – Polar moment of area – Product of inertia and Principal axes. Moment of inertia of a rigid body – M. I of a lamina – M. I of 3 dimensional bodies (cylinder, circular rod, sphere).

Module III (17 hours)

Introduction to structural mechanics – Different types of supports, loads and beams – Reactions at supports. Shear force and Bending moment in beams – Shear force and bending moment diagrams for cantilever and simply supported beams (only for concentrated and uniformly distributed load cases). Plane trusses – Types of trusses (Perfect, Deficient and Redundant trusses) – Analysis of trusses - Method of joints - Method of sections.

Module IV (17 hours)

Kinetics of rectilinear motion – Newton's second law– D'Alembert's principle – Motion on horizontal and inclined surfaces – Analysis of lift motion - Motion of connected bodies. Curvilinear motion – Equation of motion – Tangential and normal acceleration - Centripetal and centrifugal forces – Motion of vehicles on circular path. Work, Power and Energy – Work done by a force – Work of the force of gravity and force of spring - Work - energy equation – Transformation and conservation of energy – Applications to problems. Kinematics of rotation – Rigid body rotation about a fixed axis – Rotation under the action of constant moment. Introduction to mechanical vibrations - Simple harmonic motion – free vibration – Oscillation of spring - Torsional vibration

Text Books

1. Timoshenko and Young, "Engineering Mechanics", McGraw Hill Publishers
2. Hibbeler, Engineering Mechanics, Vol. I statics, Vol II Dynamics, Pearson

Reference Books

1. Beer, F. P. and Johnson, E. R. , "Mechanics for Engineers - Statics and Dynamics", McGraw Hill Publishers.
2. Shames, I. H. , "Engineering Mechanics - Statics and Dynamics", Prentice Hall of India.
3. Merriam J. L and Kraige L. G. , *Engineering Mechanics - Vols. 1 and 2*, John Wiley.

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.

Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.

Q V - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)	– 30 marks
Assignment (min: 2)	– 15 marks
Attendance	– 5 marks
Total	– 50 marks

2K6 EN105 ENGINEERING GRAPHICS

(1 hour lecture & 3 hours drawing practice)

Module 0 (12 hours - 2 drawing exercise) (No questions in the university exam; questions should be included in the class test)

Introduction to engineering graphics - drawing instruments and their uses - types of lines - lettering - dimensioning - BIS code of practice for engineering drawing - construction of conics, spirals, cycloids, involutes and helix.

Module I (14 hours - 2 drawing exercises)

Introduction to orthographic projection. Projection of points - projection of lines - parallel to one plane and inclined to the other - lines inclined to both the planes - true length and inclination with reference planes - traces. Trapezoidal and rotating line method. Projections of planes.

Module II (14 hours - 2 drawing exercises)

Orthographic projection of solids in simple position - projections of frustum and truncated solids - projection of solids with axis inclined to one or both the planes - projections on auxiliary planes - primary and secondary auxiliary projections - projections of solids in combination.

Module III (18 hours - 3 drawing exercises)

Sections of solids by horizontal, vertical or inclined planes - true shape of section. Development of surface of solids, sectional solids, solids having hole. Intersection of surfaces - intersection of prism in prism, cylinder in cylinder and cylinder in cone.

Module IV (14 hours - 2 drawing exercises)

Introduction to isometric projection - isometric scale - isometric view - isometric projections of solids, frustums & truncated solids and their combinations. Conversion of pictorial projection to orthographic projection.

Module V (16 hours - 3 drawing exercises)

Introduction to machine drawing - screwed fastening - bolts and nuts - cap screw - machine screw - set screw - locking arrangements - foundation bolts. Graphic symbols used in engineering. Simple and Sectional views of Knuckle joint - protected type flanged coupling, bushed bearing - socket & spigot pipe joint.

Note: All drawing exercises mentioned above are for class work. Additional exercises wherever necessary may be given as home assignments.

Reference Books:

1. John K C, *Engineering Graphics,* JET Publishers.
2. Varghese P I, *Engineering Graphics*, VIP Publishers.
3. Bhatt N D, *Elementary Engineering Drawing*, Charotar Publishing house.
4. Narayana K L & Kannaiah P *Engineering Graphics*, Tata McGraw Hill
5. Luzadder W J, *Fundamentals of Engineering Drawing*, Prentice Hall of India
6. K Venugopal, *Engineering Graphics*, New Age International (P) Ltd
7. K N Anilkumar, *Engineering Graphics*, Adhyuth Publishers Kottayam
8. Varghese P I, *Machine Drawing,* VIP Publishers
9. Bhatt N D ,*Machine Drawing,* Charotar Publishing house
10. S. B Mathur, *A Text Book of Engineering Graphics*, Vikas Publishing house.

Sessional Marks:

Drawing exercises - 20 marks
Class tests (min: 2) - 25 marks
Attendance - 5 marks
Total marks - 50 marks

University examination pattern

Q1 - Two questions from Module I with choice to answer any one.
Q2 - Two questions from Module II with choice to answer any one
Q3 - Two questions from Module III with choice to answer any one
Q4 - Two questions from Module IV with choice to answer any one
Q5 - Two questions from Module V with choice to answer any one

Each question carries 20 marks.

2K6 EN106: BASIC CIVIL ENGINEERING

(3hrs/week)

MODULE I (16 hours)

Measurement of distance - Direct measurement – tape & chain only - Ranging out survey lines - Taking measurement of a sloping ground - Errors - Tape correction problems. Leveling instruments (Dumpy level, Tilting level and Auto levels). Leveling staff(folding type only) - How to make measurements - temporary adjustment, holding the staff, reading the staff, principles of levelling - recording measurements in the field book - deduction of level - height of collimation method only, examples. Introduction to Total station. (Description only) - Linear and angular measurements using total station, Brief description of contour maps.

MODULE II (14 hours)

Selection of site for buildings - types of buildings - Components of buildings. Exposure to various building byelaws. Fire resistance characteristics of buildings - General classification as per National Building Code - Earth quake Zoning - Disaster mitigation methods

MODULE III (18 hours)

FOUNDATION: different types (description only). Spread footing, Isolated - Footing, Combined footing - Mat foundation - Pile foundation. Safe bearing capacity of soil, Importance of the safe bearing capacity of soil. SUPER STRUCTURE: Masonry - stone masonry, brick masonry. Partition - Materials used for making partition - plywood, particle boards and glass. Doors, windows - materials used for the construction of doors and windows - wood, Steel, Aluminium. Flooring - using mosaic, ceramic tiles, marble, granite and synthetic materials. Roofing - Selection of type of roof, sloping roof - Concrete roof, tiled roof, timber roof ,GI sheet, AC sheet, PVC sheet. Selection of roof covering materials.

MODULE IV (18 hours)

CONCRETE: Ingredients - cement, aggregates and water. Qualities of ingredients. Test for determining the qualities of fine aggregate - fineness modulus and grading curves. IS specifications. Cement - mortar - IS Specification for preparation and determination of mortar strength. Plain Cement Concrete(PCC) preparation - Test on fresh concrete - Test on Hardened Concrete. IS specification for the compressive strength of concrete. Steel - common types used in construction - Mild steel, HYSD steel and their properties. Reinforced Cement Concrete (RCC) –advantages of RCC over PCC. Elementary ideas on pre - cast and pre - stressed concrete constructions.

Reference Books:

1. T. P. Kenetker& S. V Kulkarny, “Surveying & levelling Vol. - 1”, Vidyarthi Griha rakashen
2. Rangwala, “Building Materials”, Charotar Publishing House
3. Rangwala, “Building Construction”, Charoter Publishing House
4. B. C Punmia, “Building Consrtuction” , Lakshmi Publication (p) Ltd.
5. S. K. Roy, “Fundamentals of Surveying” Prentice - Hall of India, New Delhi.
6. National Building Code
7. A M Chandra , “Higher Surveying”, New age International (p)Ltd. Publishers

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.

Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.

Q V - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)	– 30 marks
Assignment (min: 2)	– 15 marks
Attendance	– 5 marks
Total	– 50 marks

2K6 EN107: BASIC MECHANICAL ENGINEERING

(3 hrs/week)

Module I (18 hours)

Thermodynamics: Definitions and basic concepts - systems, properties, state, process and cycle - work and heat - thermodynamic equilibrium, Zeroth law of thermodynamics, concepts of temperature and temperature scales, first law of thermodynamics, concepts of internal energy and enthalpy, second law of thermodynamics - Clausius and Kelvin - Planck statements, concept of entropy, thermodynamic processes - constant volume, constant pressure, adiabatic, isentropic, polytropic processes - P - V and T - S diagrams. (Simple problems only)

Module II (18 hours)

Air cycles: Carnot, Otto and Diesel cycles - air standard efficiency. (Simple problems only). I C Engines: Working and comparison of two stroke and four stroke petrol and diesel engines. Pumps and Turbines: Working principles of reciprocating , centrifugal and rotary pumps. Principles of operation of Pelton, Francis and Kaplan turbines. (Elementary ideas with simple sketches only.)

Module III (16 hours)

Properties of steam - saturation temperature, dryness fraction, degree of superheat, specific volume, enthalpy and entropy - T - S diagram. Steam Boilers: Classification - Cochran boiler, Babcock and Wilcox boiler, list of boiler mountings and accessories - applications. Refrigeration and Air conditioning: Refrigerants, properties of refrigerants, working principles of vapour compression refrigeration & vapour absorption refrigeration systems. Psychrometry - definition of terms - Principles of air conditioning - comfort and industrial air conditioning.

Module IV (14 hours)

Classification of manufacturing processes –elementary ideas with simple sketches of moulding, sand casting, die casting, forging, rolling, extrusion, wire drawing, punching and blanking, stamping, coining, surfacing, welding, soldering and brazing. Production machines - elementary ideas with simple sketches of centre lathe, milling machine, drilling machine, grinding machine and shaper - basic machining operations - Concepts of CNC machining systems.

Reference Books:

1. S. K. Hajra Choudhury, Elements *of Mechanical Engineering*, Media Promoters and Publishers Pvt. Ltd. Mumbai.
2. P. K. Nag , *Engineering Thermodynamics*,Tata McGraw - Hill Publishing Company.
3. Dr. R. K. Bansal,*Fluid mechanics and Hydraulic machines*, Lakxmi Publications (P) Ltd. New Delhi.
4. M. L. Mathur and F. S. Mehta ,*Thermal Engineering* , Jain Brothers, New Delhi.
5. K. Venugopal, Basic Mechanical Engineering, New Age International (P) Ltd.

Text Books:

1. S. Tryambaka Murthy, *Elements of Mechanical Engineering*, Vikas Publishing House Private Ltd. New Delhi.
2. S. Benjamin ,*A Text Book of Basic Mechanical Engineering* , Pentex Publishers and Distributers, Kollam - 5.

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.

Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.
Q V - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)	– 30 marks
Assignment (min: 2)	– 15 marks
Attendance	– 5 marks
Total	– 50 marks

2K6 EN108: BASIC ELECTRICAL ENGINEERING

(3 hrs/week)

Module I(16 hours)

Generation ,Transmission and Distribution of electric power

Conventional methods of generation of electric power –thermal – hydro – nuclear. Non - conventional energy sources - solar - wind - tidal - geothermal –photovoltaic - fuel cells. General outline of power transmission & distribution system - substation equipment - circuit breakers - isolators, lightning arrestors - wave traps. (Functions only). Electrical wiring - different types - switchboards - earthing - protective devices - relays - MCB's , ELCB's.

Module II(17 hours)

Transformers and Electrical machines

AC fundamentals - 1 - Φ and 3 - Φ - Power factor – economics of power factor improvement. (Derivation not required). Tariff - Types of tariff. Transformer - Construction - different types - 1 - Φ and 3 - Φ - theory –emf equation - methods of cooling. DC machines – Construction - generators and motors - types - characteristics & applications. AC machines - Alternators - Construction - voltage regulation (definition only). Synchronous motors - Applications - Induction motors - 1 - Φ and 3 - Φ - Construction - characteristics & applications. Special machines – stepper motor - universal motor.

Module III (17hours)

Utilization of Electric power

Electric heating - resistance heating - Induction heating - dielectric heating - arc furnaces - principle & applications. Electric welding - resistance welding - arc welding – ultrasonic welding - electron beam welding - laser beam welding. Illumination - different types of lamps - fluorescent, incandescent, sodium vapour, mercury vapour, halogen - energy efficient lamps Traction - traction equipment and functions. Batteries - Different types - Charging methods - Applications. Electrolysis - Basic principles - Extraction of metals - Electro deposition - Electroplating.

Module IV(16 hours)

Instrumentation

Measuring instruments – Ammeter, Voltmeter, Wattmeter, Energy meter, Meggar - basic principle of operation, measurement of power by 2 - wattmeter method. Transducers – measurement of strain, acceleration, altitude, flow, force, torque, humidity and moisture.

Text Books

1. Jain & Jain, " ABC of Electrical Engineering(Electrical Science)", Dhanapat Rai & Son's publishing Company, New Delhi

Reference Books

1. M. L. Soni, PV Gupta, U. S. Bhatnagar and A. Chakrabarthy - A textbook of Power System Engineering - Dhanpath Rai & Sons, New Delhi.
2. Nagrath I. J. & Kothari D. P. – Electric Machines – Tata Mc. graw hill.
3. J. B. Gupta - Utilization of electric power & Electric traction –S. K. Kataria & sons , New Delhi.
4. Sawhney A. K. A Course in Electrical & Electronic Measurement and Instrumentation, Dhanpath Rai & Sons, New Delhi

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.

Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

Q IV - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.
Q V - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)	– 30 marks
Assignment (min: 2)	– 15 marks
Attendance	– 5 marks
Total	– 50 marks

2K6 EN109: BASIC ELECTRONICS AND COMPUTER ENGINEERING

(3 hrs/week)

PART A - ELECTRONICS & COMMUNICATION ENGINEERING

Module I: INTRODUCTION TO ELECTRONIC COMPONENTS AND DEVICES (16 hours)

Electronic Devices: Passive components, Active components. PN Junction Diodes: Characteristics and applications. Types of Diodes: Zener Diode, LED, LCD, Photodiode, varactor diode – principles of operation and applications. Bipolar Junction Transistors – construction – npn, pnp – working – configuration – characteristics – properties – applications. Amplifiers : RC Coupled amplifier – working. JFET : Construction – characteristics, parameters – applications. Oscillators: principle, RC Phase shift oscillator, crystal oscillator. Integrated circuits : classification – advantages – analog and digital I C's. Microprocessors - 8085: Internal architecture (block diagram only) – applications. Electronic Instruments: Strain gauge, Thermistor, Condensor microphone, Moving coil Loud - speaker, principles of CRT, CRO block diagram and working. Signal generators, regulated power supplies.

Module II: PRICIPLES OF ELECTRONIC COMMUNICATION ENGINEERING (17 hours)

Analog modulation - Different types - AM,FM,PM – principles and comparison. Block diagram of AM and FM Transmitters and superhetrodyne receiver (brief explanation only). Principle of TV systems: interlaced scanning, general simplified block diagram of TV Transmitter and receiver, Yagi antenna, Basic principles of cable TV.

Principles of pulsed RADAR: Block diagram, application. Satellite communication - Concept of Geostationary satellites - simplified block diagram of earth station, Transmitter, Receiver. Block diagram of optical communication systems, Concept of optical fibre, source (LED), detector (phototransistor), advantage of optical communication.

Frequency bands in microwave communication and their uses, simplified block diagram of microwave link.

Basic principles of cellular communication, concepts of cells - Frequency reusage, advantage of cellular communication.

PART B – COMPUTER ENGINEERING

Module III: INTRODUCTION TO COMPUTERS, TROUBLESHOOTING AND MAINTANANCE (16 hours)

Introduction – Characteristics of Computers –Classifications of Computers – Basic computer organizations - Computer software – Types of software. *Components of Standard PC*: Familiarization of motherboard, Processor & Memory, Graphics adapters & Monitors, Drive controllers & Drives, Buses, Network Adapters, Power supply - *Boot Process* : BIOS , POST – Installation of operating systems - *Troubleshooting and Maintenance*: Common problems in Motherboard, Memory, Monitor, Plug & Play Devices and their Troubleshooting.

Module IV: COMPUTER PROGRAMMING & NETWORK FUNDAMENTALS (17 hours)

Computer Programming - - High level and low level languages - steps involved in computer programming - Developing algorithms and flow charts - Efficiency of algorithms - Running, debugging and testing of programs - . *Computer Network*: Topologies – Types, Basic Components, Media: Wireless & Wired, - *Internet Basics*: Applications & Impact on Society, WWW, Email, Search Engine, Web server, Web browser - Future Internet Applications. *Application software packages* – Word Processing – Spread Sheet – Graphics – Personal Assistance.

Reference Books:

1. N. N. Bhargava, "Basic Electronic and Linear Circuits ", TMH Publications.
2. Kumar, "Communication Engineering" mesh Publication New Delhi
3. Peter Norton, "Introduction to Computer", 6th Ed. , Tata McGraw Hill, 2006
4. Pradeep K Sinha and Priti Sinha, "Computer Fundamentals: Concepts, Systems and Application", BPB Publicatios , 2003
5. T F . Bogart, " Electronic Devices and Circuits" Universal Bookstall New Delhi .

6. Santi ram Kal, " Basic Electronics " PHI Publications.
7. George Kennedy, "Electronic Communication Systems", Mc Graw Hill
8. V. Rajaraman, "Fundamentals of Computers" Prentice Hall of India, 2002.
9. Hans - Peter Messmer, "The Indispensable PC hardware book" 3rd Ed., Addison Wesley.
10. Allen B. Tucker, " Fundamentals of Computing ",Tata Mc Graw Hill New Delhi, 1998
11. Stephen J Bigelow " Troubleshooting Maintaining & Repairing PCs", 5th Ed. Tata McGraw Hill
12. Andrew S Tanenbaum, "Computer Network", 3rd Ed. , Pearson Education, 2003

University Examination Pattern

(PART A and PART B to be answered in separate answer books)

PART A

Q I – 4 short answer type questions of 5 marks, 2 from each module.

Q II - 2 questions (covering entire module) of 15 marks each from module I with choice to answer any one.

Q III - 2 questions (covering entire module) of 15 marks each from module II with choice to answer any one.

PART B

Q IV– 4 short answer type questions of 5 marks, 2 from each module.

Q V - 2 questions (covering entire module) of 15 marks each from module III with choice to answer any one.

Q VI - 2 questions (covering entire module) of 15 marks each from module IV with choice to answer any one.

Marks Distribution

Tests (min: 2)	– 30 marks
Assignment (min: 2)	– 15 marks
Attendance	– 5 marks
Total	– 50 marks

2K6 EN110 P: BASIC ENGINEERING LABORATORY

(2 hrs/week)

Part – A. Mechanical Engineering Workshops

Fitting Practice (10 Hours)

Study of metal cutting and measuring tools. Fabrication Exercises involving cutting and chiseling.

Welding (5 Hours)

Study of arc and gas welding equipments. Exercises involving preparation of lap and butt joints.

