

**COCHIN UNIVERSITY OF SCIENCE & TECHNOLOGY**

Scheme for I to VIII

**B.TECH INFORMATION TECHNOLOGY**

(2006 Admission onwards)

## B.TECH INFORMATION TECHNOLOGY

**NB: For all practicals from semester I & II to semester VII, 50% weightage is to be given for continuous evaluation and 50% for end semester examination**

### Semester I & II (Common to all branches)

Course Code	Subject Name	Hrs./ week		Marks		
		L	T/D/P	Internal	University	Total
CE/CS/EB/EC/EE/EI/IT/ME/SE 101	Engineering Mathematics I	3		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 102	Engineering Physics	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 103	Engineering Chemistry	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 104	Engineering Mechanics	3	1	50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 105	Engineering Graphics	1	3	50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 106	Basic Civil & Mechanical Engineering	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 107	Basic Electrical Engineering & Electronics	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 108	Computer Programming	2		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 109	Technical Communication & Social Sciences	3*		50	100	150
CE/CS/EB/EC/EE/EI/IT/ME/SE 110	Computer Programming Lab		3	100		100
CE/CS/EB/EC/EE/EI/IT/ME/SE 111	Electrical & Mechanical Workshops		3	100		100
	<b>Total</b>	<b>20</b>	<b>10</b>	<b>650</b>	<b>900</b>	<b>1550</b>

\* 1 hour/week for environmental studies

### Semester III

Course Code	Subject Name	Hrs./ week		Marks		
		L	T/D/P	Internal	University	Total
CE/CS/EB/EC/EE/EI/IT/ME/SE 301	Engineering Mathematics II	4		50	100	150
EC/EB/EI/IT/ME 302	Electrical Technology	4		50	100	150
CS/IT 303	Discrete Computational structures	4		50	100	150
CS/IT 304	Object Oriented Programming	4		50	100	150
IT 305	Electronic circuits & Logic Design	4		50	100	150
IT 306	Computer Organization	4		50	100	150
IT 307	Logic Design Lab	-	3	100		100
CS/IT 308	Object Oriented Programming Lab	-	3	100		100
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>500</b>	<b>600</b>	<b>1100</b>

### Semester IV

Course Code	Subject Name	Hrs./ week		Marks		
		L	T/D/P	Internal	University	Total
CE/CS/EB/EC/EE/EI/IT/ME/SE 401	Engineering Mathematics III	4		50	100	150
IT 402	Microprocessor Architecture & System Design.	4		50	100	150
IT 403	Operations Research	4		50	100	150
CS/IT 404	Automata, Languages and Computation	4		50	100	150
CS/IT 405	Data Structures and Algorithms	4		50	100	150
CS/IT 406	Data Communication	4		50	100	150
IT 407	PC Hardware and Microprocessor Lab	-	3	100		100
CS/IT 408	Data structures Lab	-	3	100		100
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>500</b>	<b>600</b>	<b>1100</b>

### Semester V

Course Code	Subject Name	Hrs./ week		Marks		
		L	T/D/P	Internal	University	Total
CE/CS/EB/EC/EE/EI/IT/ME/SE 501	Engineering Mathematics IV	4		50	100	150
CS/IT 502	Systems Programming	4		50	100	150
CS/IT 503	Software Engineering	4		50	100	150
IT 504	Computer Graphics and Animation	4		50	100	150
CS/IT 505	Database Management Systems	4		50	100	150
IT 506	Knowledge Engineering	4		50	100	150
IT 507	Mini project-RDBMS Based	-	3	100		100
IT 508	Systems Programming lab	-	3	100		100
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>500</b>	<b>600</b>	<b>1100</b>

### Semester VI

Course Code	Subject Name	Hrs./ week		Marks		
		L	T/D/P	Internal	University	Total
IT 601	Financial Management & E-Banking	4		50	100	150
IT 602	Internet programming	4		50	100	150
CS/ IT 603	Operating Systems	4		50	100	150
CS/IT 604	Analysis and Design of Algorithms	4		50	100	150
IT 605	Object Oriented Modeling and Design	4		50	100	150
CS/IT 606	Computer Networks	4		50	100	150
IT 607	Computer Graphics Lab	-	3	100		100
IT 608	Mini Project – Internet based	-	3	100		100
	<b>Total</b>	<b>24</b>	<b>6</b>	<b>500</b>	<b>600</b>	<b>1100</b>

## Semester VII

Course Code	Subject Name	Hrs./ week		Marks		
		L	T/D/P	Internal	University	Total
CS/EB/EC/EE/EI/IT 701	Industrial Organization & Management	4		50	100	150
IT702	Multimedia Computing	4		50	100	150
CS/IT 703	Advanced Computer Networks	4		50	100	150
CS/IT 704	Distributed Computing	4		50	100	150
IT 705	Elective I	4		50	100	150
IT 706	Computer Network Lab	-	3	100		100
IT 707	Mini Project –Multimedia based	-	3	100		100
IT 708	Seminar	-	2	50		50
IT 709	Project Design	-	2	50		50
	<b>Total</b>	<b>20</b>	<b>10</b>	<b>550</b>	<b>500</b>	<b>1050</b>

### ELECTIVE I

**IT 705 A: Parallel Computer Architecture & Programming**

**CS/IT 705 B: Information Retrieval**

**CS/EB/IT 705 C: Artificial Neural Networks**

**IT 705 D: Cryptography and Data Security**

**IT 705 E: Data Mining & Warehousing**

## Semester VIII

Course Code	Subject Name	Hrs./ week		Marks		
		L	T/D/P	Internal	University	Total
IT 801	Electronic Business and Services	4		50	100	150
IT 802	Real Time Systems	4		50	100	150
IT 803	Software Project Management	4		50	100	150
IT 804	Elective II	4		50	100	150
IT 805	Project Work		14	300		300
IT 806	Viva-voce				100	100
	<b>Total</b>	<b>16</b>	<b>14</b>	<b>500</b>	<b>500</b>	<b>1000</b>
<b>Grand Total</b>				<b>3700</b>	<b>4300</b>	<b>8000</b>