Carpentry (10 Hours)

Wood and its processing - measuring and marking tools. Wood working hand tools - Wood working machinery. Preparation of joints like dove tail, mortise & tenon.

Sheet metal practice (5 Hours)

Study of machines and tools used in sheet metal work.

Development and fabrication of simple sheet metal components like cylindrical dish, rectangular duct.

Foundry (5 Hours)

Study of foundry tool appliances. Preparation of sand for sand molding, making green sand molds for simple objects. Demonstration of melting, pouring and production of casting.

Smithy (5 Hours)

Study of hand forging tools. Hand forging exercises to make components of simple Geometry.

Part – B Civil Engineering Workshop

Surveying (10 Hours)

Chain survey - Traversing and plotting of details. Plane Table Surveying - method of radiation, intersection and traversing. Leveling – Fly leveling.

Sessional Requirements

Total Attendance	:5 marks
Part - A Mechanical Engineering Workshops	
Workshop Practical and Record	:25 marks
Test	:10 marks
Part – B Civil Engineering Workshop	
Workshop Practical and Record	: 5 marks
Test	: 5 marks
Total	: 50 marks

2K6 EN111P BASIC ELECTRICAL AND ELECTRONICS WORKSHOP

(2 Hrs / week)

A. Electrical Wiring (total 15 hours)

a) Familiarization of various types of service mains - wiring and installations – accessories and household electrical appliances.
b) Earthing – measurements of earth resistances – testing of Electrical installations – precautions and care from Electrical shocks.
c) Wiring practices of a circuit to control :
    i. one lamp by SPST switch
    ii. two lamps by SPST switch.
    iii. two lamps in series and parallel
    iv. stair case wiring
d) Familiarization of various parts and assembling of Electrical Motors and wiring practices of connecting a 3 phase – 1 phase motor with starter.

B. Electronics Workshop (total 15 hours)

1. Familiarization of various Electronic components such as resistors, capacitors, transformers, inductors, diodes, transistors and IC's
2. Assembling and soldering practice of a single phase full wave rectifier circuit with capacitor filter.
3. Assembling and soldering practice of common emitter amplifier circuits.
4. Assembling a timer circuit using IC555, phase shift oscillator using transistor and op - amp and JK flip - flop using NAND gates on the bread board.

C. Computer hardware Lab (total 20 hours)

1. Identification of components / cards – PC assembling from components.
2. Installation of motherboard, processor, memory and child hard disk.
3. Installation of peripherals such as FDD and a CD drive.
4. BIOS setup.
5. Preparation of HDD for installation – formatting partitioning and basics of file system.
6. Installation of different operating systems and managing application software.
7. Troubleshooting of standard PC.

Sessional Requirements

Total Attendance	: 5 marks
Workshop Practical and Record	: 10 marks each for A, B and C
Test	: 5 marks each for A, B and C
Total	: 50 marks

SCHEME AND SYLLABUS OF PHYSICAL EDUCATION, HEALTH AND FITNESS

Introductory Lectures

Unit 1. Health and Fitness: Modern concept of health and fitness, meaning, scope, need and importance of health, fitness and wellness
Unit II. Exercise and Fitness: Means and methods of developing fitness. Importance of physical activities and exercises in developing and maintaining good health, Physical fitness and well being.
Unit III. Sports and Physical education: Meaning and scope, role and importance of sports and games in the development of physical fitness and personality. Social values of sports. Rules of major games.

Practical Sessions

(All classes will be conducted after the normal working hours of the college)

50 sessions of minimum 1hour duration each are envisaged (including Theory and Practical). The student can opt for one of the following activities in line with the specific programme/ schedule announced by the faculty.
Athletics, Badminton, Basketball, Cricket, Football, General Fitness, Hockey, Kabaddi,
Table Tennis, Ball Badminton, Archery, Volley ball, Yoga (not all activities may be offered in a particular semester. More disciplines will be offered based on the availability of infrastructure and expertise.)
In addition, health and fitness assessment such as Height, Weight, Resting Pulse Rate and Blood Pressure will be carried out.

Objective

a) Basically to inculcate awareness of health, general fitness and attitude to voluntary physical involvement.

b) To promote learning of basic skills in sports activities and secondarily to pave the way for mastering some of the skills through continued future involvement.

Scheme of assessment

The student will be continuously assessed on his performance on the field of play. There will not be minimum mark for pass or fail. Total 50 marks will be given assessing their attendance, regularity, punctuality and performance for 50 hours of activity from1st semester to 7^{th} semester.

KANNUR UNIVERSITY
FACULTY OF ENGINEERING

Curricula, Scheme of Examinations & Syllabi for B.Tech Degree Programme (III-IV Semesters) in COMPUTER SCIENCE AND ENGINEERING With effect from 2007 Admissions

THIRD SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6CS 301	Engineering Mathematics II	3	1	-	50	3	100
2K6CS 302	Humanities	3	1	-	50	3	100
2K6CS 303	Discrete Computational Structures	3	1	-	50	3	100
2K6CS 304	Computer Programming	3	1	-	50	3	100
2K6CS 305	Switching Theory & Logic Design	3	1	-	50	3	100
2K6CS 306	Electronic Circuits & Systems	3	1	-	50	3	100
2K6CS 307(P)	**Programming Lab**	-	-	3	50	3	100
2K6CS 308(P)	**Electronics Lab**	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

FOURTH SEMSTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6CS 401	Engineering Mathematics III	3	1	-	50	3	100
2K6CS 402	Data Structures & Algorithms	3	1	-	50	3	100
2K6CS 403	Systems Programming	3	1	-	50	3	100
2K6CS 404	Microprocessors & Microcontrollers	3	1	-	50	3	100
2K6CS 405	Computer Organization & Design	3	1	-	50	3	100
2K6CS 406	Electric Circuits & Systems	3	1	-	50	3	100
2K6CS 407(P)	**Data Structures Lab**	-	-	3	50	3	100
2K6CS 408(P)	**Hardware Lab**	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

2K6 CS 301 : ENGINEERING MATHEMATICS II

3 hours lecture and 1 hour tutorial per week

Module I:

Infinite Series: Convergence and divergence of infinite series – Ratio test – Comparison test – Raabe's test – Root test – Series of positive and negative terms- absolute convergence – Test for alternating series. ***Power Series***: Interval of convergence – Taylors and Maclaurins series representation of functions – Leibnitz formula for the derivative of the product of two functions – use of Leibnitz formula in the Taylor and Maclaurin expansions

Module II:

Matrices: Concept of rank of a matrix –echelon and normal forms – System of linear equation - consistency – Gauss elimination– Homogeneous liner equations-Fundamental system of solutions- Inverse of a matrix – solution of a system of equations using matrix inversion – eigen values and eigen vectors - Cayley- Hamilton Theorem.

Module III:

Vector Integral Calculus: Evaluation of line integral, surface integral and volume integrals – Line integrals independent of the path, conservative force fields, scalar potential- Green's theorem- Gauss' divergence theorem- Stoke's theorem (proof of these not required).

Module IV:

Vector Spaces: subspaces–linear dependence and independence–bases and dimension-linear transformations -sums, products and inverse of linear transformations.

References:

1. Kreyszing E. Advanced Engineering Mathematics, Wiley Eastern
2. Sastri. S. S. Engineering Mathematics, Prentice Hall of India.
3. Wylie .C. R. Advanced Engineering Mathematics, Mc Grawhill.
4. B .S. Grewal. Higher Engineering Mathematics, Khanna Publishers.
5. Greenberg. M.D. Advanced Engineering Mathematics, Pearson Education Asia.
6. Narayanan .S. Manickavachagom Pella and Ramaiah. Advanced Mathematics for Engineering Students, S. Viswanathan Publishers

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 302 : HUMANITIES

3 hours lecture and 1 hour tutorial per week

Module I (20 hours)

Functional English Grammar: Sentence Analysis -Basic Patterns -Noun Group, Verbal Group, and Adverbial Group- Tenses – Conditionals - Active and Passive Voice - Reported Speech

Module II (14 hours)

Technical Communication

1. Nature, Growing need, and importance of technical communication – technical communication skills – listening, speaking, reading, and writing.
2. Barriers to effective communication – improper encoding, bypassing inter- cultural differences etc.
3. Organization in technical communication – spatial, chronological etc.
4. Style in technical communication - objectivity, accuracy, brevity, clarity etc.
5. Technical reports – types and format

Professional Ethics: 1. Ethics in Engineering, copyright – IPR- patents

Module III (10 hours)

Humanities, Science and Technology

1. Importance of humanities to technology, Education and Society
2. Relevance of a scientific temper
3. Relation between science, society and culture – the views of modern thinkers
4. The development of science and technology in society – science and technology in ancient Greece and India – the contribution of the Arabs to science and technology – recent advances in Indian science.

Reference books

1. Huddleston R, English Grammar – An outline, Cambridge University Press
2. Pennyor, Grammar Practice Activities, Cambridge University Press
3. Murphy, Intermediate English Grammar, Cambridge University Press
4. Hashemi, Intermediate English Grammar, Supplementary Exercises with answers, Cambridge University Press
5. Vesilind; Engineering, Ethics and the Environment, Cambridge University Press
6. Larson E; History of Inventions, Thompson Press India Ltd.
7. Bernal J. D., Science in History, Penguin Books Ltd.
8. Dampier W. C., History of Science, Cambridge University Press
9. Encyclopedia Britannica, History of Science, History of Technology
10. Subrayappa; History of Science in India, National Academy of Science, India
11. Brownoski J, Science and Human Values, Harper and Row
12. Schrödinger, Nature and Greeks and Science and Humanism, Cambridge University Press
13. Bossel. H., Earth at a Crossroads – paths to a sustainable future, Cambridge University Press
14. McCarthy, English Vocabulary in Use, Cambridge University Press
15. M. Ashraf Rizvi, Effective Technical Communication, Tata McGraw Hill, New Delhi, 2005

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 10 short type questions of 2 marks, from Module 1

Q II - 10 questions of 5 marks, from module II and III for writing short notes with choice to answer any **seven**

Q III - 2 questions A and B of 15 marks from module I for writing essay with choice to answer any one

Q IV - 2 questions A and B of 15 marks from module II for writing essay with choice to answer any one

Q V - 2 questions A and B of 15 marks from module III for writing essay with choice to answer any one

2K6 CS 303 : DISCRETE COMPUTATIONAL STRUCTURES

3 hours lecture and 1 hour tutorial per week

Module I: Logic (13 hours)
Prepositional Logic - Logical arguments - Consistency completeness and independence - Formal proofs - Natural deduction - Soundness, completeness and compactness theorems - Predicate logic - Completeness - Resolution - Unification algorithm

Module II: Relational structures (13 hours)
Sets relations and functions - Pigeonhole principle - Cardinals - Countable and uncountable sets - Digonalization - Equivalence relations and partitions - Partial order - Lattices and Boolean algebra

Module III: Group theory (13 hours)
Groups and subgroups - Products and quotients - Homomorphism theorems - Cosets and normal subgroups - Lagrange's theorem - Permutation groups - Cayley's theorem - Hamming Codes and Syndrome decoding

Module IV: Rings and fields (13 hours)
Rings, integral domains and fields - Ideals and quotient rings - Euclidean domains - Polynomial rings and division algorithm - Factorization and unique factorization - Irreducibility - Field properties and extensions - Ruler and compass constructions - Introduction to cyclic codes

Text books
1. Truss J.K., *Discrete Mathematics for Computer Scientists*, Addison Wesley (Modules I & II)
2. Kolman B. & Busby R.C., *Discrete Mathematical Structures for Computer Science*, Prentice Hall of India (Modules III & IV)

Reference books
1. Liu C.L., *Elements of Discrete Mathematics*, McGraw Hill
2. Grimaldi P., *Discrete & Combinatorial Mathematics*, Addison Wesley
3. Tremblay, J P., Manohar R - *Discrete Mathematical Structures to Applications to Computer Science* – Tata McGraw-Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 304 : COMPUTER PROGRAMMING

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)

Overview of C – Variables, Expressions and assignments, Lexical Elements, Fundamental Data Types, Operators *Control Statements* – if, switch-case, for , while, do, goto, break, switch *Functions*- Parameter passing , scope rules, recursion

Module II (12 hours)

Arrays – One dimensional and Multi Dimensional, *Pointer*-Linked List, Arrays of Pointers, Dynamic Memory Allocations, *Strings* – Operations and functions , *Bitwise Operators and Enumeration Types , Structures and Unions, Files and File Operations*

Module III (13 hours)

Overview of Java Language- Constants, Variables and Data Types, Operators and Expressions *Control Structures* – Decision Making, Branching and Looping, *Object Oriented Programming* – Concept of Classes, Objects and Methods, Benefits Java and OOP- Polymorphism and Overriding of methods, Inheritance

Module IV (12 hours)

Arrays and Strings, Interfaces, Multiple Inheritance, Packages – Putting Classes together – Managing Errors and Exceptions – Applet Programming and Graphics Programming (Basics only) – Managing Input/Output Files in Java

Text books

1. Kelley, Al & Pohl, Ira.,., *A Book on C- Programming in C*, 4th Ed,, Pearson Education (Modules I &II)
2. Balagurusamy E., Programming with Java: A Primer, 3rd Ed., Tata McGraw-Hill (Module III &IV)

Reference books

1. Balagurusamy E., Programming in ANSI C, Tata McGraw Hill
2. Eckel, Bruce., *Thinking in Java*, 2nd Ed, Pearson Education

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 305 : SWITCHING THEORY & LOGIC DESIGN

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)

Number Systems and codes - *Boolean algebra* - Postulates and theorems - Constants, variables and functions - Switching algebra - Electronic gates and mechanical contacts *Boolean functions and logical operations* - Normal and canonical forms - Self-dual functions - Logical operations - *Karnaugh map* - Prime cubes - Minimum sum of products and product of sums - Quine-McClusky algorithm

Module II (13 hours)

Combinational Logic - Analysis and design of combinational logic circuits - Universal property of the NAND and NOR gates – Adders - Parallel adders and look-ahead adders – Comparators - Decoders and encoders - Code conversion - Multiplexers and demultiplexers - Parity generators and checkers - ROMs, PLAs

Module III (10 hours)

Fault diagnosis and tolerance - Fault classes and models - Fault diagnosis and testing - Test generation - Fault table method - Path sensitisation method - Boolean difference method - Fault-tolerance techniques. *Programmable logic arrays* - PLA minimization - Essential prime cube theorem - PLA folding - Design for testability

Module IV (15 hours)

Counters and shift registers - SR, JK, D and T flip-flops - Excitation tables - Triggering of flip-flops - Flip-flop applications - Latches - Ripple counters - Synchronous counters - Up-down counters - Design of sequential circuits - Counter decoding - Counter applications - Shift registers and their applications - *Clock mode sequential machine - S*tate tables and diagrams

Text books

1. Biswas N.N., *Logic Design Theory*, Prentice Hall of India (modules I, II & III)
2. Floyd T.L., *Digital Fundamentals*, Universal Book Stall (module IV)

Reference books

1. Leach D, Malvino A P & Saha-*Digital Principles and Applications,* 6th Ed, Tata McGraw Hill
2. Kohavi Z., *Switching & Finite Automata Theory*, Tata McGraw Hill
3. Marcovitz, Alan, *Introduction to Logic and Computer Design*, Tata McGraw Hill
4. Taub, Herbert. & Schilling., *Digital Integrated Electronics*, McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 306 : ELECTRONIC CIRCUITS & SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)
Diode switch, clipping and clamping circuits - Transistor switch - Bistable multivibrator - Schmitt trigger - Monostable and astable multivibrator - Miller and bootstrap sweep generators

Module II (13 hours)
Logic levels - Concepts of SSI, MSI, LSI and VLSI - Logic families: NOT gate, TTL, ECL, CMOS logic - Interfacing - Comparison of logic families - TTL and MOS flip-flops

Module III (13 hours)
Memories: Basic concepts - Read only memories - Programmable ROMs - Static and dynamic random access memories - Memory expansion - Magnetic bubble memories - Magnetic surface storage devices - CD-ROMs - Special memories - Sample and hold circuit - D/A converters - A/D converters - Timing circuits

Module IV (13 hours)
Communication systems - Need for modulation - External and internal niose - Noise figure definition - Amplitude modulation and demodulation - Frequency and phase modulation - Noise and FM - FM demodulation - TRF and superheterodyne receivers - Radiation and propagation of electromagnetic waves

Text books
1. Millman J. & Taub H., *Pulse, Digital & Switching Waveforms*, McGraw Hill (Module I)
2. Taub H. & Schilling D., *Digital Integrated Electronics*, McGraw Hill (Modules II & III)
3. Kennedy G., *Electronic Communication Systems*, Tata McGraw Hill (Module IV)

Reference books
1. Nagarath I.J., *Electronics Analog & Digital,* Prentice Hall India
2. Floyd T.L., *Digital Fundamentals,* Universal Book Stall
3. Schilling D.L. & Belove C., *Electronic Circuits: Discrete & Integrated,* McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 307(P) : PROGRAMMING LAB

3 hours practicals per week

Set 1 (3 lab sessions)

C Programming - HCF (Euclid's algorithm) and LCM of given numbers - Conversion of numbers from binary to decimal, hexadecimal, octal and back - Evaluation of functions like e^x, sin*x*, cos*x* etc. for a given numerical precision using Taylor's series - String manipulation programs: sub-string search, deletion - Lexicographic sorting of a given set of strings - Generation of all permutations of the letters of a given string using recursion

Set 2 (2 lab sessions)

C Programming - Matrix operations: Programs to find the product of two matrices - Inverse and determinant (using recursion) of a given matrix - Solution to simultaneous linear equations using Jordan elimination. Files: Use of files for storing records with provision for insertion - Deletion, search, sort and update of a record

Set 3 (2 lab sessions)
JAVA - String handling programs, Implementation of Inheritance, Polymorphism, Overriding and Exceptions

Set 4 (3 lab sessions)
JAVA- Input/Output File Operations, Applet and Graphic Programming

Reference books

1. Schildt H., *C: The Complete Reference*, Tata McGraw Hill
2. Kelley, Al & Pohl, Ira.,., *A Book on C- Programming in C*, 4th Ed,, Pearson Education
3. Balagurusamy E., Programming with Java: A Primer, 3rd Ed., Tata McGraw-Hill

Sessional work assessment

Lab practicals & record	= 30
Test	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

2K6 CS 308(P) : ELECTRONICS LAB

3 hours practicals per week

Set 1: Circuits

1. Silicon, germanium and Zener diode characteristics
2. Static transistor characteristics in CE and CB configurations
3. Clipping, clamping, differentiating and integrating circuits
4. Series voltage regulator
5. Frequency response of RC coupled amplifier
6. RC phase shift oscillator, UJT relaxation oscillator
7. OPAMP: inverting and non-inverting amplifier, voltage follower

Set 2: Digital Electronics

1. Verification of truth tables of AND, OR, NOT, NAND, NOR and XOR gates, use for gating digital signals
2. TTL characteristics
3. Verification of the postulates of Boolean algebra and DeMorgan's theorem using logic gates
4. Half and full adders, half and full subtractors
5. Digital comparator, parity generator and checker, and code converter
6. Characteristics and operations of RS, gated RS, D, T, and JK master slave flipflops
7. Multiplexer and demultiplexer using gates
8. Shift register, ring counter, and twisted ring counter
9. Decade counter and variable modulo asynchronous counter
10. Astable multivibrator and Schmitt trigger using gates, Astable and Monostable multivibrator using 555 IC.

Reference books

1. Bhargava et.al., *Basic Electronic Circuits and Linear Circuits,* Tata McGraw Hill
2. Boylestead & Nashelski, *Electronic Devices and Circuit Theory*, 9th Ed, Pearson/PHI
3. Nagarath J., *Electronics Analog & Digital*, Prentice Hall India
4. Millman & Halkias, *Integrated Electronics*, Tata McGraw Hill

Sessional work assessment

Lab practicals & record	= 30
Test	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

2K6 CS 401 : ENGINEERING MATHEMATICS III

3 hours lecture and 1 hour tutorial per week

Module I: (13 hours)

Complex analytic functions and conformal mapping: Complex functions – limits. derivative, analytic function- Cauchy-Riemann equations- elementary complex functions such as powers, exponential function, logarithmic, trigonometric and hyperbolic functions- Conformal mapping – Linear fractional transformations- mapping by elementary functions

Module II: (13 hours)

Complex integration: Line integral, Cauchy's integral theorem - Cauchy's integral formula – Taylor's series, Laurent series – residue theorem – evaluation of real integrals using integration around unit circle, around semicircle, integrating contours having poles on the real axis

Module III: (13 hours)

Jointly Distributed Random Variables: Joint distribution functions, independent random variables , covariance and variance of sums of random variables, joint probability distribution functions of random variables, conditional probability and conditional expectations. ***Curve fitting***: Method of least squares, correlation and regression, line of regression.

Module IV: (13 hours)

Vibrating strings: One dimensional wave equation – D' Alembert's solution – solution by method of separation of variables One dimensional heat equation - solution of the equation by the method of separation of variable Solutions of Laplace's equation over a rectangular region and a circular region by the method of separation of variable

Reference books

1. Kreyszig E. Advanced Engineering Mathematics. Wiley Eastern
2. Johnson, Miller and Freud. Probability and Statistics for Engineers, Pearson Education Asia.
3. Wylie .C.R. Advanced Engineering Mathematics, Mc Grawhill.
4. B.S. Grewal. Higher Engineering Mathematics, Khanna Publishers.
5. Freund. J.E. Mathematical Statistics, Prentice hall of India.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 402 : DATA STRUCTURES & ALGORITHMS

3 hours lecture and 1 hour tutorial per week

Module I (10 hours)

Review of data types - Scalar types - Primitive types - Enumerated types - Character strings - arrays - records - sets - Data abstraction - Complexity of algorithms - Time and space complexity of algorithms using "big oh" notation - Recursion: Recursive algorithms - Analysis of recursive algorithms – Solution of recurrences.

Module II (13 hours)

Object oriented Programming: Concepts, ADT, *Linear Data structures*: linked structures–Ordered array, indirect reference, Linked nodes, insertion and deletion in linked lists - Stacks - Queues – Collections -Lists - Stack and queue implementation using array

Module III (13 hours)

Non linear structures: -Trees , Binary trees – traversals, Graphs- BFS, DFS, Spanning trees , Shortest path algorithms- Heaps and Priority Queues.

Module IV (16 hours)

Searching - Sequential search - Binary search - Searching arrays and binary search trees - Hashing - Introduction to simple hash functions - resolution of collisions - *Sorting*: n^2 Sorts - Bubble sort - Insertion Sort - Selection sort - NlogN sorts - Quick sort - Heap sort - Merge sort .

Text book

1. Sedgewick, Robert., *Algorithms in JAVA*., 3rd Ed.,Pearson Education

Reference books

1. Aho A.V., Hopcroft J.E. & Ullman J.D., *Data Structures and Algorithms*, Addison Wesley (Module I)
2. Hubbard J R & Huray Anita., Data Structures with JAVA – Pearson Education (Module II, III & IV)
3. Cormen T.H., Leiserson C.E., & Rivest R.L., *Introduction to Algorithms*, MIT Press, 1990
4. Lafore Robert., *Data Structures and Algorithms in Java, 2nd Ed., SAMS publishing*
5. Waite, Mitchell., *Data Structures and Algorithms in Java, 2nd Ed., SAMS publishing*
6. Wirth N., *Algorithms +Data Structures = Programs*, Prentice Hall
7. Drozdeck, Adams, Data Structures and Algorithms in Java., Thompson Learnig.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 403 : SYSTEMS PROGRAMMING

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)

Background - System software machine architecture - The simplified instructional computer - Traditional machines - RISC machines. *Assemblers* - Basic Assembler functions - Machine dependent and machine independent - Assembler features - *Assembler design* - Assembler design options - Implementation examples - AIX Assembler

Module II (13 hours)

Loaders and linkers - Basic loader functions - Machine dependent features – relocation and program linking. Machine independent features - automatic library search , loader features - Loader design options – Linkage editors, Dynamic linking, Boot strap loaders and implementation examples- MS-DOS Linker, Sun OS linker

Module III (9 hours)

Macro Processors - Basic macro processor functions - Machine-independent macro processor features – Macro processor Algorithm and Data structures, Conditional Macro expansion, Recursive Macro expansion, General purpose macroprocessors . implementation examples- MASM Macro processor, ANSI C Macro language

.

Module IV (15 hours)

Basics of Compilers: Basic compiler functions, different phases of compilers (Introduction only), Interpreters, P- code compilers.

Introduction to Operating systems - Basic principles – Batch processing - Multiprogramming - Timesharing systems and real-time systems - Parallel and distributed systems - *Computer system structure* - Computer system operation - I/O structure - structure - Storage Hierarchy - Hardware protection - General system architecture – Case Study: *General Overview of the UNIX operating system*

Text books

1. Beck L.L., *System Software - An introduction to Systems Programming*, Addison Wesley (First 3 Modules)
2. Silberschatz, Galvin, Operating system (5th edition), Addison Wesley (4th Module)
3. Aho, Revi sethi, Compilers Principles, techniques & Toolss , Pearson edn. (4th module)

Reference books

1. Dhamdhere D.M., *Systems Programminmg & Operating Systems*, Tata McGraw Hill
2. Bach M.J., *The Design of the Unix Operating System*, Prentice Hall India (module IV)
3. Godbole S., *Operating Systems*, Tata McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 404 : MICROPROCESSORS & MICROCONTROLLERS

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)
Intel 8086 processor - Architecture - Memory addressing - Addressing modes - Instruction set - Assembly language programming - Assemblers - Interrupts - Pin configuration - Timing diagrams - Minimum and maximum mode - Multiprocessor configuration

Module II (12 hours)
Interfacing - Address decoding - Interfacing chips - Programmable peripheral interface (8255) - Programmable communication interface (8251) - Programmable timer (8253) - DMA controller (8259) - Programmable interrupt controller (8257) - Keyboard display interface (8279)

Module III (12 hours)
Introduction to 80386 - Memory management unit - Descriptors, selectors, description tables and TSS - Real and protected mode - Memory paging - Special features of the pentium processor - Branch prediction logic - Superscalar architecture

Module IV (13 hours)
Intel 80196 microcontroller - CPU operation - Memory space - Software overview - Peripheral overview - Interrupts - PWM timers - High speed inputs and outputs - Serial port - Special modes of operation

Text books

1. Hall D.V., *Microprocessors & Interfacing*, McGraw Hill
2. Brey B.B., *The Intel Microproessors - Architecture, Programming & Interfacing*, Prentice Hall
3. Liu Y.C. & Gibsen G.A., *Microcomputer System: The 8086/8088 Family*, Prentice Hall of India
4. Hintz K.J. & Tabak D., *Microcontrollers-Architecture, Implementation & Programming*, McGraw Hill

Reference books

1. Intel Data Book Vol.1, *Embedded Microcontrollers and Processors*
2. Tribel W.A. & Singh A., *The 8088 and 8086 Microprocessors*, McGraw Hill
3. Mohammed R., *Microprocessors & Microcomputer Based System Design*, Universal Bookstall
4. Intel Data Book EBK 6496 16 bit Embedded Controller Handbook
5. Intel Data Book, EBK 6485 Embedded Microcontrollers Data Book
6. Intel Data Book, EBK 6486 Embedded Applications Book

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 405 : COMPUTER ORGANISATION & DESIGN

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)
Computer abstraction and technology: Below your program - Under the covers - Historical perspective - Measuring performance - Relating the metrics - evaluating, comparing and summarizing performance - Case study: SPEC95 benchmark – Instructions - Operations and operands of the computer hardware - Representing instructions - Making decision - Supporting procedures - Beyond numbers - Other styles of addressing - Starting a program - Case study: 80x86 instructions

Module II (12 hours)
Computer arithmetic - Signed and unsigned numbers - Addition and subtraction - Logical operations - Constructing an ALU - Multiplication and division - Floating point - Case study: floating point in 80x86

Module III (11 hours)
The processor: Building a data path - Simple and multicycle implementations - Microprogramming - Exceptions - Case study: Pentium Pro implementation

Module IV (15 hours)
Memory hierarchy - Caches - Cache performance - Virtual memory - Common framework for memory hierarchies - Case study - Pentium Pro memory hierarchy - Input/output - I/O performance measures - Types and characteristics of I/O devices - Buses - Interfaces in I/O devices - Design of an I/O system

Text book
1. Pattersen D.A. & Hennesy J.L., *Computer Organisation & Design: The Hardware/ Software Interface*, Harcourt Asia

Reference books
1. Heuring V.P. & Jordan H.F., *Computer System Design & Architecture*, Addison Wesley
2. Hamacher, Vranesic & Zaky, *Computer Organisation*, McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 406: ELECTRIC CIRCUITS & SYSTEMS

3 hours lecture and 1-hour tutorial per week

Module I (12 hours)

Network theorems – Kirchoff's current and voltage law-superposition theorem – Thevenin's theorem – Norton's theorem - node and mesh analysis, coupled circuits - Definition of graph, cut sets and loops - trees incidence matrix - Applications of graph theoretic methods for the formation of network equations.

Module II (12 hours)

Laplace transform - Application of Laplace transform for the solution of differential equations .Transient analysis of RL, RC and RLC circuits - concept of time constant - Polyphase circuit - 3 phase circuit with balanced and unbalanced loads - star-delta transformation

Module III (12 hours)

Bridge circuits - Principles of Maxwells bridge - Wiens bridge, Andersons bridge and Scherring bridge - Two port networks - Concept of impedance - Admittance and hybrid parameters - Interconnection of two port networks - Driving point and transfer functions.

Module IV (16 hours)

Introduction to systems - Systems engineering - Block diagram - Transfer function - Poles and zeros - Control system characteristics - Dynamic responses - Feedback control - System response - First and second order systems - Frequency response - Stability analysis using frequency response (Bode plot) and using root locus

Text books

1. Siskind, *Electrical Circuits*, McGraw Hill
2. Smith R.J. & Dorf R.C., *Circuits Devices & Systems*, John Wiley

Reference books

1. Kuo F., *Network Analysis & Synthesis*, John Wiley
2. Chang D.K., *Analysis of Linear Systems*.
3. Edminister, *Electric Circuits, Schaum 's Outline Series*, McGraw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 407(P) : DATA STRUCTURES LAB

3 hours practicals per week

1. *Stack and Queue*: Implementation using arrays and Linked lists
2. *Searching Methods*: Binary search and Hashing
3. N^2 *algorithms* – Bubble sort, Insertion Sort
4. *Sorting*: Recursive implementation of Quick Sort and Merge Sort
5. *Binary Search Tree*: Implementation with insertion, deletion and traversal
6. *Graph Search Algorithms*: DFS and BFS on a connected directed graph
7. *Minimal Spanning Tree*: Implementation of Kruskal's and Prim's Algorithms
8. *Shortest Path Algorithms*: Dijkstra and Floyd Warshall Algorithms
9. *Applications of Heap*: Priority Queue and Heap Sort

Reference books

1. Cormen T.H., Lieserson C.E. & Rivest R.L., Introduction to Algorithms, Prentice Hall of India
2. Hubbard J R & Huray Anita., Data Structures with JAVA – Pearson Education

Sessional work assessment

Lab practicals & record	= 30
Test	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

2K6 CS 408(P) : HARDWARE LAB

3 hours practical per week

Lab 1 : Identification of components/cards and PC assembling from components

Lab 2,3 : Assembly language programming

Lab 4 : TSR (Terminate and Stay Resident) Programming

Lab 5 : ADC and DAC interface

Lab 6 : Waveform Generation

Lab 7 : Stepper Motor interface

Lab 8,9 : Parallel Interface: Printer and HEX keyboard.

Lab 10 : Serial Interface: PC to PC serial interface using NULL MODEM.

Lab 11 : Familiarization of Microcontroller Kit

Lab 12 : Interfacing with Microcontroller Kit

Reference books

1. Messmer H.P., *The Indispensable PC Hardware Book*, 3/e, Addison Wesley
2. Hall D.V., *Microprocessors and Interfacing, 2/e,* Tata McGraw Hill
3. Norton P., *Dos Internals*
4. Hintz K.J. & Tabak D., *Microcontrollers-Architecture, Implementation & Programming*, McGraw Hill
5. Ayala, Kenneth J, *The 8051 Microcontroller*, Penram Publishers
6. Axelson, Jan., *The Microcontroller Idea Book,* Penram Publishers

Sessional work assessment

Laboratory practicals and record	= 30
Test	= 20
Total marks	= 50

University evaluation will be for 100 marks of which 70 marks are allotted for writing the procedure/formulae/sample calculation details, preparing the circuit diagram/algorithm/flow chart, conduct of experiment, tabulation, plotting of required graphs, results, inference etc., as per the requirement of the lab experiments, 20 marks for the viva-voce and 10 marks for the lab record.
Note: Duly certified lab record must be submitted at the time of examination

KANNUR UNIVERSITY

FACULTY OF ENGINEERING

Curricula, Scheme of Examinations & Syllabus for Semesters V & VI of B.Tech. Degree Programme in Computer Science & Engineering with effect from 2007 Admissions

FIFTH SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6 CS 501	Engineering Mathematics IV	3	1	-	50	3	100
2K6 CS 502	Economics & Business Management	3	1	-	50	3	100
2K6 CS 503	Theoretical foundation of Computation	3	1	-	50	3	100
2K6 CS 504	Programming Language Concepts	3	1	-	50	3	100
2K6 CS 505	Operating Systems	3	1	-	50	3	100
2K6 CS 506	Software Engineering	3	1	-	50	3	100
2K6 CS 507(P)	Programming Environment Lab	-	-	3	50	3	100
2K6 CS 508(P)	Systems Lab	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

SIXTH SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hrs	Marks
2K6 CS 601	Environmental Engg: & Disaster Management	3	1	-	50	3	100
2K6 CS 602	Graph Theory & Combinatorics	3	1	-	50	3	100
2K6 CS 603	Data Base Management Systems	3	1	-	50	3	100
2K6 CS 604	Compiler Design	3	1	-	50	3	100
2K6 CS 605	Data Communication & Computer Networks	3	1	-	50	3	100
2K6 CS 606	Elective - I	3	1	-	50	3	100
2K6 CS 607(P)	Networks & DBMS Lab	-	-	3	50	3	100
2K6 CS 608(P)	Compiler Lab	-	-	3	50	3	100
TOTAL		**18**	**6**	**6**	**400**	**-**	**800**

Elective I

2K6 CS 606 (A) – Distributed Computing
2K6 CS 606 (B) - Bioinformatics
2K6 CS 606 (C) – Software Project Management
2K6 CS 606 (D) – Digital Signal Processing
2K6 CS 606 (E) - Entrepreneurship
2K6 CS 606 (F) – Advanced Mathematics

2K6 CS 501 ENGINEERING MATHEMATICS IV

3 hours lecture and 1 hour tutorial per week

Module I Probability distributions (13 hours)
Random variables-Probability distributions - binomial distribution –Poisson distribution-normal distribution –Mean, variance and Moment generating function -Poisson process - Chebyshev's theorem- Geometric Distribution-Uniform Distribution, Gamma distribution, Beta Distribution, Exponential Distribution and Hyper-Geometric Distributions.

Module II Statistical inference (13hours)
Population and Sample-Sampling Distributions of Mean and Variance-Point Estimation-Interval Estimation -Null Hypotheses and Significance tests-Hypotheses concerning one mean- Confidence Intervals of mean and variance - Estimation of Variances-Hypotheses concerning one variance-Hypotheses concerning two variance- Chi square test as test of goodness of fit.

Module III (Series solutions of differential equations (13hours)
Power series method of solving ordinary differential equations - series solution of Bessel's equation – Recurrence formula for Jn(x)-expansions for J_0 and J_1 – value of $J_{1/2}$- generating function for Jn(x)- Orthogonality of Bessel functions - Legendre's equation – series solution of Legendre's differential equation -Rodrigues formula-Legendre Polynomials – Generating function for Pn(x)- Recurrence formulae for Pn(x) -Orthogonality of Legendre polynomials

Module IV Quadratic forms and Fourier Transforms (13 hours)
Quadratic forms - Matrix associated with a quadratic form - Technique of Diagonalization using row and column transformations on the matrix - Definite, Semidefinite and Indefinite forms - their identification using the Eigen values of the matrix of the quadratic form.
Fourier Transform-Properties of Fourier Transforms-Linearity property-Change of scale property-shifting properties –Modulation property-Transform of the Derivative-simple problems- Fourier Cosine transform-Fourier Sine Transform.

Text book
Johnson RA, Miller & Freund's Probability and Statistics for Engineers, Prentice Hall of India
(For Module I and II only)

Reference Books
1. Wylie C R & Barrett L. C., Advanced Engineering Mathematics, Mc Graw Hill
2. Kreyszig E., Advanced Engineering Mathematics, John Wiley.
3. Bali N. P. & Manish Goyal, A Text book of Engineering Mathematics, Laxmi Publications
4. Grewal B. S, Higher Engineering Mathematics, Khanna Publishers

Sessional work assessment

Two tests	2 x 15 = 30
Two assignments	2 x 10 = 20
Total marks	= 50

University Examination Pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module.
Q II - 2 questions of 15 marks each from module I with choice to answer any one.
Q III - 2 questions of 15 marks each from module II with choice to answer any one.
Q IV - 2 questions of 15 marks each from module III with choice to answer any one.
Q V - 2 questions of 15 marks each from module IV with choice to answer any one.

2K6 CS 502 ECONOMICS & BUSINESS MANAGEMENT

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Definition of economics-nature and scope f economic science-nature and scope of managerial economics-central problems of an economy-scarcity and choice-opportunity cost-objectives of business firms-forms of business-proprietorship-partnership-joint stock company-co-operative organization-state enterprise

Module II (14hours)

Consumption – wants –characteristics of wants- law of diminishing marginal utility- demand – law of demand-elasticity of demand- types of elasticity-factors determining elasticity-measurement- its significance in business-demand forecasting-methods of demand forecasting- supply – law of supply- elasticity of supply

Module III (14hours)

Production – factors of production – features of production – features of factors of production- division of labour – production function- Cobb-Douglas production function-production possibility curve-isoquants-marginal rate of technical substitution- properties of isoquants -law of variable proportions- returns to scale-isocost line-least cost combination of factors-expansion path-technical and economical efficiency-linear programming –graphical method-economics of large scale production.