### ELECTIVE II:

**IT 804 A: Software Testing methods & Tools**

**CS/EB/EC/ IT 804 B: Bioinformatics**

**IT 804 C: Soft Computing**

**CS/IT 804 D: Mobile Computing**

**CS/IT 804 E: Geographical Information Systems**

## CE/CS/EB/EC/EE/EI/IT/ME/SE 101 ENGINEERING MATHEMATICS I

### Module 1

#### Ordinary differential equations:

First order differential equations-Methods of solution and Simple applications-Linear differential equations of higher orders with constant co-efficients-Methods of solution of these equations. Cauchy's Linear differential equations. Simultaneous linear differential equations- Simple applications of linear differential equations in engineering problems –Electrical Circuits, Mechanical Systems

### Module 2

**Infinite series** : Integral test, comparison test, ratio test, Cauchy's root test, Raabe's test, series of positive and negative terms, concept of absolute convergence, alternating series, Leibniz test(No proofs for any of the above tests)

**Power series** : Interval of convergence of power series, Taylor and Maclaurin series of functions, Leibniz formula for the nth derivative of the product of two functions (No proof), use of Leibniz formula for the determination of co-efficients of the power series.

### Module 3

**Partial differentiation**: Partial differentiation-Concept of partial derivative - Chain rule- Total derivative- Euler's theorem for homogeneous functions, Differentials and their applications in errors and approximations, Jacobians - Maxima minima of functions of two variables(Proof of the result not required)-Simple applications.

Taylor's series expansion for a function on two variables-Simple problems

**Co-ordinate systems**:Rectangular co-ordinates-Polar co-ordinates-In plane and in Space-Cylindrical polar co-ordinates-Spherical polar co-ordinates.

### Module 4

#### Integral calculus:

Application of definite integrals: Area, Volume, Arc length, Surface area.

Improper Integrals-Beta function-Gamma function

Multiple integrals : Evaluation of double integrals-Change of order of integration. Evaluation of triple integrals-Change of Variables in integrals.

Applications of multiple integrals Plane Area, Surface area & Volumes of solids

#### Text Books:

Engineering mathematics -Voll:S.S.Sastry, PHI publishers

Erwin Kreyzig, Wiley Easter Advanced Engineering Mathematics:,\*\*

#### References:

Mathematical Techniques: Oxford University Press

T.Veerarajan Engineering Mathematics:, TMGH Publishers, \*

B.S.Grewal ,Higher Engineering Mathematics:, Khanna Publishers, \*

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CE/CS/EB/EC/EE/EI/ME/IT/SE 102: ENGINEERING PHYSICS

### Module 1

Interference of light – Michelson interferometer – Applications-Interference in thin films – Antireflection coatings – Interference filters – Fringes produced by air wedge – Testing of flat surfaces- Diffraction of light – Zone plate - Plane diffraction grating - Reflection and transmission gratings – Determination of wavelength of light – Dispersive and resolving powers - Polarization of light – Double refraction – Nicol's prism – Quarter and half wave plates – Elliptically and circularly polarized light – Optical activity – Specific rotation – Half-shade polarimeter – Applications of polarized light.

### Module 2

Lasers and Holography – Properties of laser light – Coherence of light – Principles of laser action – Population inversion – Optical pumping – Metastable states – Conditions for laser action – Types of lasers – Helium-Neon, Ruby and Semiconductor lasers – Applications of lasers – Principles of holography – Recording and Reconstruction of holograms – Applications of holography- Fiber optics – Light transmission through optical fiber – Numerical aperture – Multi and single mode fibers – Step index and graded index fibers – Fiber drawing – Fiber optic communication (basic ideas) – Ultrasonics – Generation of ultrasonic waves – Applications of Ultrasound.

### Module 3

Quantum mechanics – Heisenberg's uncertainty principle - Experimental illustrations – Quantum mechanical wave equation – Time independent Schrodinger equation – Physical significance of wave function – Properties of the wave function – Solution of Schrodinger equation - Atomic and nuclear physics – The Vector atom model – Quantization of orbital angular momentum – Electron spin - Magnetic moment of orbital electron – Pauli's exclusion principle– Zeeman effect – Stark effect – Raman effect. Nuclear physics – Nuclear forces – Properties of the nucleus - Nuclear reactions-Nuclear reaction cross section-Artificial radioactivity – Nuclear reactors – Nuclear fusion – Thermonuclear reactions-Controlled thermonuclear reactions.

### Module 4

X-rays – Production of X-rays – Origin of X-rays and X-ray spectra – Moseley's law – Properties of X-rays – Applications of X-rays – Diffraction of X-rays by crystals – Bragg's law – Crystallography – Unit cell – Seven crystal systems – Bravais space lattices - Packing factor – Lattice planes and Miller indices – Energy bands in solids – Conductors, semiconductors and insulators – Intrinsic and extrinsic semiconductors – Conductivity of semiconductors – Fermi level - Applications of semiconductors – p-n junctions – solar cells – Hall effect and its applications – Superconductivity – Superconducting transition – The Meissner effect – Type I and Type II superconductors – Isotope effect - High temperature superconductors – Josephson effect – SQUIDS – Applications of superconductors

### Text and Reference Books :

1. *Jacob Philip – A text book of Engineering Physics, Educational Publishers and Distributors 2002*
2. *A.S. Vasudeva – Modern Engineering Physics, S. Chand & Co.,\**
3. *M.R. Sreenivasan – Physics for Engineers – New Age International,\**

#### **Type of questions for University Examination**

**Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module**

**Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks**

## CE/ CS/EB/EC/EE/EI/ME/IT/SE 103 ENGINEERING CHEMISTRY

### Module 1

Solid state chemistry: Fundamentals, Bonding in solids, Born-Haber cycle, Point defects, Methods to improve reactivity of solids, Free electron theory, Band theory, Fermi level in semiconductors, Molecular field theory of magnetic materials, Conventional and organic superconductors, High temperature superconductors, Liquid crystals, Applications. Solid surface characterisation: Electron spectroscopy for chemical analysis, Chemical shift, BET isotherm, Thermodynamics of adsorption.