Module IV (12hours)

Market structures and price determination – perfect competition-monopoly -monopolistic competition-oligopoly-kinked demand curve-money and banking-nature and functions of money-money market and capital market-commercial banks –functions-central banking functions-methods of credit control.

Text books and References

1 Varshney R.L & Maheshwari K.L , Managerial economics, S Chand & Co. Ltd..
2 Dwiivedi D.N, Managerial Economics, Vikas Publishing House Pvt Ltd
3. Dewett K.K, Modern Economic theory, S Chand & company Ltd.
4. Barthwal A.R ,Industrial Economics, New Age International Publishers
5. Benga T.R & Sharma S.C, Industrial Organization and Engineering Economics , Khanna Publishers
6. Ahuja H.L Modern Micro Economics –Theory and Applications , S Chand & Co. Ltd
7. Koutsoyiannis A , Modern Microeconomics, Macmillan Press Ltd.
8. Joel Dean, managerial Economics Prentice-Hall of India Pvt Ltd.
9. Dewett .K.K& Verma J.D,Elementary Economic Theory , S Chand & Co. Ltd.
10. Jhingan M.L., Macro Economic theory , Vrinda Publications Pvt.Ltd.

Sessional work assessment

Two tests	2 x 15 = 30
Two assignments	2 x 10 = 20
Total	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module.
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one.
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one.
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one.
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 503: THEORETICAL FOUNDATION OF COMPUTATION

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)

Introduction; alphabets, Strings and Languages; Automata and Grammars -Finite automata (FA) -DFA-NFA – Finite Automata with epsilon-transitions-Equivalence of DFAs and NFAs -Regular expressions (RE) -Definition, RE to FA, FA to RE, algebraic laws for RE, applications of REs. -Regular grammars and FA -Proving languages to be non-regular -Pumping Lenma – Applications. Closure properties of Regular languages -Closure under Boolean operations, reversal, homomorphism, inverse homomorphism, etc. –Myhill-Nerode theorem-DFA Minimization - Decision properties of Regular languages - Two-way finite automata, Finite automata with output.

Module II (13 hours)

Context-free Grammars (CFG) -Parse tree - Ambiguity in grammars and Languages-Applications of CFG-Pushdown Automata (PDA) -Equivalence of PDAs and CFGs -DPDAs -Definition, DPDAs and Regular Languages,-DPDA and Ambiguous grammars--CYK algorithm -Simplification of CFGs -Normal forms -CNF and GNF --Pumping lemma for CFLs,Closure properties of CFLs - Decision properties of CFL.

Module III (13 hours)

Turing Machines -Formal definition and behavior - TM as a computer of integer functions -Programming techniques for TMs -Storage in state, multiple tracks, subroutines, etc.-Computing a partial function with Turing machine-Variants of TMs –Multitape TMs, Nondeterministic TMs. -TMs with semi-infinite tapes, multistack machines.-universal Turing Machines-Equivalence of the various variants with the basic model- Models of computation and Church-Turing Thesis.

Module IV (13 hours)

Computability – Closure properties of recursive and recursively enumerable language. Undecidability- A language that is not RE – An undecidable problem that is RE – Undecidable problems about TM-Halting problem – Post Correspondence Problem – The Chomsky hierarchy – Context sensitive language and LBA –Equivalence of LBA and CSG.

Text books

1. J E Hopcroft And J D Ullman : Introduction to Automata Theory and Computation, Addison Wesley
2. John C Martin : Introduction to Languages and the Theory of Computation(3 rd Edition) , TMH

Reference books

1. H R Lewis and C H Papadimitriou : Elemnts of Theory of Computation
2. Sipser : Introduction to theory of Computation, CENAGE LEARNING Indian Edition
3. Linz P : An Introduction to Formal Languages and Automata, Narosa

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 504: PROGRAMMING LANGUAGE CONCEPTS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Preliminaries – Reasons for studying concept of programming languages- Programming Domains-Language evaluation criteria- influence on language design-language categories-Implementation methods-Programming environments – Evolution of programming languages- Describing Syntax and semantics-Formal methods of describing syntax- attribute grammars- Dynamic semantics-Names, variables-concept of binding-type checking-strong typing-type compatibility-Scope and lifetime-referencing environments-Named constants.

Module II (15 hours)

Data types-Primitive-Character strings-Array types-Associative arrays-record and union types-Pointer and reference types-Expression and assignment statements-arithmetic expressions-Overloaded operators-type conversions-relational and Boolean expressions-short circuit evaluation-assignment statements-mixed mode assignment-statement level control structures-selection and iterative statements- unconditional branching and guarded commands- subprograms-Design issues – parameter passing methods-over loaded subprograms-Implementing subprograms-blocks-implementing dynamic scope

Module III (12 hours)

Concept of Abstraction-Data abstraction-design issues-encapsulation constructs-Object oriented programming-Design issues-support for object oriented programming in C++,JAVA,C# etc- Implementation of object oriented constructs- Concurrency – Subprogram level concurrency-monitors-message passing-threads-statement level concurrency- Exception handling in JAVA & C++ -event handling with JAVA.

Module IV (12 hours)

Functional programming languages – Mathematical functions – fundamentals of functional programming languages- Introduction to COMMON LISP, ML-Application of functional languages- Comparison of functional & Imperative languages – Logic programming languages – Introduction to predicate calculus-Overview of logic programming-origins of prolog-basic elements of prolog Applications of logic programming

Text books

4. Robert W Sebesta, Concepts of programming Languages (7 edn) – Pearson Education

Reference books

1. Sethi R, Programming languages: Concepts & Constructs , Addison Wesley
2. Scott M L, Programming language Pragmatics, Morgan Kaufman

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 505: OPERATING SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Computers and Software –General System software- Resource abstraction & Sharing-Operating system strategies (Batch, Timesharing, real time, embedded etc) – Concept of Multiprogramming- Operating system organization – Basic functions-Implementation considerations-Computer organization-bootstrapping the machine-Mobile computers, Multiprocessors and parallel computers- Device Management-Device controllers & Device drivers – I/O strategies (direct I/O with polling, Interrupt driven I/O, DMA), Buffering, Disk scheduling strategies

Module II (15 hours)

Process & Threads- Implementing process & Threads – Process address space- process state transition diagram-Process manager responsibilities- concept of Linux process & thread descriptors-Process scheduler organization-different scheduling strategies(non preemptive & preemptive)- Process synchronization- critical section- semaphore & its implementation – classical synchronization problems and its solutions (Producer-consumer, readers-writers, dining philosopher)- Deadlock-prevention-avoidance-bankers algorithm-detection-reduced resource allocation graph- Inter process communication(Pipes, message passing etc)-concept of process management in Linux and widows NT.

Module III (12 hours)

Memory management- address space abstraction-address binding-memory allocation-Fixed partition & variable partition memory strategies-dynamic address binding-swapping-paging-virtual memory address translation-dynamic paging-static paging algorithms-dynamic paging algorithm-working set algorithm-segmentation-implementation-memory mapped files-concept of memory management in Linux & Windows NT/XP.

Module IV (12 hours)

File Management – Low level files and Structured files- Low level file implementation – different approaches to Block management- Structured sequential file-Indexed sequential file-different directory structures-file systems-Mounting file systems- Protection and Security-security and Policy – Authentication , authorization and cryptography- Kerberos authentication- General protection model- Acess matrix-Access control list – Capability list – Concept of File management in Linux and Windows NT.

Text books

5. Gary Nutt,Operatig Systems (3rd edn), Pearson education
6. Gary Nutt, Nebendu Chaki, and Sarmistha Neogy, Operating Systems(Third Edition), Pearson Education.

Reference books

3. Siberschatz & Galvin, Operating system concepts (7 edn), Addison Wesley
4. Crowley C., Operating Systems – A Design oriented Approach, TMH
5. Tanenbaum A. S, Modern Operating Systems, Prentice hall, Pearson Education

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 506: SOFTWARE ENGINEERING

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Introduction- The software process, Software process models-Waterfall model, RAD model, Prototyping model, Spiral model, Component based development, Aspect-oriented software development System modeling, System engineering process, System models-Data models, Object oriented model, Scenario based model, Flow oriented model, Class-based model, Behavioral model Software requirements- Functional and Non-functional requirements-SRS- Requirement Engineering Process

Module II (13 hours)

Design Engineering- Design concepts, design model, pattern based software design Architectural Design-system structuring, control models, modular decomposition, Object oriented Design, Component based design, User Interface Design

Module III (13 hours)

Software Testing- Testing process, Testing strategies- Verification and validation, Software inspection, Unit testing and Integration Testing, Validation testing, System testing Testing tactics- Software Testing Fundamentals, Black box testing, White box testing, Object-oriented testing, Clean room engineering process

Module IV (14 hours)

Project Management- Metrics for process and projects, Estimation- Project planning process, Software scope and feasibility, Resources, software project estimation, Decomposition techniques, Project scheduling, Risk Management- Risk identification, Risk projection, Risk refinement, RMMM Quality management-Product metrics, Quality-Quality control, Quality assurance, Cost of Quality, Change Management-Configuration Management, Software re-engineering, Reverse Engineering, CBSE process.

Text books

7. Pressman S. Roger, "Software Engineering", Tata Mac Graw Hill
8. Sommerville Ian, "Software Engineering 6th Addition", Addition Wesley 2002

Reference books

1. Jalot Pankaj, "An Integrated Approach to S/W Engg."Narosa Publishing House
2. Rajib Mall

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 507(P): Programming Environment Lab

3 hours practical per week

Object-oriented programming in Java/C++

1. Define a base class "Shape" and derived classes for "Rectangle", "Square", "Ellipse" and "Circle" with proper class hierarchy.
2. Implement operator and function overloading.
3. Design and implement an interface.
4. Design and implement a Generic class

Functional Programming in LISP/Scheme

1. Write a program to implement Tower of Hanoi problem for n number of disks.
2. Write a program to implement Missionaries and Cannibals problem.
3. Write a program to implement Binary Search Tree (BST) and do the following operations on BST.

   (i) Insertion of an element

   (ii) Deletion of a n element
   (iii) Display of BST
   (iv) Display of Maximum and Minimum elements of BST
4. Write a program to implement Quick Sort on both list of numbers and list of strings. If strings, sort them in lexicographic order.

Concurrent Programming in Java/ Ada

1. Design and implement a multi-threaded program.
2. Design and implement a multi-process application

Reference books

1. Robert W Sebesta, Concepts of programming Languages (7 edn) – Pearson Education
2. Sethi R, Programming languages: Concepts & Constructs, Addison Wesley
3. Scott M L, Programming language Pragmatics, Morgan Kaufman
4. Elaine Rich, Kevin Knight, "Artificial Intelligence", Tata McGraw Hill Publishing Company Limited

Sessional work assessment

Laboratory practical and Record	= 35
Test	= 15
Total marks	= 50

2K6 CS 508(P): SYSTEMS LAB

3 hours practical per week

Operating systems

1. Inter-process communication using pipes, FIFO, message queues and shared memory
2. Producer-Consumer problem using mutex and condition variables
3. Producer-Consumer problem using semaphores
4. Detection and handling of signals like death of child process, user generated interrupts etc. by a process.
5. Open a directory and display its contents, size of each file, total size etc.
6. Banker's algorithm
7. Simulation of various process scheduling algorithms (Pre-emptive and non pre-emptive)
8. Simulation of various memory page replacement strategies

Reference books

1. Kay Robbins, Steve Robbins: UNIX Systems Programming- Communication, Concurrency and Threads.
2. Garry Nutt, Operating Systems

Sessional work assessment

Laboratory practical and Record	= 35
Test	= 15
Total marks	= 50

2K6CS 601 ENVIRONMENTAL ENGG: & DISASTER MANAGEMENT

3 hours lecture and 1 hour tutorial per week

MODULE I (12 HOURS)

Multidisciplinary nature of Environmental studies – Definition – scope and importance – need for public awareness
Natural resources – renewable and non-renewable resources – natural resources – forest resources - water resources
Mineral resources – food resources – energy resources – Land resources – use, overuse and misuse of these resources with appropriate case studies to substantiate – effect on the environment – role of individual in conservation of natural resources – equitable use of resources for sustainable lifestyle.

MODULE II (12 HOURS)

Ecosystem – concept – structure and function – producers, consumers & decomposers – energy flow in the ecosystem- Ecological successive food chains - food webs (all in brief)
Ecological pyramids – introduction, types and characteristic features, structure and function of forest, grassland, desert and acquatic ecosystems (ponds, lakes, streams, rivers, oceans and estuaries) Biodiversity and its conservation – Introduction – definition : genetic species and ecosystem diversity – Biogeographical classification of India – value of biodiversity – consumptive and productive use, social, ethical, aesthetic and option values – biodiversity at global, national and local levels –India as a mega-diversity nation – hot spots of biodiversity – threats to biodiversity : habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity : In-situ and Ex-situ conservation of biodiversity.

MODULE III (13 HOURS)

Environmental Pollution – Definition – causes - effects and control measures of : Air Pollution – water Pollution – soil Pollution – marine Pollution – noise Pollution – thermal Pollution – Nuclear hazards .
Solid waste management – causes, effects and control measures of urban and industrial wastes – Role of an individual in preventing Pollution – Environmental Protection Act – Prevention and control of air and water Pollution – Wildlife Protection Act – Forest Conservation Act – Issues involved in Enforcement of Environmental Legislation – Public awareness.
Disaster Management – Principles of disaster management – nature and extent of disasters – natural disasters , hazards, risks and vulnerabilities – man-made disasters – chemical, industrial, nuclear and fire. – preparedness and mitigation measures for various hazards – financing relief expenditure – legal aspects - post disaster relief – voluntary agencies and community participation at various stages of disaster management – rehabilitation programmes.

MODULE IV (10 HOURS)

Social Issues and the Environment – From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting , watershed management – resettlement and rehabilitation of people ; its problems and concerns, case studies – environmental ethics : Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. Case studies – waste land reclamation – consumerism and waste products.
Human population and the environment – Population growth, variations among nations – population explosion – Family welfare programmes – Environment and human health – Pollution hazards, sanitation and health – Human rights for a clean environment – value education – HIV/AIDS – social concern – Women and Child welfare – role of Information Technology in environment and human health – Case studies.

FIELD WORK (5 HOURS)

- Visit to a local area to document environmental assets – river / forest / grassland / hill / mountain

- Visit to local polluted site – urban / rural / industrial / agricultural
- Study of common plants, insects , birds
- Study of simple ecosystems – pond, river, hill slopes, etc.

Text book

1. Clarke. R.S. Marine Pollution. Clanderson Oress Oxford.`
2. Mhaskar A.K. Matter Hazardous. Techno-Science Publications.
3. Townsend. C., Harper. J. and Michael Begon, Essential of Ecology. Blackwell Science.
4. S. Deswal & A . Deswal, A Basic Course in Environmental Studies, Dhanpat Rai & Co
5. Environmental Studies – Dr. B . S. Chauhan, University Science Press.
6. Kurien Joseph & R. Nagendran, Essentials of Environmental Studies, Pearson Education.
7. Trivedi. R.K. and Goel. P.K. Introduction to air pollution. Techno-Science Publications.

Reference Books

1. Agarwal.K.C. Environmental biology. Nidi Publ.Ltd. Bikaner.
2. Bharucha erach, Biodiversity of India, Mapin Publishing Pvt.Ltd.,.
3. Brunner,R.C.. Hazardous Waste Incineration. McGraw Hill Inc..
4. Cunningham W.P. , Cooper T.H., Gorhani E. & Hepworth M.T. Environmental Encyclopedia ,Jaico Publ.House ,.
5. De A.K. Environmental Chemistry.Wiley Eastern Ltd.
6. Hawkins R.E. Encyclopediaof Indian Natural History, Bombay Natural History Society ,.
7. Heywood V.H. & Watson R.T.. Global Biodiversity Assessment. Cambridge Univ. Press.
8. Jadhav H. & Bhosale V.M.. Environmental Protection and Laws. Himalaya Pub. House,
9. Odum E.P. Fundamentals of Ecology W.B. Saunders Co..
10. Rao M.N. & Datta A.K. Waste Water Treatment. Oxford & IBH Publ. Co. Pvt. Ltd..
11. Sharma B.K.. Environmental Chemistry Goel Publ. House, Meerut
12. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol.I & II.Enviro Media.
13. Wagner K.D. Environmental Management. W.B. Saunders Co.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University Examination Pattern

Q I – 8 short answer type questions of 5 marks, 2 from each module.
Q II- 2 questions of 15 marks each from module I with choice to answer any one.
Q III- 2 questions of 15 marks each from module II with choice to answer any one.
Q IV- 2 questions of 15 marks each from module III with choice to answer any one.
Q V- 2 questions of 15 marks each from module IV with choice to answer any one.

2K6 CS 602: GRAPH THEORY & COMBINATORICS

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Introduction to graphs-definitions and examples-subgraphs-complements-isomorphism-vertex degree-Euler trails and circuits-.Planar Graphs-Kuratowski's theorem(without proof).Graph coloring and chromatic polynomials

Module II (13 hours)

Trees-Definitions and properties-examples-Weighted Trees-Dijkstra's shortest path algorithm-Spanning trees - Kruskal and Prim's algorithms.

Module III (13 hours)

Fundamental principles of counting-The rules of sum and product -permutations and combinations-binomial theorem-principle of inclusion and exclusion-derangements.-Rook polynomials

Module IV (14 hours)

Generating functions-definitions and examples-calculational and techniques.-partitions of integers-exponential generating functions-recurrence relations-first order linear recurrence relation-second order linear homogeneous recurrence relation with constant coefficients-Non homogeneous recurrence relation-method of generating function

Text Books

1. Grimaldi R P ,"Discrete and Combinatorial Mathematics".4 th Edn Pearson education Asia

Reference books

1. Joe L Mott Abraham Kandel Theodore P Baker,"Discrete Mathematics for Computer Scientist and Mathematicians ,2 nd Edn PHI
2.Rose K H '"Discrete Mathematics and its Applications",6th Edn McGrawHill
3.Kolman Busby Ross ,"Discrete Mathematical Structures",PHI
4.Corman ,Leserson and Rivest,"Introduction to Algorithms",PHI
5. Fred Buckley and Frank Harry, “Distance in graphs”, Addison Wesley

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 603: DATABASE MANAGEMENT SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Introduction - Characteristics of Database approach - Advantages of using DBMS approach - Data models - schemas and instances - Three-schema architecture and data independence - Database languages and interfaces - The database system environment - Centralized and client-server architectures - Classification of Database Management systems.

Entity-Relationship Model - Entity Types, Entity Sets, Attributes and Keys - Relationship types, Relationship Sets, Roles and Structural Constraints - Weak Entity Types - Refining the ER Design - ER Diagrams and Naming Conventions - Example of Other Notation: UML Class Diagrams

Module II (16 hours)

Relational Model and Relational Algebra - Relational Model Concepts - Constraints - Relational Database Schemas – Relational Algebra: Unary Operations - Set Theoretic operations - Binary Operations - Aggregate functions and grouping – Outer Join and Outer Union - Examples of Queries - The Tuple Relational Calculus - The Domain Relational Calculus

SQL - Data Definition and Data Types - Specifying constraints - Schema change statements - Basic queries – Aggregate functions and grouping - Insert, Delete and Update statements - Assertions and Triggers - Views

Database Design - Informal Design Guidelines for Relation Schemas - Functional Dependencies - Normal Forms Based on Primary Keys (Up to BCNF) - Properties of Relational Decompositions - Algorithms for Relational Database Schema Design - The Database Design and Implementation Process - Use of UML Diagrams in database design.

Module III (12 hours)

Disk Storage, Basic File Structures, and Hashing - Secondary Storage Devices – Placing File Records on Disk - Operations on Files - Heap Files - Sorted Files - Hashing Techniques - Parallelizing Disk Access Using RAID Technology - New Storage Systems

Indexing Structures for Files - Types of Single-Level Ordered Indexes - Multilevel Indexes - Dynamic Multilevel Indexes Using B-Trees and B+ Trees - Indexes on Multiple Keys

Module IV (14 hours)

Transaction Management - Transaction and System Concepts – ACID Properties - Schedules - Characterizing Schedules Based on Recoverability and Serializability - Transaction Support in SQL

Concurrency Control Techniques - Locking Techniques - Timestamp Ordering - Multiversion Concurrency Control - Optimistic Concurrency Control - Using Locks for Concurrency Control in Indexes

Database Recovery Techniques - Recovery Concepts - Recovery Techniques Based on Deferred and Immediate Updates - Shadow Paging - Recovery in Multidatabase Systems - Backup and Recovery from Catastrophic Failures.

Text books

1. R. Elmasri and S. B. Navathe: Fundamentals of Database Systems, 5th Edition, Addison-Wesley, 2007

Reference books

1. A. Silberschatz, H. F. Korth and S. Sudarshan: Database System Concepts, 5/E, Mc-Graw Hill, 2006.
2. Database systems, a practical approach to design implementation and management – Thomas Connolly and Carolyn Begg, Pearson Education,
3. Raghu Ramakrishnan and Johannes Gehrke: Database Management Systems, McGraw-Hill
4.C.J. Date, A. Kannan, S. Swamynatham: An Introduction to Database Systems, Pearson education
5. Jeffrey D Ullman: Principles of Database Systems, Galgotia Publications

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 604: COMPILER DESIGN

3 hours lecture and 1 hour tutorial per week

Module 1 (12Hrs)

Introduction to compilers:-Phases of a compiler-Analysis and synthesis phases-Lexical analysis and its role-Review of finite automation and Regular Expressions-Specification of tokens using regular expressions-Implementing lexical analyzer using finite automation-Design of lexical analyzer using LEX

Module 2 (14 Hrs)

Syntax analyzer-Role of syntax analyzer-Review of context free grammar-derivation and parse trees-Basic parsing approaches-Top down parsing-Recursive Descent parsing –LL(1) parsing-Bottom up parsing-Shift reduce parsing-Operator precedence parsing-LR parsing-Simple LR, Canonical LR and LALR parsers- Design of syntax analyzer using YACC

Module 3 (15 Hrs)

Semantic analysis-Need for semantic analysis-Syntax directed definitions-S attributed definitions- L- attributed definitions-Translation schemes-Type system and Type checking-Design of a simple type checker

Storage Management:-Memory allocation strategies (static, stack and heap allocations)-Memory allocation in block structured languages-Accessing local and non local data-Array allocation and access-Procedure calls-Parameter passing methods-Runtime stack and storage management

Synthesis phase:-Intermediate Code Generation (ICG)-Need for ICG-IC Formats-3 Address code-Triples and quadruples

Module 4(14 Hrs)

Code optimization:-Need for code optimizer-Basic blocks and program flow graph-Machne dependent and machine independent optimizations-Optimization transformations-Local and global optimizations Code Generation-Basic issues in code generation-Data descriptors-Expression trees-Generating target code from expression trees-Symbol table handling-Symbol table requirements and organization. Error handling-Types of errors-Compile time errors and recovery-Runtime errors-Runtime Error Handling

Text books

1.Aho A Ravi Sethi and J D Ullman, Compilers Principles Techniques and Tools,Addison Wesley

Reference books

1. Kenneth C Louden, “Compiler Construction Principles and Practice”, Cenage Learning Indian Edition
2.D M Dhamdhare, System programming and operating system,TMH
3.Tremblay and Sorenson,The theory and practice of Compiler writing,TMH
3Allen T Hollub , Compiler design in C ,PHI

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any

2K6 CS 605: DATA COMMUNICATION & COMPUTER NETWORKS

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)

Components – Direction of Data flow – networks – Components and Categories – types of Connections – Topologies –Protocols and Standards – ISO / OSI model – Transmission Media – Line Coding – Modems – RS232 Interfacing sequences-Modulation-Multiplexing-TDM FDM WDM OFDM

Module II (16 hours)

Data link layer services - Error detection and correction – Parity – LRC – CRC – Hamming code .HDLC. - Multiple Access Protocols - Link Layer addressing - Hub and Switches -PPP. LAN - Ethernet IEEE 802.3 - IEEE 802.4 - IEEE 802.5 - FDDI - SONET – Bridges.

Module III (13 hours)

Network layer: Introduction - Virtual circuit and datagram networks - Router - Internet Protocol -Forwarding and addressing in the Internet - Routing Algorithms -LS -DV -Hierarchial routing -Routing in the Internet -Broadcast and Multicast routing.

Module IV (14 hours)

Transport layer : Introduction and services-multiplexing and demultiplexing -Connectionless transport UDP - Principles of Reliable data transfer - Connection oriented transport TCP - Principles of Congestion Control - TCP congestion control. Application Layer -Principles -HTTP –FTP -SMTP -DNS.

Text books

1. Behrouz A. Forouzan, “Data communication and Networking”, Tata McGraw-Hill, 2004.
2. Kurose and Ross, "Computer Networking", Third Edition,Pearson

Reference books

1. Crowley C.,Operating Systems - A Design Oriented Approach, TMH
2. Tanenbaum A S, Computer Networks, PHI
3. William Stallings, **“**Data and Computer Communication, Pearson EducationI

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 606 (A): DISTRIBUTED COMPUTING

3 hours lecture and 1 hour tutorial per week

Module I (16 hours)

Characterization of Distributed Systems: Introduction, Examples of distributed Systems,Issues in Distributes Operating Systems, Resource sharing and the Web Challenges. **System Models:** Architectural models, Fundamental Models **Theoretical Foundation for Distributed System**: Limitation of Distributed system, absence of global clock, shared memory, Logical clocks, Lamport's & vectors logical clocks, Causal ordering of messages, global state, termination detection. **Distributed Mutual Exclusion**: Classification of distributed mutual exclusion, requirement of mutual exclusion theorem, Token based and non token based algorithms, performance metric for distributed mutual exclusion algorithms.

Module II (14 hours)

Distributed Deadlock Detection: system model, resource Vs communication deadlocks, deadlock prevention, avoidance, detection & resolution, centralized dead lock detection, distributed dead lock detection, path pushing algorithms, edge chasing algorithms. **Agreement Protocols**: Introduction, System models, classification of Agreement Problem-Interactive consistency Problem, Applications of Agreement algorithms.

Module III (12 hours)

Distributed Objects and Remote Invocation: Communication between distributed objects, Remote procedure call, Events and notifications, Java RMI case study. **Transactions and Concurrency Control**: Transactions, Nested transactions, Locks, Optimistic Concurrency control, Timestamp ordering, Comparison of methods for concurrency control

Module IV (12 hours)

Distributed Transactions: Introduction, Flat and nested distributed transactions, Atomic commit protocols, concurrency control in distributed transactions, Distributed deadlocks, Transaction recovery. **Distributed shared memory** – Design and Implementation issues, consistency models..**CORBA Case Study**: CORBA RMI, CORBA services.

Text books

1. Mukesh Singhal And Niranjan G Shivaratri, "Advanced Concept in Operating Systems",Tata McGraw Hill.
2. Coulouris, Dollimore, Kindberg: "Distributed System: Concepts and Design", Pearson Education

Reference books

1. Tanenbaum S , "Distributed Operating Systems",Pearson Education.
2. P K Sinha, ""Distributed System: Concepts and Design", PHI

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 606 (B) BIOINFORMATICS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

The Central Dogma – Killer Application – Parallel Universes – Watson's Definition – Top Down Vs Bottom Up Approach – Information Flow – Conversance – Communications.

Module II (16 hours)

Definition – Data Management – Data Life Cycle – Database Technology – Interfaces – Implementation – Networks: Communication Models – Transmission Technology – Protocols – Bandwidth – Topology – Contents – Security – Ownership – Implementation.

Search Process – Technologies – Searching And Information Theory – Computational Methods – Knowledge Management – Sequence Visualizations – Structure Visualizations – User Interfaces – Animation Vs Simulation

Module III (16 hours)

Statistical Concepts – Micro Arrays – Imperfect Data – Basics – Quantifying – Randomness – Data Analysis – Tools Selection – Alignment – Clustering – Classification – Data Mining Methods – Technology – Infrastructure Pattern Recognition – Discovery – Machine Learning – Text Mining – Pattern Matching Fundamentals – Dot Matrix Analysis – Substitution Matrix – Dynamic Programming – Word Method – Bayesian Method – Multiple Sequence Alignment Tools.

Module IV (10 hours)

Drug Discovery Fundamentals – Protein Structure – System Biology Tools – Collaboration And Communication – Standards – Issues – Case Study.

Reference books

1. Bryan Bergeron, Bio Informatics Computing , Prentice Hall, 2003.
2. T.K. Affward, D.J. Parry Smith, Introduction To Bio Informatics, Pearson Education, 2001.
3. Pierre Baldi, Soren Brunak, Bio Informatics – The Machine Learning Approach, 2nd Edition, First East West Press, 2003

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 606(C): SOFTWARE PROJECT MANAGEMENT

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Introduction - Importance of software project management, Problems with Software Projects Stages of Project - The Feasibility Study, Planning, Project Execution, Project and Product Life Cycles , The Stakeholder of Project , The Role of Project Manager, Project Management Framework , Software Tools for Project Management

Project Planning- Integration Management, Project Plan Development, Plan Execution, Scope Management, Methods for Selecting Projects , Project Charter, Scope Statement, Work Breakdown Structure, Main Steps in Project Planning , Use of Software to Assist in Project Planning Activities

Module II (16 hours)

Project Scheduling : Time Management- Importance of Project Schedules, Schedules and Activities , Sequencing and Scheduling Activity Project Network Diagrams- Network Planning Models , Duration Estimating and Schedule Development, Critical Path Analysis, Program Evaluation and Review Technique (PERT) Use of Software to Assist in Project Scheduling

Project Cost Management-Importance and Principles of Project Cost Management, Resource Planning , Cost Estimating- Types of Cost Estimates, Expert Judgment , Estimating by Analogy , COCOMO Model, Cost Budgeting, Cost Control , Use of Software to assist in Cost Management.

Module III (12 hours)

Project Quality Management- Quality of Information Technology Projects, Stages of Software Quality Management, Quality Planning , Quality Assurance , Quality Control Quality Standards- Tools and Techniques For Quality Control

Project Human Resources Management- Keys to Managing People , Organizational Planning- Issues in Project Staff Acquisition and Team Development , Project Communication Management - Communications Planning, Information Distribution, Performance Reporting,.

Module IV (14 hours)

Project Risk Management - The Importance of Project Risk Management, Common Sources of Risk in IT projects, Risk Identification, Risk Quantification, Risk Response Development and Control

Project Procurement Management- Importance of Project Procurement Management, Procurement Planning, Solicitation, Source Selection, Contract Administration, Contract Close-out, Pr**oject Management Process Groups-** Introduction to Project Management Process Groups Project Initiation, Project Planning, Project Executing, Project Controlling and Configuration Management , Project Closing.

Reference books

1. Software Project Management" Bob Hughes and Mike Cotterell, Third Edition, Tata McGraw-Hill.
2. "Information Technology Project Management" Kathy Schwalbe, International Student Edition, THOMSON Course Technology, 2003
3. Software Project Management in Practice, Pankaj Jalote, Pearson Education, 2002
4. Software Project Management, A Concise Study, S.A. Kelkar, Revised Edition, Prentice-Hall India, 2003
5. Walker Royce "Software Project Management – A Unified Framework ", Pearson Education, 2004
6. Ramesh Gopalaswamy, "Managing Global Projects", Tata McGraw Hill, 2001

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 606 (D): DIGITAL SIGNAL PROCESSING

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Review of signals and systems. Introduction - advantages and limitations of Digital Signal Processing. Infinite Impulse Response (IIR) Filters - Signal Flowgraph- Basic Network structure for IIR filter- Direct- Cascade- Parallel Forms. Design of IIR Digital filters from analog filters- Butterworth design- Chebyshev design- design based on numerical solutions of differential equations- Impulse Invariant Transformation.

Module II (16 hours)

Finite Impulse Response (FIR) Filters: Linear phase FIR filters- Frequency response of linear phase FIR filters - Location of the zeros of linear phase FIR filters. Realization of FIR- cascade - lattice design-Fourier Series method- using windows-rectangular- triangular or barlett windows- hanning- hamming- Blackman- Kaiser windows.

Module III (13 hours)

Discrete fourier Transform: Properties-Circular convolution- Linear Convolution using DFT- relation between Z-Transform and DFT- Fast Fourier Transform; decimation – in time and Frequency - FFT algorithms – General Computation using Radix 2 algorithm.

Module IV (14 hours)

Finite word length effects in digital filters: Introduction- Number Representation - Fixed Point- Sign-Magnitude - One's-complement- Two's - complement forms -Addition of two fixed point numbers- Multiplication in Fixed Point arithmetic - Floating point numbers- Block floating point numbers- quantization - truncation- rounding - effects due to truncation and rounding- Input quantization error - Product quantization error - Co-efficient quantization error- zero-input limit cycle Oscillations - Overflow limit cycle Oscillations - Scaling- Quantization in Floating Point realization IIR digital filters - Finite Word Length Effects in FIR Digital Filters- Quantization effects in the Computation of the DFT- quantization errors in FFT algorithms.

Reference books

1. Ifechor-, Digital signal processing, Pearson edn.
2. Oppenhiem ,Desecrate time signal processing , Pearson edn.
3. Oppenhiem and Sheffer ,Digital signal processing , PHI
4. Johny R Johnson ,Introduction to Digital signal processing
5. Proakis and Manolakis, Digital signal processing
6. P Ramesh Babu ,Digital signal processing:,Scitech Publications.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 606 (E) ENTERPRENEURSHIP

3 hours lecture and 1 hour tutorial per week

Module I (20 hours)

Entrepreneurial perspectives - understanding of entrepreneurship process - entrepreneurial decision process - entrepreneurship and economic development - characteristics of entrepreneur - Entrepreneurial competencies - managerial functions for enterprise

Module II (10 hours)

Process of business opportunity identification and evaluation - industrial policy- environment - market survey and market assessment - project report preparation – study of feasibility and Viability of a project - assessment of risk in the industry

Module III (12 hours)

Process and strategies for starting a venture - stages of small business growth – entrepreneurship in -international environment - entrepreneurship – achievement - motivation - time management creativity and innovation - structure of the enterprise - planning, implementation and growth

Module IV (10 hours)

Technology acquisition for small units - formalities to be completed for setting up a small scale unit - forms of organizations for small scale units - financing of project and working capital-venture capital and other equity assistance available - break even analysis and economic ratios technology transfer and business incubation

Reference books

1. Harold Koontz and Heinz Weihrich: Essentials of Management, TMH International
2. Robert D Hirich and Michael Peters: Enterpreneurship, Mc Graw Hill
3. Rao T., Deshpande M. V, P. Mehta, M. S. Nadakami: Developing Enterpreneurship, a Handbook Learning System
4. D. Kurado and R M. Hodgelts: Enterpreneurship, a Contemporary Approach, The Dryden Press
5. Dr. Patel V. G.: Seven Business Crisis, TMH
6. Rao C. R.: Finance for Small Scale Industries

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 606 (F) – ADVANCED MATHEMATICS

3 hours lecture and 1 hour tutorial per week

Module I : (10 hours)

Linear Programming I : Systems of linear equations and inequalities – Convex sets – Convex functions – Formulations of linear Programming problems – Theory of simplex methods – simplex algorithm – Charnes Mmethod – Two phase method – Duality in linear programming – dual simplex method.

Module II: (10 hours)

Linear Programming II : Sensitivity analysis – Parametric Programming – Bounded variable problems – Transportation problems – Development of the method – Integrality property – Degeneracy – Unbalanced problems – Assignment problem – Development of the Hungarian method – Routing problems.

Module III: (10 hours)

Nonlinear Programming : Mathematical preliminaries of non-linear programming – Gradient and Hessian – Unimodal functions – Convex and Concave functions – Role of convexity – Unconstrained optimization – Fibnonacci search – Golden section search – Optimal gradient method – Classical optimization – Langrange multiplier method – Kuhn-Tucker conditions – Quadratic programming – Separable convex programming.

Module IV: (9 hours)

Dynamic Programming & Game Theory : Nature of Dynamic programming problem – Bellman's optimality principle – Cargo loading problem – Replacement problems – Multistage production planning and allocation problems – Rectangular games – Two person zero sum games – Pure and mixed strategies – 2 x m and m x 2 games – Relation between theory of games and linear programming.

Text books and References

1. Bazarra M. S., Jarvis J. J. & Sherall H. D., 'Linear Programming and Network Problems' John Wiley.
2. Bazarra M. S., Sherall H. D & Shetty C. M., 'Nonlinear Programming Theory and Algorithms' John Wiley.
3. Hadley G. 'Linear Programming' Narosa.
4. Hillier. F. S. & Liebermann G. J. 'Introduction to Operations Research' Mc Graw Hill. 5. Taha H.A. 'Operation Research, An Introduction' PHI.