### Module 2

Electrochemistry: Fundamentals, Electrode potentials, Types of electrodes, Salt bridge, emf measurement, Concentration cells, Acids and bases, Buffer solutions, pH measurements, Polarisation, Overvoltage. Power generation: Secondary cells, Fuel cells, Photovoltaic effect, Solar cells. Corrosion: Different forms of corrosion, Prevention of corrosion.

Chemical Kinetics: reaction rate, rate constant, rate law, reaction order, first order, second order, pseudo-first order reactions, integrated rate laws, half-life of a reaction and its relation to rate constant. Molecularity, simple unimolecular and bimolecular reactions. Arrhenius equation. Fast reactions – flash photolysis, flow techniques and relaxation methods.

### Module 3

Chemical Thermodynamics: Fundamentals, Molecular interpretation of internal energy, enthalpy and entropy, Heat of reaction, Kirchhoff's equation, Trouton's rule, Entropy changes accompanying different processes, Nernst heat theorem, Third-law. Free energy: Dependence on pressure and temperature, Gibbs-Helmholtz equation, Free energy changes and equilibrium constant, Chemical potential, Fugacity, Thermodynamics of biochemical reactions.

### Module 4

Engineering materials: Industrial polymers-polymerization techniques, structure-property relationships, polymer additives, polymer processing methods (extrusion, injection, compression, transfer and blow molding methods). Nanomaterials: definition, classification and applications. Nanometals and nanoceramics – examples and properties.

Lubricants: classification, functions and properties. Mechanism of lubrication.

Refractories: classification and properties. Portland cement, lime and plaster of Paris – manufacture, setting and hardening.

Chemistry of optical fibres, fullerenes and organoelectronic materials (introduction only).

### Text Books:

1. Peter Atkins and Julio de Paula *Elements of Physical Chemistry*, Oxford University Press, 2005
2. Shashi Chawla *A Text Book of Engineering Chemistry* (3<sup>rd</sup> edn.); Dhanpat Rai & Co, New Delhi, 2003.

### References

1. Atkins, P.W., *Physical Chemistry*, Oxford University Press, UK, 1998
2. Bhatnagar, M. S., *Textbook of Pure & Applied Physical Chemistry*, A. H. Wheeler & Co, New Delhi, 1999.
3. Geoffrey Ozin, Andre Arsenault *Nanochemistry: A Chemical Approach to Nanomaterials.*; Royal Society of Chemistry, U.K. 2005.

### Type of questions for University Examination

**Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module**

**Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks**

## CE/CS/EB/EC/EE/EI/IT/ME/SE 104 ENGINEERING MECHANICS

### A) STATICS

#### Module 1

**Concurrent forces in a plane:** Principles of statics. Composition and resolution of forces. Equilibrium of concurrent forces in a plane. Method of projection. Method of moments. Friction.

**Parallel forces in a plane:** Two parallel forces. General case of parallel forces in a plane. Centre of parallel forces and centre of gravity, Pappus theorems, centroids of composite plane figures and curves. Distributed forces in a plane.

#### Module 2

**Properties of areas:** . Moment of inertia of a plane figure with respect to an axis in its plane. Polar moment of inertia. Product of inertia. Principal axes. Mass moment of inertia of material bodies.

**General case of forces in a plane:** Composition of forces in a plane. Equilibrium of forces in a plane. Plane trusses - Method of joints. Method of sections. Plane frames : Method of members.

**Principle of virtual work:** Equilibrium of ideal systems, stable and unstable equilibrium.

### B) DYNAMICS

#### Module 3

**Rectilinear translation:** Kinematics of rectilinear motion. Differential equation of rectilinear motion. Motion of a particle acted upon by a constant force, by a force as a function of time and by a force proportional to displacement. Simple harmonic motion. D'Alembert's principle. Momentum and impulse. Work and energy, ideal systems, conservation of energy. Impact.

#### Module 4

**Curvilinear translation:** Kinematics of curvilinear translation. Differential equations of motion. Motion of a projectile. D'Alembert's principle in curvilinear motion. Moment of momentum. Work and energy in curvilinear motion.

**Rotation of a rigid body:** Kinematics of rotation. Equation of motion of a rigid body rotating about a fixed axis. Rotation under the action of a constant moment. Compound pendulum. General case of moment proportional to the angle of rotation. D'Alembert's principle of rotation. Resultant inertia force in rotation. Principle of angular momentum in rotation. Energy equation for rotating bodies.

#### Text Book & References :

1. Timoshenko and Young -Engineering Mechanics - McGraw Hill Book Company,\*
2. Beer F. P. & Johnston E. R. - Tata McGraw Hill-Mechanics for Engineers (Vol. 1- Statics and Vol.2 -Dynamics) - \*\*
3. Merriam H. L. & Kraige L. G. - John Wiley and Sons, Engineering Mechanics (Vol. 1- Statics and Vol.2 -Dynamics) - \*\*
4. Biju N- Engineering mechanics- Educational Publishers.\*

#### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

### **Module 1**

**Introduction to engineering graphics.** Drawing instruments and their use. familiarisation with current Indian Standard Code of Practice for general engineering drawing.

Scales- plain scale ,vernier scale, diagonal scale.

Conic sections- Construction of ellipse, parabola, hyperbola - construction of cycloid, involute, archimedian spiral and logarithmic spiral- drawing tangents and normals to these curves.

### **Module 2**

**Introduction to orthographic projections-** plane of projection- principles of first angle and third angle projections, projection of points in different quadrants.

Orthographic projection of straight lines parallel to one plane and inclined to the other plane- straight lines inclined to both the planes- true length and inclination of lines with reference planes- traces of lines.

Projection of plane laminae of geometrical shapes in oblique positions.

### **Module 3**

**Projection of polyhedra and solids of revolution-** frustum, projection of solids with axis parallel to one plane and parallel or perpendicular to other plane- projection of solids with axis inclined to both the planes- projection of solids on auxiliary planes.

Section of solids by planes inclined to horizontal or vertical planes- true shape of sections.

### **Module 4**

Development of surface of cubes, prisms, cylinders, pyramids and cones

Intersection of surfaces- methods of determining lines of intersection - intersection of prism in prism and cylinder in cylinder.

### **Module 5**

Introduction to isometric projection- isometric scales, isometric views- isometric projections of prisms, pyramids, cylinders, cones and spheres.

Introduction to perspective projections : visual ray method and vanishing point method- perspective of circles- perspective views of prisms and pyramids.

### **Text Books & References:**

1. P.I.Varghese & K.C. John -Engineering Graphics- JET Publishers \*\*
2. N.D.Bhat -Elementary engineering drawing- Charotar publishing house
3. P.S.Gill ,Geometric drawing, B.D Kataria &sons Ludhiana \*
4. P I Varghese- Engineering Graphics VIP Publishers. \*

### **University Examination Pattern**

**Answer 5 questions choosing one from each module**

**CE/CS/EB/EC/EE/EI/IT/ME/SE 106**  
**BASIC CIVIL AND MECHANICAL ENGINEERING**

**(A) CIVIL ENGINEERING**

**Module 1**

**Materials:** *Cement* - varieties and grade of cement and its uses. *Steel*- types of steel for reinforcement bars, steel structural sections. *Brick*- varieties and strength , tests on bricks.

*Aggregates*- types & requirements of good aggregates. *Concrete*- grades of concrete as per IS code, water cement ratio, workability, mixing, batching, placing, compaction and curing.

**Construction** : *Foundation*- types of foundations- isolated footing, combined footing, raft, pile & well foundations,

**Module 2**

**Super structure** : Brick masonry, English bond and Flemish bond , Stone masonry, Random rubble masonry. *Roofing*- Steel trusses, roofing for industrial buildings

**Surveying:** Principles, instruments, ranging and chaining of survey lines, errors in chaining, field work, field book, selection of survey stations, reconnaissance ,,

**Levelling** : Levelling instruments, different types, temporary adjustments, mean sea level, reduced level of point, booking of field notes, reduction of levels by height of collimation method.

**Text Books & References :**

1. Rangawala - Engineering materials ,\*\*
2. Punmia Building construction , \*\*
3. N.K.R. Murthy, A Text book of building construction, \*\*
4. Roy M Thomas, Fundamentals of Civil Engineering- Educational Publishers. \*
5. Jha & Sinha - A Text book of building construction,
6. T P Kanetkar, Surveying & Levelling,\*
7. Hussain - Surveying & Levelling \* :

**(B) MECHANICAL ENGINEERING**

**Module 3**

Thermodynamics: thermodynamic systems - open, closed and isolated systems, equilibrium state. of a system, property' and state, process, cycle, work, Zeroth law of thermodynamics-concept of temperature, temperature scales. First law - internal energy, enthalpy. Second law - Kelvin-Plank and Claussius statements, Carnot Cycle.

Refrigeration and Air conditioning: Vapour compression and vapour absorption refrigeration systems, summer and winter Air conditioning, Comfort and industrial Air conditioning.

Elementary ideas of simple reaction and impulse turbines, compounding of turbines.

**Module 4**

Internal Combustion Engines: working of two stroke and four stroke Petrol and Diesel engines, simple Carburettor, ignition system, fuel pump, fuel injector, cooling system, lubricating system.

Transmission of Power: Belt drives (open and closed), chain drives.

Metal fabrication: Welding - Arc, gas, resistance welding, Welding defects, Soldering, Brazing

**Text Books & References:**

1. P.K.Nag - Engineering Thermodynamics ,\*\*
2. D.B. Spalding & E.H.Cole- Engineering Thermodynamics \*
3. Van Wylon- Engineering Thermodynamics,\*
5. J.P.Holman - Thermodynamics,\*
6. Rogowsky, Tata McGraw Hill - Elements of Internal Combustion Engines \*
7. Gill, Smith & Ziurys Fundamentals of Internal Combustion Engines , Oxford & IBH \*
8. Stoecker Tata McGraw Hill - Refrigeration and Air Conditioning,\*

*Type of questions for University Examination*

**Part A -**

*Question 1- 4 short answer questions of 5 marks each. 2 questions from each module*

*Question 2-3 – There will be two choices from each module .Answer one question from each module of 15 marks*

**Part B**

*Question 4-4 short answer questions of 5 marks each. 2 questions from each module*

*Question 5-6 – There will be two choices from each module .Answer one question from each module of 15 marks*

# CE/CS/EB/EC/EE/ EI/IT/ME/SE 107 BASIC ELECTRICAL ENGINEERING & ELECTRONICS

## (A) ELECTRICAL ENGINEERING

### Module 1

**Basic principles of Electric circuits:** Review of Ohms law - Definition of resistance, current, voltage and power - Series and parallel circuits- constant voltage source and constant current source.