Sessional work assessment

Two tests	2 x 15 = 30
Two assignments	2 x 10 = 20
Total	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions of 15marks from module I with choice to answer any one
Q III - 2 questions of 15marks from module II with choice to answer any one
Q IV - 2 questions of 15marks from module III with choice to answer any one
Q V - 2 questions of 15marks from module IV with choice to answer any one

2K6 CS 607(P) – NETWORKS & DBMS LAB

3 hours practical per week

1. Study and configuration of NIC cards.
2. Implementation of client server model using TCP protocol.
3. Implementation of client server model using UDP protocol.
4. Implementation of client server model using Multicast server.
5. Implementation of POP3 protocol.
6. Implementation of SMTP protocol.
7. File transfer-using socket.
8. DNS – Tracing the path and find the root/name servers
9. Dynamic Host Configuration Protocol – To study about dynamic allocation of IP addresses.
10. Web server installation and configuration.
11. Mail server configuration.
12. Setting up multiple virtual hosts in a single domain.
13. Simulation of Medium access control protocols-Go back N, Selective repeat, sliding window
14. Perform a case study about the different routing algorithms to select the network path with its optimum and economical during data transfer.
    - Shortest path routing
    - Flooding
    - Link State
    - Hierarchical

Database Management Systems

Recommended Software: Mysql /Oracle latest version

1. DDL statements in SQL
2. DML statements in SQL
3. Simple Queries using SELECT command on a given database.
4. Queries (along with sub Queries) using ANY, ALL, IN, EXISTS, NOTEXISTS, UNION, INTERSECT and Constraints.
5. Queries using Aggregate functions (COUNT, SUM, AVG, MAX and MIN), GROUP BY, HAVING
6. Creation and dropping of Views
7. High level language extension with cursors.
8. High level language extension with triggers.
9. Procedures and Functions.

Reference books

1. Stevens W. Richard, "Unix Network Programming", PHI
2. James F. Kurose & Ross, "Computer Network, Third Edition", Pearson Education
3. Comer D.E., "Internetworking with TCP/IP, Volume 1, II & III, PHI
4. Elmasr, Navathe, *'Fundamentals of Database Systems'*, 4/e, Pearson Education
5. Reghu Ramakrishnan, *Databse Management Systems*, McGrawHill

Sessional work assessment

Laboratory practical and Record	= 35
Test	= 15
Total marks	= 50

2K6 CS 608(P): COMPILER LAB

3 hours practical per week

1. Design of a Lexical Analyzer using Finite Automation (including Symbol table)
   (The program should be designed for a specific number of keywords, identifiers, numbers, operators, punctuators etc. Finite automata should be designed for each type of token)
2. Design of lexical analyzer using LEX
3. Design of recursive descent and LL (1) parsers (including syntax tree)
   (The programme should be designed for a subset of PL features (For example Arithmetic expressions with operators +, -, *, /, ↑ etc)
4. Implementation of Operator precedence Parsing (including syntax tree)
5. Design of parser for arithmetic expressions using YACC
6. Design of a simple type checker (For eg for the primitive types of C)
7. Generation of IC for arithmetic expressions
8. Simple code optimization strategies (For example Constant folding, Loop invariant elimination, common sub expression elimination etc)
9. Design of a code generator for arithmetic expressions using Expression tree
   (The program should take a set of IC as the input and produce the target code for some machine such as Intel 8086 Microprocessor)
10. Writing a simple Compiler for a subset of Language features

Reference books

6. Sethi R, Programming languages: Concepts & Constructs , Addison wesley
7. Scott M L, Programming language Pragmatics, Morgan Kaufman

Sessional work assessment

Laboratory practical and record	= 35
Test	= 15
Total	= 50

KANNUR UNIVERSITY

FACULTY OF ENGINEERING

Curricula, Scheme of Examinations & Syllabus for Semesters VII & VIII of B.Tech. Degree Programme in Computer Science & Engineering with effect from 2007 Admissions

SEVENTH SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hours	Marks
2K6 CS 701	Internet and Mobile Communication System Technologies	3	1	-	50	3	100
2K6 CS 702	Design and Analysis of Algorithms	3	1	-	50	3	100
2K6 CS 703	Computer Graphics and Multimedia	3	1	-	50	3	100
2K6 CS 704	Internet and Web Programming with Java	3	1	-	50	3	100
2K6 CS 705	Elective II	3	1	-	50	3	100
2K6 CS 706(P)	Graphics and Multimedia Lab	-	-	3	50	3	100
2K6 CS 707(P)	Internet and Web Programming Lab	-	-	3	50	3	100
2K6 CS 708(P)	Mini Project	-	-	4	50	-	-
2K6 CS709(P)	Physical Education, Health & Fitness	-	-	-	50	-	-
TOTAL		15	5	10	450	-	700

Elective II

2K6 CS 705 (A) Advanced Database Systems
2K6 CS 705 (B) Simulation and Modeling
2K6 CS 705 (C) Embedded Systems
2K6 CS 705 (D) VLSI Design
2K6 CS 705 (E) Stochastic Process
2K6 CS 705 (F) Computational Complexity
2K6 CS 705 (G) Digital Signal Processing
2K6 CS 705 (H) Information Storage Management

EIGHTH SEMESTER

Code	Subject	Hours/Week			Sessional Marks	University Examination	
		L	T	P/D		Hours	Marks
2K6 CS 801	Operations Research	3	1	-	50	3	100
2K6 CS 802	Cryptography and Network Security	3	1	-	50	3	100
2K6 CS 803	Artificial Intelligence	3	1	-	50	3	100
2K6 CS 804	Advanced Computer Architecture	3	1	-	50	3	100
2K6 CS 805	Elective III	3	1	-	50	3	100
2K6 CS 806(P)	Project & Industrial Training	-	-	6	100	-	-
2K6 CS 807(P)	Seminar	-	-	4	50	-	-
2K6 CS 808(P)	Viva Voce	-	-	-	-	-	100
TOTAL		15	5	10	400	-	600
Aggregate marks for 8 semesters = 8400					3000		5400

Elective III

2K6 CS 805 (A) Advanced Topics in Algorithms
2K6 CS 805 (B) Image Processing
2K6 CS 805 (C) Neural networks and Fuzzy Logic
2K6 CS 805 (D) Management Information Systems
2K6 CS 805 (E) Quantum Computations
2K6 CS 805 (F) Data Mining and Warehousing
2K6 CS 805 (G) Advanced Mobile Communication Systems
2K6 CS 805 (H) Natural Language Processing

2K6CS 701 INTERNET AND MOBILE COMMUNICATION SYSTEM TECHNOLOGIES

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)

Computer Networks and the Internet-What is Internet-Network edge-network core-ISPs and internet backbones-Delay and loss in packet switched networks. Layered architecture-principles of application layer protocols-DNS-Socket programming with TCP/UDP-multimedia network-Examples of multimedia applications-audio and video compression-accessing audio and video through a web server-sending multimedia from a streaming server to a helper application-RTSP-RTP-RTCP-RSVP.

Module II (12 hours)

Wireless transmission: Frequencies for radio Transmission-signals-Antennas-Signal propagation-Spread spectrum-Cellular Systems-Specialized MAC:SDMA-FDMA-TDMA-CDMA-Comparison of S/F/T/CDMA.

Module III (12 hours)

Telecommunication systems-GSM-Mobile services-System Architecture-Radio interface-Protocols-localization and calling-handover-Security- Wireless LAN-Infra red Vs Radio transmission-Infra Structure and Ad-hoc networks-IEEE 802.11-Hyper LAN-Bluetooth.

Module IV (12 hours)

Mobile internet-mobile IP network layer, mobile transport layer: IP and Mobile IP Network Layers Packet Delivery and Handover Management, Location Management, Registration, Tunneling and Encapsulation, Route Optimization, Dynamic Host Configuration Protocol. Indirect TCP, Snooping TCP, Mobile TCP, Other Methods of TCP – layer Transmission for Mobile Networks- WAP-WML

Text books

1. James F Kurose, Computer Networking-A Top Down approach featuring Internet, Third dition, Pearson Education
2. Schiller.J, Mobile Communication, Second Edition, Pearson Education

Reference books

1. William Stallings, Wireless Communication Network, Second Edition, Pearson Education.
2. Behrouz A Forouzan, Data Communications and Networking, Fourth Edition , Tata Mc Graw Hill T

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 702 DESIGN AND ANALYSIS OF ALGORITHMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Role of algorithms in computing – RAM model – growth of functions – asymptotic notations (Big-Oh, Little-Oh, Big omega, Little omega, Theta)- solution to recurrences – substitution method-recursion tree-master theorem (proof not expected)-Analysis of sorting algorithms – merge sort, heap sort, quick sort-Analysis of string matching algorithms -KMP algorithm. Amortized Analysis –Aggregate –Accounting – Potential Methods

Module II (14 hours)

Different approaches to algorithm design: **Divide and conquer** – Strassens matrix multiplication –Median Finding-**Greedy method** – Huffman code-Minimum cost spanning tree-Kruskals and Prims algorithm-**Dynamic programming** –Optimal binary search tree– Chain matrix multiplication **Back tracking** – Queens problem–**Branch and bound**-assignment problem-TSP

Module III (12 hours)

Complexity: complexity classes – P,NP,Co-NP, NP-hard and NPC problems – cooks theorm (proof not expected) – NP completeness reductions for clique – vertex cover – subset sum – Hamiltonian cycle – TSP-approximation algorithms – vertex cover – TSP – set covering and subset sum

Module IV (14 hours)

Randomized algorithms: Some complexity classes randomized algorithm for n-Queen , Quick sort-Probabilistic algorithms: pseudo random number generation methods - Monte Carlo algorithms - probabilistic counting - verifying matrix multiplication - primality testing - miller rabin test - integer factorization - Dixon's integer factorization algorithm -Pollard's rho heuristic amplification of stochastic advantage - Les Vegas algorithms.

Text books

1. Corman T H, Lieserson C E & Rivest R L, Introduction to Algorithms, PHI
2. Motwani R & Raghavan P, Randomized algorithms, Cambridge university press
3. Gilles Brassard, Paul Bratley, "Fundamentals of Algorithms", PHI

Reference books

1. Basse S, Computer Algorithms : Introduction to design and analysis, Addison Wesley
2. S K Basu , Design methods and analysis of algorithms, PHI
3. Berman and Paul, "Algorithms",Cenage Learning Indian Edition

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 703 COMPUTER GRAPHICS AND MULTIMEDIA

3 hours lecture and 1-hour tutorial per week

Module I (12 hours)

Introduction to Computer Graphics. Raster Graphics - Features, raster algorithms including primitives like lines, circles, filling, clipping in 2D, etc. Geometric transformations in 2D - coordinate transformations and their matrix representation, the window to viewport transformation. Transformations in 3D, viewing in 3D –Input devices, Interaction techniques.

Module II (14 hours)

Solid modeling -Regularized Boolean set operations-Primitive instancing – sweep representation – Boundary representation. **Visible surface determination** – Techniques for efficient Visible-Surface Algorithms, Categories of algorithms, Back face removal –z-Buffer algorithm – List priority algorithm – scan line algorithms.

Representing Curves and surfaces – polygon meshes – parametric cubic curves-Hermite curves-Bezier curves –B-Splines. Parametric bicubic surfaces – Hermite surfaces – Bezier surfaces – B-Spline surfaces.

Module III (12 hours)

Introduction to Multimedia – Media and Data Streams - Properties of multimedia systems – Characterizing data streams – Characterizing continuous media datastreams. **Audio Technology** – Audio representation —Music –speech -MIDI Vs digital audio-audio file formats-wav-ogg-au etc. Graphics and Images –Video Technology – Animation –basic concepts.

Module IV (14 hours)

Data compression –Storage space –coding requirements –Classification of coding – Basic compression Techniques – JPEG –H.261 – MPEG –DVI. **Multimedia Applications**-Media Integration-Media Communication-Media Consumption-Media Entertainment-Future Directions.

Text books

1. James D Foley, Van Dam A, Steven and Hughes, “Computer Graphics”, Pearson Education
2. Ralf Steinmetz and Klara Nahrstedt, “Multimedia Fundamentals”, Pearson Education

Reference books

1. Donald Hearn and M.Pauline Baker, “Computer Graphics”, Pearson Education.
3. Newmann W and Sprull, “Principles of Interactive Computer Graphics”, TMH.
4. Koegel Buford J F, “Multimedia Systems”, Addison Wesley.
5. Prabat K Andleigh and Kiran Thakrar, “Multimedia Systems and Design”, PHI.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 704 INTERNET AND WEB PROGRAMMING WITH JAVA

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Working with User Interfaces – JAVA AWT Package, Window fundamentals, Basic User Interface Components (Labels, buttons, Check boxes, Radio buttons, choice Menu or Choice Lists, Text fields, Text areas, scrolling list, scroll bars, panels and frames), Layouts (Flow, Grid, Border, Card). Event-driven programming-Event driven programs, Event handling process, Java's event types.

JAVA Swings- Comparison between Swing and AWT, Java swing packages, Swing basic containers, Swing components, event handling using Java swing, using dialogs, Joptionpane class, input dialog boxes**,** Timers and Sliders, Tables, Borders for components.

Module II (14 hours)

JAVA database connectivity- JDBC/ODBC bridge, JAVA.SQL package, Connecting to remote data base, Data manipulation and Data navigation

JAVA Servlets – Introduction- Servlet API, Lifecycle of Java Servlet, Creating Servlets, Running servlets, Cookie class. **Networking with java**- Java.net package, Implementation of client-server application using TCP/IP and UDP.

Module III (12 hours)

Introduction to HTML- HTML tags, Frames and forms, Java Script- Introduction to scripting, control statements, Functions, Arrays, Objects.

DHTML – Object model and Collections, Event model, Filters and Transitions, Data binding with tabular data control. **XML** – XML vocabularies, Document Object Model, SAX, Simple Object Access Protocol (SOAP), Extensible Style sheet Language(XSL)

Module IV (14 hours)

Server side scripting Languages- **JSP**- Introduction to JSP, JSP Architecture, Scripting components, Standard actions, JSP with JDBC – case study of a simple online application.

PHP – Introduction (variables, control statements etc), String processing and regular expression, Form processing and business logic, Connecting to a database, Cookies, Dynamic content in PHP-case study of an online application

Text books

1. Deitel & Deitel, JAVA : How to Program, Pearson education , 7e
2. Deitel & Deitel, Internet and World Wide Web How to Program, Pearson education, 3e
3. Ivan BayRoss, Web Enabled Commercial Application using Java 2, bpb publication

Reference books

1. David Flanagan , Java Script The Definitive Guide, O'relly, 5e
2. Hans Bergsten, Java Server Pages, O'relly, 3e
3. David Sclar, Learning PHP5, O'relly

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 ques

2K6CS 705(A) ADVANCED DATABASE SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Object-Based Databases - Complex Data Types - Structured Types and Inheritance in SQL - Table Inheritance - Array and Multiset Types in SQL - Object-Identity and Reference Types in SQL - Implementing O-R Features - Persistent Programming Languages - Object-Oriented versus Object-Relational models

Module II (13 hours)

Data Analysis and Mining - Decision-Support Systems - Data Analysis and OLAP - Data Warehousing - Data Mining. Information Retrieval - Relevance Ranking Using Terms - Relevance Using Hyperlinks - Synonyms, Homonyms and Ontologies - Indexing of Documents - Measuring Retrieval Effectiveness - Web Search Engines - Information Retrieval and Structured Data.

Module III (13 hours)

Database-System Architectures – Centralized, Client–Server and Server System Architectures – Parallel and Distributed Systems. Parallel Databases - I/O Parallelism – Interquery, Intraquery, Intraoperation and Interoperation Parallelism - Design of Parallel Systems. Distributed Databases - Homogeneous and Heterogeneous Databases - Distributed Data Storage - Distributed Transactions - Commit Protocols - Concurrency Control in Distributed Databases - Distributed Query Processing - Heterogeneous Distributed Databases.

Module IV (13 hours)

Advanced Data Types and New Applications - Time in Databases - Spatial and Geographic Data - Multimedia Databases - Mobility and Personal Databases. Advanced Transaction Processing - Transaction-Processing Monitors - Transactional Workflows - E-Commerce - Main-Memory Databases - Real-Time Transaction Systems - Long-Duration Transactions - Transaction Management in Multidatabases.

Text books

1.Database System Concepts, 5/E, A. Silberschatz, H. F. Korth and S. Sudarshan, Mc-Graw Hill

Reference books

1. R. Elmasri and S. B. Navathe: Fundamentals of Database Systems, 5th Edition, Addison-Wesley
2. Database Management Systems, 3/E, Raghu Ramakrishnan and J. Gehrke, Mc-Graw Hill

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 705(B) SIMULATION AND MODELING

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Introduction: When simulation is the appropriate tool and when it is not appropriate; Advantages and disadvantages of Simulation; Areas of application; Systems and system environment; Components of a system; Discrete and continuous systems; Model of a system; Types of Models; Discrete-Event System Simulation; Steps in a Simulation Study. Simulation examples: Simulation of queuing systems; Simulation of inventory systems; Other examples of simulation. **General principles, simulation software:** Concepts in Discrete-Event Simulation: The Event-Scheduling / Time-Advance Algorithm, World Views, Manual simulation Using Event Scheduling; List processing. Simulation in Java; Simulation in GPSS.

Module II (12 hours)

Statistical models in simulation: Review of terminology and concepts; Useful statistical models; Discrete distributions; Continuous distributions; Poisson process; Empirical distributions. **Queuing models:** Characteristics of queuing systems; Queuing notation; Long-run measures of performance of queuing systems; Steady-state behavior of M/G/1 queue; Networks of queues.

Module III (13 hours)

Random-number generation, random-variate generation: Properties of random numbers; Generation of pseudo-random numbers; Techniques for generating random numbers; Tests for Random Numbers. Random-Variate Generation: Inverse transform technique; Acceptance-Rejection technique; Special properties. **Input modeling:** Data Collection; Identifying the distribution with data; Parameter estimation; Goodness of Fit Tests; Fitting a non-stationary Poisson process; Selecting input models without data; Multivariate and Time-Series input models

Module IV (12 hours)

Output analysis for a single model: Types of simulations with respect to output analysis; Stochastic nature of output data; Measures of performance and their estimation; Output analysis for terminating simulations; Output analysis for steady-state simulations. **Verification and validation of simulation models, optimization:** Model building, verification and validation; Verification of simulation models; Calibration and validation of models. Optimization via Simulation.

Text books

1. **Discrete-Event System Simulation** – Jerry Banks, John S. Carson II, Barry L. Nelson, David M. Nicol, 4th Edition, Pearson Education, 2007.

Reference books

1. Discrete – Event Simulation: A First Course – Lawrence M. Leemis, Stephen K. Park, Pearson Education/ Prentice-Hall India, 2006.
2. Simulation – Sheldon M. Ross, 4th Edition, Elsevier, 2006.
3. Simulation Modeling and Analysis – Averill M. Law, 4th Edition, Tata McGraw-Hill, 2007.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with cho

2K6CS 705(C) EMBEDDED SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Introduction to embedded systems: Embedded systems; Processor embedded into a system; Embedded hardware units and devices in a system; Embedded software in a system; Examples of embedded systems; Embedded System-on-Chip (SoC) and use of VLSI circuit design technology; Complex systems design and processors; Design process in embedded system. **Devices:** Formalization of system design; Design process and design examples; Classification of embedded systems; Skills required for an embedded system designer. I/O types and examples; Serial communication devices; Parallel device ports; Sophisticated interfacing features in device ports.

Module II (13 hours)

Communication buses for device networks: Wireless devices; Timer and counting devices; Watchdog timer; Real time clock; Networked embedded systems; Serial bus communication protocols; Parallel bus device protocols; Internet enabled systems; Wireless and mobile system protocols. **Device drivers and interrupts service mechanism**: Device access without interrupts; ISR concept; Interrupt sources; Interrupt servicing mechanism; Multiple interrupts; Context and the periods for context-switching, interrupt latency and deadline; Classification of processors' interrupt service mechanism from context-saving angle; Direct memory access; Device drivers programming.