**Network Theorems:** Kirchoff's laws- Network analysis by Maxwell's circulation currents - Thevenin's theorem - Superposition theorem -Norton's theorem - Simple illustrative problems on network theorems.

**Review of electrostatics** - Coulomb's Law- Electric field strength and Electric flux density-capacitance.

### Module 2

**Review of electromagnetic induction** -Faraday's Law- Lenz's Law - mutually induced emf. Magnetic circuits - magnetic field of a coil - Ampere turns calculation - magnetic flux - flux density - field strength.

**Measuring instruments:** Working principle of galvanometer, Ammeter, Voltmeter, watt meter & energy meter.

**AC fundamentals:** Generation of alternating voltage and current - equations of sinusoidal voltage and current - wave form, cycle frequency, time period, amplitude, phase difference, rms value, average value, power factor & form factor. Vector diagram - addition and subtraction of vectors- sine waves in phase and out of phase. AC circuits: RC, RL, RLC circuits-series and parallel - current, voltage and power relationships. Poly phase circuits: vector representation - phase sequence - star and delta connections.

## (B) ELECTRONICS

### Module 3

**Passive components:** Resistor – Capacitor - Inductor - Color coding. Transformer- different types, construction.

**Semiconductors:** Energy band diagram – intrinsic & extrinsic semi conductors, doping - PN junction – Diodes, Zener diodes- Characteristics - Application of diodes. Rectifiers- Half wave, full wave and Bridge rectifiers – Ripple factor and regulation.

**Transistors:** - PNP and NPN transistors - theory of operation - Transistor configurations - characteristics - comparison.

**Special semiconductor devices** - FET - SCR - LED - LCD – V-I characteristics, applications.

### Module 4

**Fundamentals of Instrumentation:** Transducers - Definition - Classification – Active & passive - Transducer for position, pressure, velocity, vibration and temperature measurements.

CRO – principle of operation - measurement of amplitude, frequency and phase.

**Fundamentals of Communication:** Analog communication - concept of modulation, demodulation. Types: AM - FM -PM- Block diagram of general communication system -Basic concepts of digital communication - Block diagram.

### **Text Book:**

1. B. L. Theraja - Basic Electronics – Solid State –, S. Chand & Co.\*
2. Leonard S. Bobrow - Fundamentals of Electrical Engineering –Oxford University Press.\*

### **Further References:**

1. Edward Hughes - Electrical Technology :, Addison Wesley Publication\*
2. G.K. Mithal & Ravi Mittal - Electronic Devices & Circuits , Khanna Publishers, \*

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CE/CS/EB/EC/EE/E1/IT/ME/SE 108 COMPUTER PROGRAMMING

### Module 1

**Introduction to programming in C:** Fundamental data types- integer, floating point, and enumerated data types, typedef Expressions – arithmetic, relational and logic operators, Type conversion – simple and compound statement, Access to standard library, standard I/O-getchar, putchar, Formatted I/O, scanf, printf, error handling, line input and out put, control structures, selection statement, **IF, SWITCH, WHILE, DO WHILE, FOR, BREAK, CONTINUE, GOTO, RETURN** statements.

### Module 2

**Functions:** Declarations and functions, parameter passing mechanism, storage classes- scope, visibility, and life time of variables, AUTO, EXTERN, STATIC and REGISTER modifiers, Recursion.

### Module 3

**Arrays :** Single and multi dimensional arrays, sorting, selection sort, search-linear search and binary search, Structures and union.

### Module 4

**Pointers:** Pointers and addresses, pointer arrays, function returning pointers, pointers to function, pointer arithmetic,. pointers to structures, array of structures, preprocessor directive, command line arguments

### Text Book

1. Mullish & Cooper The Spirit of C An introduction to Modern programming  
Jaico Publication 1988
2. B.S. Gotfried (Schaum series, TMH)- Programming in C, \*

### References:

1. Pradeep Dey and Manas Ghosh, "Computer Fundamentals and Programming in C", Oxford 2006
2. Varghese Paul- Computer Fundamentals,\* EPD,Kochi
3. Brian W. Kernighan and Dennis M.Richie, "The C Programming Language" PHI,2<sup>nd</sup> ed.,

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from each module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

**CE/CS/EB/EC/EE/EI/ /IT/ ME /SE 109**  
**TECHNICAL COMMUNICATION AND SOCIAL SCIENCES**  
**(Module IV Environmental Studies : 1 hour per week**  
**Other modules : 2 hours per week)**

**PART - A TECHNICAL COMMUNICATION**

**Module 1**

**(25 hours)**

**Oral Communication:** starting and ending a conversation; telling and asking people to do things; expressing opinions and ideas, decisions and intentions, offers and invitations, feelings, right and wrong, numbers and money.

Purpose and audience; dealing with customers and clients; face-to-face discussions; meetings and attending meetings; checking understanding; raising questions; giving and receiving feedback; using body language; leading and directing discussions; concluding discussions; using graphics in oral presentations

**Reading Comprehension and reference skills:** skimming and scanning; factual and inferential comprehension; prediction; guessing meaning of words from context; word reference; comprehending graphics in technical writing.

Reading strategies; reading speed; reading between the lines for hidden meaning; interpreting graphics; using a dictionary; using an index; using a contents list to find information; choosing the right reference source.

**Module 2**

**(20 hours)**

**Written Communication:** note making and note taking; summarising; notes and memos; developing notes into text; organisation of ideas: cohesion and coherence; paragraph writing: ordering information in space and time; short essays: description and argument; comparison and contrast; illustration; using graphics in writing: tables and charts; diagrams and flow-charts; maps, plans and graphs.

Spelling rules and tips; writing a rough draft; editing and proof reading; writing the final draft; styling text; filling in complex forms; standard letters; CV; writing a report; writing leaflets and brochures; writing references; essay writing: expository writing; description of processes and products; classification; the instructional process; arguments and presentation of arguments; narrating events chronologically.

**PART - B SOCIAL SCIENCES**

**Module 3**

**(15 hours)**

**Science, Technology and Ethics**

Impact of science and technology on the development of modern civilization . The philosophy of modern science – scientific determinism – uncertainty principle. Relevance of scientific temper. Science and religion. Science and technology in developing nations. Technological advances of modern India. Intermediate and appropriate technology. Development of technical education in India.

Senses of Engineering Ethics – Variety of moral issues – Types of inquiry – Moral dilemmas – Moral autonomy – Kohlberg’s theory – Gilligan’s theory – Consensus and Controversy – Professional ideals and virtues - Attributes of an ethical personality – Theories about right action – Self interest.

Responsibilities and Rights of engineers – Collegiality and Loyalty – Respect for authority – Collective bargaining – Confidentiality – Conflicts of interest – Professional rights.

**Module 4**

**Environmental Studies :**

**( 30 hours)**

Natural resources – issues related to the use and over exploitation of forest resources , water resources, mineral resources, food resources and energy resources – role of an individual in conservation of natural resources – equitable use of resources for sustainable life styles.

Concept of an ecosystem – structure and function – energy flow in the ecosystem – ecological succession - food chains, food webs and ecological pyramids – structure and functions of a forest ecosystem and an aquatic eco system.

Definition of biodiversity – genetic, species and ecosystem diversity – biogeographical classification of India – Value of biodiversity : consumptive use, productive use, social, ethical, aesthetic and option values. Causes, effects and control measures of air pollution, water pollution, soil pollution, noise pollution, marine pollution, thermal pollution and nuclear hazards – Causes, effects and control measures of urban and industrial solid wastes – Role of an individual in prevention of pollution - An overview of the various environmental legislations in India – Issues involved in enforcement of environmental legislation.

The concept of sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, water shed management – Resettlement and rehabilitation of people ; its problems and concerns - Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust – Population growth and problems of population explosion – Environmental ethics : issues and possible solutions..

### **Text Books:**

**Meenakshi Raman and Sangeetha Sharma** *Technical Communication : Principles and Practice, Oxford University Press, 2004*

**Rajagopalan. R** *Environmental Studies : From Crisis to Cure, Oxford University Press, 2005*

**Jayashree Suresh and B.S. Raghavan** *Professional Ethics, S. Chand & Company Ltd, 2005.*  
**WC Dampier** *History of Science, Cambridge University Press.*

### **References:**

**Adrian Doff & Christopher Jones,**

*Language in Use . Upper intermediate, self-study workbook & classroom book, Cambridge University Press,2000.*

**Krishna Mohan & Meenakshi Raman,**

*Effective English Communication ,Tata Mc-Graw Hill,2000.*

**Edmund D. Seebaur & Robert L. Barry**

*Fundamentals of Ethics for Scientists and Engineers, Oxford University Press, 2001*

**Krishna Mohan & Meera Banerji,**

*Developing Communication Skills Mac Millan India Ltd,2000.*

**Rajendra Pal & JS Korlahalli**

*Essentials of business communication, S. Chand & Company Ltd \*\**

**Sarah Freeman,**

*Study Strategies, Orient Longman, 1978.\**

**Meenambal T , Uma R M and K Murali**

*Principles of Environmental Science and Engineering, S. Chand & Company Ltd, 2005*

### **University Examination pattern**

The question paper will have two parts. Part A (Technical Communication) will cover Modules I, II and will have a weightage of 50 marks. Part B ( Social Sciences) will cover Module III and Module IV (Environmental Studies) and will have a weightage of 50 marks. Part A and Part B will have to be answered in separate answer books.

### **Part A**

#### **University examination pattern**

Q I - 4 short type questions of 5 marks, 2 each from module I and II

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

### **Part B**

#### **University examination pattern**

Q I - 5 short type questions of 4 marks, 2 from module III and 3 from module IV

Q II - 2 questions A and B of 10 marks from module III with choice to answer any one

Q III - 2 questions A and B of 20 marks from module IV with choice to answer any one

**CE/CS/EB/EC/EE/EI/ IT/ ME/SE 110**  
**COMPUTER PROGRAMMING LABORATORY**

1. Study of OS commands. General introduction to application packages.
2. Programming using C control structures & pointers.
3. Searching & sorting
4. Creation and use of databases in a suitable database package
5. Programming exercises in C.

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

**CE/CS/EB/EC/EE/EI/ IT/ ME/SE 111**  
**ELECTRICAL AND MECHANICAL WORKSHOPS**

ELECTRICAL WORKSHOP

1. One lamp controlled by one switch
2. Series and parallel connections of lamps.
3. Stair case wiring.
4. Hospital Wiring.
5. Godown wiring.
6. Fluroscet lamp.
7. Connection of plug socket.
8. Different kinds of joints.
9. Transformer winding.
10. Soldering practice.
11. Familiarisation of CRO.

MECHANICAL WORK SHOP

1. Fitting Shop.
  2. Sheet Metal Shop
  3. Foundry Shop
  4. Welding Shop
  5. Carpentry Shop
- (Preliminary exercises for beginners in all shops. Specific models may be designed by the teachers.)

Introduction to the use of concrete mix.

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## **EB/EC/EE/EI/CE/CS/IT/ME/SE 301 ENGINEERING MATHEMATICS II**

### **Module I**

*Matrices and Vector spaces:* Rank of matrix, Echelon and normal form, Solutions of linear systems of algebraic equations, Eigen values and Eigen vectors, Cayley- Hamilton theorem (no proof). Vector Spaces- Subspaces,-Linear Independence of vectors-Linear span-Dimension and Basis. Linear transformations.