Module III (13 hours)

Program modeling concepts, processes, threads, and tasks: Program models; DFG models; State machine programming models for event controlled program flow; Modeling of multiprocessor systems. Multiple processes in an application; Multiple threads in an application; Tasks and task states; Task and data; Distinctions between functions, ISRs and tasks. **Real-time operating systems:** Operating System services; Process management; Timer functions; Event functions; Memory management; Device, file and I/ O sub-systems management; Interrupt routines in RTOS environment and handling of interrupt source calls.

Module IV (12 hours)

Real-time operating systems: Real-Time Operating Systems; Basic design using an RTOS; RTOS task scheduling models, interrupt latency and response times of the tasks as performance metrics; OS security issues. of simulation models; Calibration and validation of models. Optimization via Simulation. EMBEDDED SOFTWARE DEVELOPMENT, TOOLS: Introduction; Host and target machines; Linking and locating software; Getting embedded software in to the target system; Issues in hardware-software design and co-design; Testing on host machine; Simulators; Laboratory tools.

Text books

1 Embedded Systems Architecture: Programming and Design – Rajkamal, 2nd Edition, Tata McGraw Hill, 2008.

Reference books

1 Computers as Components: Principles of Embedded Computer System Design – Wayne Wolf, Elsevier.
2. Embedded Systems Architecture – Tammy Noergaard, Elsevier.
3. Embedded Systems Design – Steve Heath, 2nd Edition, Elsevier.
4. Embedded/Real-Time Systems: Concepts, Design and Programming: The Ultimate Reference – Dr. K.V.K.K. Prasad, Dreamtech Press
5 Embedded C – Michael J.Point, Pearson Education.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 705(D) VLSI DESIGN

3 hours lecture and 1 hour tutorial per week

Module I (16 hours)
Introduction to MOS technology-IC technology-MOC and VLSI NMOS and CMOS fabrication-thermal aspects-MOS circuits tub ties and latch up-wire paarsitic-design rules and layouts-multilayer CMOS process-layout diagrams-stick diagrams-hierarchical stick diagrams-layout design analysis tools.

Module II (12 hours)
Logic gates-review of combinational logic circuits-basic gate layouts-delay-power consumption-speed power product-wires and delay-combinational logic networks-layout methods-network delay-cross talk-power optimization-switch logic networks.

Module III (13 hours)
Sequential machines-latches and flip-flops-sequential system design-subsystem design-pipelining-data paths-adders-ALU-ROM-RAM-FPGA-PLA-multipliers.

Module IV (13 hours)
Floor planning-methods-floor plan of a 4 bit processor-off chip connections-architecture design-register transfer design-architecture for low power-architecture testing-cad systems and algorithms- simulation-layout synthesis.

Reference books

1. Puck nell D A & Eshraghm K, "Basic VLSI Design Systems and Circuits".
2. Mead C , Conway L, "Introduction to VLSI System " Addison Wesley
3. Wayne wolf, "Modern VLSI Design"

Sessional work assessment	
Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 705(E) STOCHASTIC PROCESS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)
Markov chains and Poisson processes (a brief revision) - continuous time Markov chains - definition -transition probability function - Chapman - Kolmogorov equations - rate matrix - Kolmogorov forward and backward equations - computing the transition probabilities - limiting probabilities - pure birth process - birth and death process - M/ M/ 1 queue

Module II (12 hours)
Renewal theory and its applications - the renewal process N(t) - distribution of N(t) - renewal function - renewal equation - limit theorems and their applications - elementary renewal theorem (without proof) - applications of renewal theorem - central limit theorem of renewal processes (without proof) - renewal reward processes - regenerative processes - delayed renewal processes - alternating renewal processes.

Module III (14 hours)
Queuing theory I: introduction - preliminaries - cost equations - Little's formula - steady state probability - exponential models - single server exponential queuing system - single server exponential - system having finite capacity - a queuing system with bulk service - network of queues - open systems - closed systems - the system M/G/1 - preliminaries - work and cost identity - applications of work to M/G/1 - busy periods - discussion of M/D/1 model and $M/E_k/1$ model.

Module IV (12 hours)
Queuing theory II: variations on the M/G/1 - the M/G/1 with random sized batch arrivals - priority queues - the model G/M/1 - the G/M/1 busy and idle periods - multi server queues - Erlang loss system - the M/M/k queue -the G/M/k queue - the M/G/k queue - $M/G/\infty$ queue.

Reference books

1 Ross S.M., Introduction to Probability Models, Sixth edition, Harcourt Asia Pvt. Ltd. and academic Press.
2. Medhi J., Stochastic Processes, Wiley Eastern Ltd.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 705(F) COMPUTATIONAL COMPLEXITY

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)
Review of Complexity Classes, NP and NP Completeness, Space Complexity, Hierarchies, Circuit satisfiability, Karp Lipton Theorem.

Module II (13 hours)
Randomized Computation, PTMs, Examples, Important BPP Results, Randomized Reductions, Counting Complexity, Permanent's and Valiant's Theorem

Module III (12 hours)
Review of Interactive Proofs, Lower bounds: Randomized Decision Trees, Yao's minimax lemma, Communication Complexity, Multiparty Communication Complexity

Module IV (13 hours)
Advanced Topics: Selected topics from Average case Complexity, Levin's theory, Polynomial time samplability, random walks, expander graphs, derandomization, Error Correcting Codes, PCP and Hardness of Approximation, Quantum Computation

Reference books

1 Papadimtriou C. H.., Computational Complexity, Addison Wesley, First Edition, 1993.
2.` Motwani R, Randomized Algorithms, Cambridge University Press, 1995.
3. Vazirani V., Approximation Algorithms, Springer, First Edition, 2004.
4 Mitzenmacher M and Upfal E., Probability and Computing, Randomized Algorithms and Probabilistic Analysis, Cambridge University Press, 2005.
Arora S and Boaz B, Computational Complexity, (Web Draft) http://www.princeton.edu/theory/complexity

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 705(G) DIGITAL SIGNAL PROCESSING

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Discrete time signals and systems - discrete signal sequences - linear shift invariant systems - discrete signals - stability and causality - difference equations - frequency domain representation - Fourier transform and its properties - relationship between system representation, review of Z-transforms.

Module II (15 hours)

Discrete Fourier transform - representation of discrete Fourier series -properties of discrete Fourier series - periodic convolution - DFT -properties of DFT - computation of DFT - circular convolution - linear convolution using DFT -FFTs - DIT-FFT and DIF-FFT -FFT algorithm for composite N.

Module III (13 hours)

Design of digital filters - IIR and FIR filters - low pass analog filter design - Butterworth and Chebyshev filters - design examples – bilinear transformation and impulse invariant techniques - FIR filter design – linear phase characteristics - window method.

Module IV (12 hours)

Realization of digital filters - discrete form I and II -cascade and Parallel form - finite word length effects in digital filters - quantizer characteristics- saturation overflow - quantization in implementing systems - zero input limit cycles - introduction to DSP processors.

Reference books

1 Prokis & Manolalus, Digital Signal Processing, Principles, Algorithm & Applications, Prentice Hall
2. Oppenheirn & Schafer, Discrete Time Signal Processing, Prentice Hall .
3. Ludeman L. C., Fundamentals of Digital Signal Processing, Harper and Row Publishers.
4 Van Valkenburg M E, Annalog Filter Design, Holt Saunders.
5. Terrel T J & Shark L K, Digital Signal Processing, MacMillan

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 705(H) INFORMATION STORAGE MANAGEMENT

3 hours lecture and 1 hour tutorial per week

Module I (13Hrs)
Storage Systems: Review the amount of information being created and understand the value of information to a business - Identify Data Center infrastructure elements and their requirements - Understand role of ILM strategy - List physical and logical components of host, connectivity, and storage - Detail the disk drive architecture and performance - Describe the concept of RAID and different RAID levels (RAID 0, 1, 3, 5, 0+1/1+0, and 6) - Define Intelligent Storage System (ISS) and its components - Implementation of ISS as high-end and midrange storage arrays.

Module II (13 Hrs)
Storage Networking Technologies and Virtualization: Describe the implementation of DAS and overview of SCSI - Define and detail the architecture, components, and topologies of FC-SAN, NAS, and IP-SAN - Understand the object based storage system CAS and its application as long-term archiving solution - Describe block-level and file-level storage virtualization technologies and processes - Overview of emerging technologies such as cloud storage and virtual provisioning

Module III (13 Hrs)
Business Continuity: Understand the concept of information availability and its measurement - Describe the causes and consequences of downtime- Define RTO, and RPO - Identify single points of failure in a storage infrastructure and solutions for its mitigation - Describe the backup/recovery purposes and considerations - Discuss architecture and different backup/Recovery topologies - Describe local replication technologies and their operation - Describe remote replication technologies and their operation.

Module IV (13 Hrs)
Storage Security and Management: Define information security - List the critical security attributes for information systems - Define storage security domains - List and analyze the common threats in each domain - Identify key parameters and components to monitor in a storage infrastructure - List key management activities and examples - Define storage management standards and initiative.

Text books
1. EMC Corporation, Information Storage and Management, Wiley India, 9788126521470

Reference books

1.. Robert Spalding, "Storage Networks: The Complete Reference", Tata McGraw Hill , Osborne, 2003
2. Marc Farley, "Building Storage Networks", Tata McGraw Hill ,Osborne, 2001
3. Additional resource material on www.emc.com/resource-library/resource-library.esp

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 706(P) GRAPHICS AND MULTIMEDIA LAB

1. Implement Bresenham's algorithms for line, circle and ellipse drawing.
2. Perform 2D Transformations such as translation, rotation, scaling, reflection and sharing.
3. Implement Cohen-Sutherland 2D clipping and window-viewport mapping
4. Perform 3D Transformations such as translation, rotation and scaling.
5. Visualize projections of 3D images.
6. Convert between color models.
7. Implement text compression algorithm
8. Implement image compression algorithm
9. Perform animation using any Animation software
10. Perform basic operations on image using any image editing software

Text books

1. James D Foley, Van Dam A, Steven and Hughes, "Computer Graphics", Pearson Education
2. Ralf Steinmetz and Klara Nahrstedt, "Multimedia Fundamentals", Pearson Education

Reference books

1. Donald Hearn and M.Pauline Baker, "Computer Graphics", Pearson Education.
3. Newmann W and Sprull, "Principles of Interactive Computer Graphics", TMH.
4. Koegel Buford J F, "Multimedia Systems", Addison Wesley.
5. Prabat K Andleigh and Kiran Thakrar, "Multimedia Systems and Design", PHI.

Sessional work assessment

Laboratory practical and record - 35 marks
Tests – 15 marks
Total – 50 marks

2K6CS 707(P) INTERNET AND WEB PROGRAMMING LAB

Servlets , JDBC & Networking

1. Write a program to create a authentication form which validates the Login ID and Password keyed in by the user and returns an appropriate page generated by a servlet code.
2. Write a program to create a feedback form, which validates the email-id and Comment, entered in the form and stores this data into the database. On clicking the button "Read the Guest book" the entries in the database is displayed in the form of a table. This table should be generated by a servlet code.
3. Write simple client-server program using TCP/IP and UDP [client can create an applet which contain a text field and a button. User enters a port number and presses the button labeled say "Connect". The date and time obtained from server is then displayed].
4. Write a program to create a simple chat application where multiple clients can chat with each other.
5.

Java scipt, JSP/PHP

1. Write a function distance that calculates the distance between two points. All values and return values should be floating point values. Incorporate this into a script that enables the user to enter the coordinates of points through an XHTML form.
2. Write functions for linear search and binary search and incorporate in the script as above.
3. Write a script that inputs a line of text , tokenize it with string method split and outputs the tokens in reverse order.
4. Write script for validating data entered in the form.
5. Write web server application using JSP/PHP to insert the data entered through forms into a database and to access and display the details.
6. Write a small online web application using PHP/JSP.

NB: These are sample programs. Programs of similar kind can be done for better understanding.

Text books

1. Deitel & Deitel, JAVA : How to Program, Pearson education , 7e
2. Deitel & Deitel, Internet and World Wide Web How to Program, Pearson education, 3e
3. Ivan BayRoss, Web Enabled Commercial Application using Java 2, bpb publication

Reference books

1. David Flanagan , Java Script The Definitive Guide, O'relly, 5e
2. Hans Bergsten, Java Server Pages, O'relly, 3e
3. David Sclar, Learning PHP5, O'relly

Sessional work assessment

Laboratory practical and record - 35 marks
Tests – 15 marks
Total – 50 marks

2K6 CS 708(P): MINI PROJECT

4 hours practical per week

Each student group (not more than 5 members in a group) is expected to develop a complete software product using the software engineering techniques- the product is to be deployed and should have user manual – a detailed report also to be submitted- the student may be assessed individually and in groups.

Sessional work assessment

Design & Development - 20 marks
Testing and Installation – 20 marks
Report-10 marks
Total Marks – 50 marks

2K6 CS 709(P): PHYSICAL EDUCATION, HEALTH & FITNESS

Introductory Lectures:

Unit 1: Health and fitness: Modern concept of health and fitness, meaning, scope, need and importance of health, fitness and wellness.

Unit II: Exercise and fitness: Means and methods of developing fitness. Importance of physical activities and exercises in developing and maintaining good health, Physical fitness and well being.

Unit III : Sports and Physical education: Meaning and scope, role and importance of sports and games in the development of physical fitness and personality. Social values of sports. Rules of major games.

Practical Sessions:

(All classes will be conducted after the normal working hours of the college)

50 sessions of minimum 1 hour duration each are envisaged (including Theory and Practical). The student can opt for one of the following activities in line with the specific programme / schedule announced by the faculty.

Athletics, Badminton, Basketball, Cricket, Football, General fitness, Hockey, Kabadi, Table Tennis, Ball Badminton, Archery, Volley ball, Yoga (not all activities may be offered in a particular semester. More disciplines will be offered based on the availability of infrastructure and expertise).

In addition, health and fitness assessment such as height, Weight, Resting Pulse rate and blood Pressure will be carried out.

Objective :

1. Basically to inculcate awareness of health, general fitness and attitude to voluntary physical involvement.
2. To promote learning of basic skills in sports activities and secondarily to pave the way for mastering some of the skills through continued future involvement.

Scheme of assessment:

The student will be continuously assessed on his performance on the field of play. There will not be minimum mark for pass or fail. Total 50 marks will be given assessing their attendance, regularity, punctuality and performance for 50 hours of activity from 1st semester to 7th semester.

2K6 CS 801: OPERATIONS RESEARCH

3 hours lecture and 1 hour tutorial per week

Module I: Linear algebra (13 hours)

Vectors - vector space and Euclidean space - vector operations - matrix operations - unit vector - sum vector - linear dependence - bases - spanning set - rank - simultaneous equations - basic solutions - point sets - lines and hyper planes - linear inequalities - convex sets - extreme points - fundamental theorem of linear programming

Module II: Linear programming (13 hours)

Statement of the LP problem - slack and surplus variables - basic feasible solutions - reduction of a feasible solution to basic feasible solution - artificial variables - optimality conditions - unbounded solutions - Charnes' M method - two phase method - degeneracy - duality

Module III: Transportation, assignment and game problems (13 hours)

Transportation problem - coefficient matrix and its properties - basic set of column vectors - linear combination of basic vectors - tableau format - stepping stone algorithm - UV method - inequality constraints - degeneracy in transportation problems - assignment problem as a maximally degenerate transportation problem - Köning's method - rectangular zero sum games - von Neuman's theorem - saddle points - pure and mixed strategies - formulation of the primal and dual LP problem for fixed strategies - dominance - graphical solutions

Module IV: Queuing theory (13 hours)

Basic structure of queuing models - exponential and Poisson distributions - birth and death processes - queuing models based on Poisson inputs and exponential service times - basic model with constant arrival rate and service rate - finite queue - limited source queue models involving non-exponential distributions - single service model with Poisson arrival and any service time distribution - Poisson arrival with constant service time - Poisson arrival and Erlang service times - priority disciplines - dynamic programming - Bellman's principle of optimality - formulation and solution of simple problems

Text books

1. Riggs J.L., Economic Decision Models for Engineers and Managers, McGraw Hill International Students Edition
2. Weist & Levy, A Management Guide to PERT & CPM, Prentice Hall of India
3. Starr & Miller, Inventory Control - Theory & Practice, Prentice Hall of India
4. Samuel Eilon, Production Planning & Control, Universal Book Corporation
5. Francis & White, Facility Layout & Location, Prentice Hall Inc.

Reference books

1. Hillier & Lieberman, *Introduction to Operations Research*, Holden Day Inc.

2. Biegel, *Production Control,* Prentice Hall of India

3. James Moore, *Plant Layout & Design*, The Macmillan Company

Sessional work assessment	
Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 802 CRYPTOGRAPHY AND NETWORK SECURITY

3 hours lecture and 1 hour tutorial per week

Module 1 (14Hrs)
Divisibility - The division algorithms- gcd, lcm, primes- Fundamental theorem of arithmetic- Euler function, Congruence- Complete residue system- Reduced residue system- Euler theorem- Fermatt's little theorem- Wilson's theorem- The Chinese reminder theorem- Quadratic Residues - Legendre symbol

Module II (12 Hrs)
Security goals – Attacks – Services and Mechanisms – Techniques – Symmetric key encryption – Introduction – Substitution and Transposition ciphers – Stream and block ciphers –Modern symmetric key ciphers-DES-Structure, Analysis ,Security-AES- Introduction, AES Ciphers .

Module III (12 Hrs)
Asymmetric key Cryptography – Introduction – RSA cryptosystem – Rabin cryptosystem – Elgamal Cryptosystem – Elliptic Curve Cryptosystem
Message Integrity – Message Authentication – Hash Functions – SHA 512 – Digital Signature – Digital Signature Schemes –Entity authentication , Introduction.

Module IV (12 Hrs)
E mail Security – PGP & S/MIME – Transport layer Security – SSL & TLS – Network layer security – IP Sec

Text books
1. An Introduction to the theory of numbers. Ivan Niven, Herbert S Zuckerman, Hugh L Montgomery- Wiely Student Edition
2. Cryptography and Network Security, Behrouz A. Forouzan, Tata McGraw-Hill

Reference books *1.*

1 Elementary Theory of Numbers- C Y Hsuing - Allied publishers Tom M Apostol Introduction to analytic Number Theory - Springer International Student Edition

2. Niven I., Zuckerman H.S. and Montgomery H. L., An Introduction to the Theory of Numbers, John Wiley and Sons.
2. Stallings W., Cryptography and Network Security: Principles and Practice, Pearson Education Asia.
3. Mano W., Modern Cryptography: Theory & Practice, Pearson Education.
4. D. A. Burton, Elementary Number Theory, 6/e, Tata McGraw Hill.
5. Delfs H. and Knebel H., Introduction to Cryptography: Principles and Applications, Springer.