### **Module II**

*Fourier series and Fourier integrals:* Fourier series of Periodic functions-Euler formulae for Fourier coefficients- functions having period  $2\pi$  , arbitrary period- even and odd functions-half range expansions, Fourier integral, Fourier cosine and sine transformations, linearity property, transform of derivatives, convolution theorem (no proof)

### **Module III**

*Laplace transforms:* Linearity property, transforms of elementary functions, Laplace transforms of derivatives and integrals, differentiation and integration of transforms, convolution theorem (no proof), use of Laplace transforms in the solution of initial value problems, unit step function, impulse function - transform of step functions, transforms of periodic functions.

### **Module IV**

*Vector calculus :* Scalar and Vector point functions-Gradient and directional derivative of a scalar point functions.- Divergence and Curl of a vector point functions- their physical meanings.

Evaluation of line integral, surface integral and volume integrals, Gauss's divergence theorem,. Stoke's theorem (No Proof of these theorem), conservative force fields, scalar potential.

### **Text books:**

1. R.K. Jain, S.R.K Iyengar: Advanced Engineering Mathematics, Narosa publishers.1991
2. C.R. Wilie & L.C. Barrett: Advanced Engineering Mathematics, MGH Co.

### **References**

1. Larry C Andrews, Ronald C Philips: Mathematical Techniques for Engineers & Scientists, PHI
2. M.C. Potter, J.L. Goldberg: Advanced Engineering Mathematics, Oxford university press
3. B. S. Grewal: Higher Engineering Mathematics, Khanna publishers,1986

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## EB/ EC / EI/IT/ ME 302 ELECTRICAL TECHNOLOGY

### Module I

**Transformers:** working principle and elementary theory of an ideal transformer, Constructional features of single phase transformer, emf equation, turns ratio, vector diagram, equivalent circuit, impedance transformation, transformer losses, flux leakage, efficiency, open circuit and short circuit test, load test. Auto transformer - working principle and saving copper, basic idea of current transformer and potential transformer, distribution and power transformer, applications, standard rating, IS specifications.

### Module II

**Basic principles of electrical machines:** Concepts of motoring and generating action,

**DC machines-** Main constructional features, principles of operation, types of generators, emf equation, characteristics, applications, armature reaction and commutation, types of motors, torque, speed, and power, characteristics, applications, starting losses, and efficiency, speed control, testing, load test of dc machines.

### Module III

**AC Machines:** Alternator- rotating field, speed and frequency, effect of distribution of winding, coil span, characteristics, emf equation, losses and efficiency, regulation (emf method only), applications, synchronous motor- principle of operation, over excited and under excited, starting, applications, synchronous capacitor.

**Induction Motor:** Three phase induction motor, principles of operation, and constructional features of squirrel cage and slip ring motors, torque-slip characteristics, starting, speed control, losses and efficiency.

**Single phase induction motor:** Principle of operation, types of single phase induction motors

### Module IV

**Generation, transmission & distribution of electrical energy:**

Different methods of power generation- thermal, hydro-electric, nuclear, diesel, gas turbine stations (general idea only), electrical equipments in power stations, concept of bus bar, load dispatching, methods of transmission, transmission lines, overhead lines and insulators, corona and skin effect of DC & AC distribution, substation (elementary idea only)

### Text Books:

1. F. S. Bimbra, *Electrical Machines*, 7<sup>th</sup> ed., Khanna publications.

### References:

1. B. L. Theraja, *Electrical Machines*, vol I & IV, 23<sup>rd</sup> ed., Khanna Publishers.
2. H. Cotton, *Advanced Electrical Technology*, 6<sup>th</sup> ed., Wheeler publications.
3. Nagarath & Kothari, *Electrical Machines*, 3<sup>rd</sup> ed., Tata McGraw Hill.

### *Type of questions for University Examination*

**Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module**

**Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks**

## CS/IT 303 DISCRETE COMPUTATIONAL STRUCTURES

### Module 1

Logics and Proofs ,propositions, conditional propositions and logical equivalences, quantifiers, proofs resolution, mathematical induction ,sets ,relations ,equivalence relations ,functions.

### Module 2

Algorithms introduction, notations, recursive algorithms, complexity of algorithm, counting methods and pigeon hole principle, recurrence relations.

### Module 3

Graph theory, paths and cycles, Hamiltonian cycles, representation of graphs, Eulerian paths, traveling sales man problem, trees, characterization, spanning trees, game trees.

### Module 4

Algebraic systems semi groups, monoid, subgroups, homomorphism, isomorphism automorphism , rings, sub rings, posets, lattice, hasse diagrams

### Text books:

1. Discrete mathematics Richard Johnsonbaugh Pearson Education fifth edition
2. Discrete mathematical structures Satinder Bal Gupta Laxmi publications III edition

### References:

1. Bernard Kolman, Robert C Busby, Sharon Cutler Ross, Nadeem-ur-rehman, Discrete mathematical structures , Pearson Education
2. J P Tremblay and Manohar Mc Graw Hill, Discrete mathematical structures with applications to computer science -
3. John Truss Addison , Wesley Discrete mathematical structures for Computer science

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 304 OBJECT ORIENTED PROGRAMMING USING C++

### Module 1

Object oriented technology, comparison with procedural programming (C and C++), key concepts of object programming, input and output in C++, declarations, control structures, functions

### Module 2

Classes and Objects, declaring objects, accessing member variables, defining member functions, inline functions, static member variables and functions, friend function, overloading, constructors and destructors, overloading constructors, copy constructors, anonymous objects, dynamic initialization using constructors, dynamic operators and constructors, recursive constructors, encapsulation