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 803 ARTIFICIAL INTELLIGENCE

3 hours lecture and 1-hour tutorial per week

Module I (13 Hours)

Artificial Intelligence: History and Applications, Production Systems, Structures and Strategies for state space search- Data driven and goal driven search, Depth First and Breadth First Search, DFS with Iterative Deepening, Heuristic Search- Best First Search, A* Algorithm, AO* Algorithm, Constraint Satisfaction, Using heuristics in games- Minimax Search, Alpha Beta Procedure.

Module II (13 Hours)

Knowledge representation - Prepositional calculus, Predicate Calculus, Theorem proving by Resolution, Answer Extraction, AI Representational Schemes- Semantic Nets, Conceptual Dependency, Scripts, Frames, Introduction to Agent based problem solving.

Module III (12 Hours)

Machine Learning- Symbol based and Connectionist, Social and Emergent models of learning, The Genetic Algorithm- Genetic Programming, Overview of Expert System Technology- Rule based Expert Systems,

Module IV (12 Hours)

Languages and Programming Techniques for AI- Introduction to PROLOG and LISP, Search strategies and Logic Programming in LISP, Production System examples in PROLOG.

Text books

1. George F Luger, Artificial Intelligence- Structures and Strategies for Complex Problem Solving, 4/e, 2002, Pearson Education
2. E. Rich, K.Knight, Artificial Intelligence, 2/e, Tata McGraw Hill

Reference books

1. S Russel, P Norvig, Artificial Intelligence- A Modern Approach, 2/e, Pearson Education, 2002.
3. Winston. P. H, LISP, Addison Wesley .
4. Ivan Bratko, Prolog Programming for Artificial Intelligence, 3/e, Addison Wesley, 2000

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 804 : ADVANCED COMPUTER ARCHITECTURE

3 hours lecture and 1 hour tutorial per week

Module I (15 hours)

Fundamentals - task of a computer designer - trends in technology usage and cost - performance measurement - quantitative principles of computer design - *instruction set architectures* - classification - addressing and operations - encoding an instruction set - role of compilers - *case study* - the DLX architecture - *pipelining* - pipeline for DLX - pipeline hazards - data and control hazards - implementation difficulties - pipelining with multi-cycle operations

Module II (12 hours)

Instruction level parallelism - concepts and challenges - dynamic scheduling - dynamic hardware prediction - multiple issue of instructions - compiler and hardware support for ILP - *vector processing* - vector architecture - vector length and stride - compiler vectorization - enhancing vector performance

Module III (13 hours)

Memory hierarchy design - reducing cache misses and miss penalty, reducing hit time - main memory - virtual memory and its protection - *case study* - protection in the Intel Pentium - crosscutting issues - *I/O systems* - performance measures - reliability and availability - designing an I/O system - case study - Unix file system performance

Module IV (12 hours)

Interconnection networks - simple networks - connecting more than two computers - practical issues - *multiprocessors* - introduction - application domains - centralized-shared memory and distributed-shared memory architectures - synchronization - models of memory consistency

Text book

Hennesy J.L. & Pattersen D.A., *Computer Architecture: A Quantitative approach*, 2/e, Harcourt Asia Pte Ltd. (Morgan Kaufman)

Reference books

1. Pattersen D.A. & Hennesy J.L., *Computer Organisation and Design: The Hardware/ Software Interface*, 2/e, Harcourt Asia Pte Ltd (Morgan Kaufman)
2. Hwang K., *Advanced Computer Architecture: Parallelism, Scalability and Programmability*, McGraw Hill
3. Hwang & Briggs, *Computer Architecture and Parallel Processing*. McGrawHill.

Sessional work assessment

Assignments	2x10 = 20
Tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions of 15marks from module I with choice to answer any one
Q III - 2 questions of 15marks from module II with choice to answer any one
Q IV - 2 questions of 15marks from module III with choice to answer any one
Q V - 2 questions of 15marks from module IV with choice to answer any one

2K6CS 805(A) ADVANCED TOPICS IN ALGORITHMS

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Balanced binary search trees – AVL Trees – Height of an AVL Tree, Insertion Procedure, Deletion Procedure. **Red Black Trees** – Properties of Red Black Trees, Rotations, Insertion and Deletion procedures. **B-Trees**- Definition, Basic operations on B-Tree, Deleting a key from B-Tree. **Binomial Heaps**- Binomial Trees and Binomial Heaps, Operations on Binomial Heaps. **Fibonacci Heaps**- Structure of Fibonacci Heaps, Mergeable Heap operations, Decreasing a key and Deleting a node, Bounding the maximum degree.

Module II (12 hours)

Flow Networks – Properties of Flow Networks, Ford-Fulkerson method, Edmonds-Karp method, Maximum Bipartite Matching, Push Relabel algorithm, The Relabel to Font Algorithm. **Solving Systems of Linear Equations** – Overview of LUP decomposition, Forward and Back Substitution, Computing an LU Decomposition, Computing LUP decomposition.

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Module III (14 hours)

Linear Programming - Overview of Linear Programming, Standard and Slack forms, Converting linear programs into slack forms, The Simplex Algorithm, Initial basic feasible solution, Fundamental theorem of Linear Programming. Polynomials and FFT – Representation of Polynomials, DFT and FFT, divide and conquer FFT algorithm, efficient parallel FFT algorithm.

Module IV (12 hours)

Pattern Matching Algorithms – Finite Automata based Pattern Matching, Rabin Karp method, The Boyer Moore heuristic, Longest Common Subsequence. Computational Geometry – Line Segment Properties, Segments intersection problem, Finding Convex Hull, Graham Scan method, Jarvis's March, Finding Closest pair of points.

Reference books

1 Thomas H. Cormen, Charles E. Leiserson, Ronald L. Rivest, Clifford Stein, *Introduction to Algorithms*, Prentice Hall of India
2. Basse S., *Computer Algorithms – Introduction to Design and Analysis*, Addison Wesley
3. Dexter C. Kozen, The Design and Analysis of Algorithms, Springer verlag N.Y, 1992

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 805(B) IMAGE PROCESSING

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)
Introduction - digital image representation - fundamental 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 relationship between pixels - image geometry - image transforms - introduction to Fourier transform - discrete Fourier transform - some properties of 2-fourier transform (DFT) - the FFT - other separable image transforms - hotelling transform

Module II (13 hours)
Image enhancement - point processing - spatial filtering - frequency domain - color image processing - image restoration - degradation model - diagonalization of circulant and block circulant matrices - inverse filtering - least mean square filter

Module III (12 hours)
Image compression - image compression models - elements of information theory - error-free compression - lossy compression - image compression standards

Module IV (12 hours)
Image reconstruction from projections - basics of projection - parallel beam and fan beam projection - method of generating projections - Fourier slice theorem - filtered back projection algorithms - testing back projection algorithms

Reference books

1. Rafael C., Gonzalez & Richard E. Woods, Digital Image Processing, Addison Wesley, New Delhi
2. Rosenfeld A. & Kak A.C., Digital Picture Processing, Academic Press
3. Jain A.K, Fundamentals of Digital Image Processing, Prentice Hall, Englewood Cliffs, N.J.
4. Schalkoff R. J., Digital Image Processing and Computer Vision, John Wiley and Sons, New York
5. Pratt W.K., Digital Image Processing, 2nd edition, John Wiley and Sons, New York

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 805(C) NEURAL NETWORKS AND FUZZY LOGIC

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)

Introduction to artificial neural networks-biological neurons-Mc Culloch and Pitts models of neurons-types of activation function-network architectures-knowledge representation-learning process-error-correction learning-supervised learning-unsupervised learning-single unit mappings and the perceptrons- perceptrons convergence theorem (without proof)-method of steepest descent-least mean square algorithms-adaline /Medaline units-multiplayer perceptrons-derivation of the back-propagation algorithm.

Module II (13 hours)

Radial basis and recurrent neural networks-RBF network structure-Covers Theorem and the separability of patterns-RBF learning strategies-K-means and LMS algorithms-comparison of RBF and MLP networks-recurrent networks-Hopfield networks-energy function-spurious states-error performance-stimulated annealing-the Boltzman machine-Boltzman learning rule-the mean field theory machine-MFT learning algorithm-applications of neural network-the XOR problem-traveling salesman problem-image compression using MLPs-character retrieval using Hopfield networks.

Module III (13 hours)

Fuzzy logic-fuzzy sets-properties-operations on fuzzy sets-fuzzy relations-operations of fuzzy relations-the extension principle-fuzzy measures-membership functions-fuzzification and defuzzification methods-fuzzy controllers-Mamdani and Sugeno types-design parameters-choice of membership functions- fuzzification and defuzzification methods-applications.

Module IV (13 hours)

Introduction to genetic algorithm and hybrid systems-genetic algorithms-natural evolution-properties-classification-GA features-coding-selection-reproduction-crossover and mutation operations basic GA and structure. Introduction to hybrid systems-concept of neuro-fuzzy and nuero-genetic systems.

Reference books

1. Simon Haykins, “Neural Network – A Comprehensive Foundation” Macmillan College, Proc, Con-Inc
2.Zurada J M, “Introduction to Artificial neural Systems”, Jaico Publishers
3. Driankov D,Hellendoom H & Reinfrank M, “An Introduction to Fuzzy control”, Narosa Publishing House.
4. Thimothy J Rose,”Fuzzy Logic with engineering Applications” TMH
5. Bart Kosko , “Neural Network and Fuzzy Systems”, PHI
6. David E Goldberg, “Genetic Algorithms in Search Optimization and Machine Learning”, Addison Wesley.
7. Suran Goonatilake & Sukhdev Khebbal, “Intelligent Hybrid Systems”,John Wiley Sons

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 805(D) MANAGEMENT INFORMATION SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (12Hrs)
Information systems – functions of management – levels of management – framework for information systems – systems approach – systems concepts – systems and their environment – effects of system approach in information systems design – using systems approach in problem solving – strategic uses of information technology.

Module II (10 Hrs)
An overview of computer hardware and software components – file and database management systems – introduction to network components – topologies and types – remote access – the reasons for managers to implement networks – distributed systems – the internet and office
communications

Module III (14 Hrs)
Applications of information systems to functional – tactical and strategic areas of management, decision support systems and expert systems .

Module IV (16 Hrs)
Information systems planning – critical success factor – business system planning – ends /means analysis – organizing the information systems plan – systems analysis and design – alternative applications development approaches – organization of data processing – security and ethical issues of information systems .

Text books
1. Robert Schultheis & Mary summer , "Management Information System – The Manager's View" ,TMH.

Reference books

1. Landon K C & Landon J P, "Management Information Systems – Organization and Technology",4th Edition TMH.
2. Sadagopan s, "Management Information Systems", PHI
3. Basandra S K ," Management Information Systems", Wheeler Publishing.
4. Alter S, "Information Systems – A Management Perspective" 3/e Addison Wesley

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 805(E) QUANTUM COMPUTATION

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)
Review of Linear Algebra. The postulates of quantum mechanics. Review of Theory of Finite Dimensional Hilbert Spaces and Tensor Products.

Module II (12 hours)
Models of computation – Turing machines. Quantifying resources. Computational complexity and the various complexity classes. Models for Quantum Computation. Qubits. Single and multiple qubit gates. Quantum circuits. Bell states. Single qubit operations. Controlled operations and measurement. Universal quantum gates.

Module III (14 hours)
Quantum Algorithms – Quantum search algorithm - geometric visualization and performance. Quantum search as a quantum simulation. Speeding up the solution of NP Complete problems. Quantum search as an unstructured database. Grover's and Shor's Algorithms.

Module IV (12 hours)
Introduction to Quantum Coding Theory. Quantum error correction. The Shor code. Discretization of errors, Independent error models, Degenerate Codes. The quantum Hamming bound. Constructing quantum codes – Classical linear codes, Shannon entropy and Von Neuman Entropy.

Reference books

1 Nielsen M.A. and I.L. Chauang, Quantum Computation and Quantum Information, Cambridge University Press, 2002.
2. Gruska, J. Quantum Computing, McGraw Hill, 1999.
3. Halmos, P. R. Finite Dimensional Vector Spaces, Van Nostrand, 1958

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 805(F) DATA MINING AND DATA WAREHOUSING

3 hours lecture and 1 hour tutorial per week

Module I (14 hours)
Fundamentals of Data Mining-What is data mining, Data mining strategies(Mining Frequent pattern, Association, classification & prediction, cluster analysis)-classification of data mining systems-major issues in data mining-Data preprocessing-Data mining applications.
Data warehouse & OLAP technology- What is data warehouse, Multi dimensional data model, star, snowflakes and fact constellations, OLAP operations in Multidimensional data model- Data warehouse architecture-A three tier data warehouse architecture-Data warehouse back-end tools and utilities-types of OLAP servers.

Module II (13 hours)
Mining Frequent patterns- Frequent item sets, closed item sets and association rules, APRIORI algorithm for finding frequent item sets, Generating association rule from frequent item. Classification and Prediction-Issues regarding classification and prediction, classification by decision tree Induction, Bayesian classification, Rule based classification, SVM, k-Nearest neighbor classifiers. Prediction-Linear regression, Nonlinear regression.

Module III (13 hours)
Cluster analysis- What is cluster analysis, Type of data in cluster analysis-Categorization of major clustering Methods-classical partitioning methods- K-means and K-Medoids, Hierarchical methods-BIRCH (Balanced Iterative Reducing and Clustering using Hierarchies)- Introduction about Density based methods, Grid based methods model based methods and outlier analysis.

Module IV (12 hours)
Introduction about Mining data streams, mining time series data, spatial data, multimedia data, text data and web (Concepts only).
Introduction about WEKA Data mining tool- introduction, installation, WEKA data file format, Data visualization, Data filtering, selecting attributes, Data mining with WEKA, APRIORI algorithm through WEKA, clustering through WEKA, regression analysis through WEKA

Text books
1. Data Mining – Concepts and Techniques – Jiawei Han & Michaline Kamber Elsevier, second edition .
2. Data Mining: Methods and Techniques, ABM Shawkath Ali, Saleh A Wasimi, Cengage Learning India edn. (for WEKA data mining tool)

Reference books
1. Data Mining Introductory and advanced topics –Margaret H Dunham, Pearson Education
2. Data Mining Techniques – Arun K Pujari, University Press

Sessional work assessment	
Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern
Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 805(G) ADVANCED MOBILE COMMUNICATION SYSTEMS

3 hours lecture and 1 hour tutorial per week

Module I (13 hours)
Introduction : Technical Background, Transmission Fundamentals, Communication Networks, Protocols and TCP/IP Suite . Wireless Communication Technology Antennas and Propagation Signal, Encoding Techniques, Spread Spectrum Coding and Error Control . Wireless Networking Satellite Communications, Cellular Transmission Principles, Cordless Systems and Wireless Local Loop Mobile IP and Wireless access protocol

Module II (13 hours)
Wireless LANs : Wireless LAN Technology, IEEE 802, 11 Wireless LAN standards. System Architecture for CDMA. Network and Data Link Layers of CDMA. Signaling Applications in CDMA System. Voice Applications in CDMA System.

Module III (12 hours)
RF Engineering and Facilities : Wireless Data, Cellular Communication Fundamentals, GSM Architecture and Interfaces. Radio . Link Features in GSM, GSM Logical Channels and Frame Structure. Speech Coding in GSM (Messages, Services and Call Flows in GSM).

Module IV (12 hours)
Wireless Sensor Networks : Overview/Architectures; Data Dissemination/Data Gathering; MAC Protocols; Sensor Management; Localization.

Reference books

1. Applications of CDMA in Wireless/Personal Communications - by V K Garg, K Smolik
2. Principles and Applications of GSM – by V K Garg Prentice Hall
3. Wireless Communication and Networks - by Stallings
4. Mobile Communication Schiller Prentice Hall
5. Mobile Communication - by Lee, Pearson
6. Related IEEE/IEE publications

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6CS 805(H) NATURAL LANGUAGE PROCESSING

3 hours lecture and 1 hour tutorial per week

Module I (12 hours)

Introduction to Natural Language Processing- The Study of Language- Applications of Natural Language Understanding- Evaluating Language Understanding Systems- Different Levels of language analysis- Representation and understanding- The Organization of Natural Language Understanding Systems Linguistic background.

Module II (12 hours)

Grammars and parsing, Top down and Bottom up parsers, Transition Network Grammars, Feature systems and augmented grammars, Morphological analysis and the lexicon, Parsing with features, Augmented Transition Networks.

Module III (12 hours)

Grammars for natural language, Movement phenomenon in language, Handling questions in context free grammars, Hold mechanisms in ATNs, Gap threading, Human preferences in parsing, Shift reduce parsers, Deterministic parsers, Statistical methods for Ambiguity resolution.

Module IV (15 hours)

Semantic Interpretation, word senses and ambiguity, Basic logical form language, Encoding ambiguity in logical from, Thematic roles, Linking syntax and semantics, Recent trends in NLP.

Text books

1. James Allen, Natural Language Understanding, Second Edition, 2003, Pearson Education

Reference books

1. D Juraffsky, J H Martin, Speech and Language Processing, Pearson Education
2. Tomek Strzalkowski " Natural Language Information Retrieval ", Kluwer academic Publishers, 1999
3. Ron Cole, J.Mariani, et.al "Survey of the State of the Art in Human Language Technology", Cambridge University Press, 1997

Sessional work assessment

Assignments	2x10 = 20
2 tests	2x15 = 30
Total marks	= 50

University examination pattern

Q I - 8 short answer type questions of 5 marks, 2 from each module
Q II - 2 questions A and B of 15 marks from module I with choice to answer any one
Q III - 2 questions A and B of 15 marks from module II with choice to answer any one
Q IV - 2 questions A and B of 15 marks from module III with choice to answer any one
Q V - 2 questions A and B of 15 marks from module IV with choice to answer any one

2K6 CS 806(P) SEMINAR

4 hours practical per week

Each student is expected to give a seminar on a topic of current relevance in Computer Science and engineering –they have to refer published papers from standard journals-the seminar report must not be the reproduction of the original paper

Sessional work assessment	
Presentation	= 30 marks
Report	= 10 marks
Discussion	= 10 marks
Total marks	= 50 marks

2K6 CS 807(P) PROJECT & INDUSTRIAL TRAINING

6 hours practical per week

Each student group consisting of not more than four members is expected to develop a complete product- the design and development of which may include hardware and /or software- the students will present and demonstrate the project work before the committee - a detailed report is also to be submitted - sixty percent of total marks will be awarded by the guide and the remaining forty percent will be awarded by the evaluation committee. An industrial training of minimum one week should be carried out to have an industrial exposure to the students. A report on Industrial visit should be submitted also.

Sessional work assessment	
Design and Development	= 30 marks
Presentation & Demonstration	= 35 marks
Project Report	= 10 marks
Industrial visit Report	= 25 marks
Total marks	= 100 marks

2K6 CS 808 (P) : VIVA VOCE

There is only University examination for Viva Voce. Examiners will be appointed by the university for conducting the viva voce. The viva voce exam will be based on the subjects studied for the B.Tech course, mini project, project & Industrial training and seminar reports of the student - the relative weightages would be as follows

Sessional work assessment

Subjects	: 30
Mini project	: 20
Project & Industrial Training	: 30
Seminar	: 20
Total marks	: 100