### Module 3

Inheritance, types of inheritance, virtual base class, abstract class, advantages and disadvantages of inheritance, pointers and arrays, C++ and memory

### Module 4

Binding, polymorphism and virtual functions, generic programming with templates, exception handling, string handling and file handling

### Text Books:

1. Ashok N Kamthane, Object oriented programming with ANSI and TURBO C++ , Pearson education
2. Saurav Sahay, Object oriented programming with C++ Oxford

### References:

1. K R Venugopal et. al, Tata McGraw Hill, Mastering C++,
2. Malik, C++ Programming :From Problem Analysis To Program Design, Thomson Learning
3. Forouzan, Computer Science :A Structured Approach Using C++, 2nd Ed., Thomson Learning

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module. Answer one question from each module of 15 marks*

## IT 305 ELECTRONIC CIRCUITS AND LOGIC DESIGN

### Module I

Amplification: CE amplifier – Low, Medium & high frequency analysis and design of RC coupled amplifier – FET construction & characteristics - classifications class A, Class B, Class C amplifiers – transformer coupled amplifier - Push pull amplifier- Negative & positive feedback.

### Module II

Pulse Circuits: Pulse shaping using RC circuits – differentiating integrating circuits-clipping – clamping using diodes and transistors – UJT – construction – characteristics-relaxation oscillator-Tunnel diode, SCR- Theory of operation and characteristics.

Operational Amplifier: - Differential amplifier common mode and difference mode operation – characteristics of ideal opamp block diagram – CMRR – Drift and offset problems.

### Module III

Number system – Binary – HEX and other number systems – conversion from one radix to another - Boolean algebra – ASCII – EBCDIC –Grey Code- Excess 3 code – Code Conversion – parity checking. Basic logic gates – positive and negative logic – OR, AND, NAND, NOR, XOR and NOT gates – K map- Half adder –Full adder – subtractor - serial parallel addition- binary multiplication and division. multiplexer – demultiplexer-encoder – decoder -

### Module IV

Sequential circuits: Flip-flops – RS, JK, T and D flip flops – conversions – shift registerscounters- asynchronous counter – synchronous counter – up down counter- ring counter. Logic families - TTL, RTL, ECL, CMOS - tristate logic – specification – noise consideration RAM, ROM, PROM, EPROM, BJTRAM CELLS – MOSRAMS.

### References :

- 1) H.H.Taub and D.Schgilling : Digital Integrated Electronics
- 2) Yarbrough, Digital Logic Applications and Design
- 2) R.Sandigi : Digital concepts with standard Integrated circuits
- 3) H.Blackly and John Viley : Digital Design with standard MSI and LST
- 4) Milman and Halkias : Electronic devices and circuits, Tata McGraw Hill
- 5) Milman and Halkias : Integrated Electronics
- 6) Milman and Taub : Pulse and Digital circuits
- 7) Boyelstead : Electronic devices & Integrated circuits.

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 306 COMPUTER ORGANISATION

### Module 1

Basic structure of computers – Functional units – Basic operational concepts – Bus structures – Instructions & instruction sequencing. Hardware and software - Addressing modes – Assembly language – Stacks & Subroutines

### Module 2

Processing Unit – Fundamental concepts – Execution of a complete instruction - Hardwired control unit- micro programmed control - control signals - microinstructions- micro program sequencing- Branch address modification- Pre-fetching of micro instructions- Emulation.

Computer arithmetic - logic design for fast adders - multiplication - Booth's algorithm - Fast multiplication - integer division - floating point numbers and operations.

### Module 3

Memory organization-Semiconductor RAM memories- internal organization of memory chips- Static and Dynamic memories - cache memories - mapping functions-replacement algorithms - virtual memory - address translations – performance considerations – interleaving - Secondary storage.

### Module 4

Input-output organizations - interrupts – Enabling & Disabling interrupts - handling multiple devices - device identification - vectored interrupts - interrupt nesting – Simultaneous requests – DMA - Buses - I/O interface circuits – Standard I/O interfaces.

### Text Books:

1. Hamacher C V, “Computer Organisation – International Edition -5th Edition”, Mc.Graw Hill, NewYork
2. Stallings William, “Computer Organization and Architecture”,6th Edition, Pearson Education.

### References:

1. J.L Hennesy and D.A Pattersen,”Computer Architecture”, Elsevier
2. Behrooz Parhami, “Computer Architecture”, Oxford Univ. Press
3. Parthasarathy, Advanced Computer Architecture, Thomson Learning
4. V. P. Heuring and H. F. Jordan, *Computer System Design and Architecture*, Addison Wesley, New Delhi, 1997
5. Pal Chaudhary P, “Computer Organisation and Design “, Prentice Hall, New Delhi,
6. Hayes J P , “Computer Organisation and Architecture - 2nd Edition “, Mc Graw Hill,
7. Tanenbaum A S , ”Structured Computer Organisation - 3rd Edition”, Prentice Hall,
8. Kai Hwang & Faye A Briggs “Computer Architecture and Parallel Processing “Mc.Graw Hill.,NewYork –1985

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 306 LOGIC DESIGN LAB

### A. ANALOG

1. Study of Multimeters, Signal Generators, CRO etc and measurement of electrical quantities.
2. Testing of active and passive components – Resistors , Capacitors, Inductors, Transformers, Diodes, Transistors etc.
3. Characteristics of active devices:
  - i. Forward and reversed characteristics of a diode measurement of forward resistance .
  - ii. Common base characteristics of a transistor – measurements of current gain, input resistance and output resistance , maximum ratings of the transistor.
  - iii. Common emitter characteristics of a transistor – measurement of current gain, input resistance and output resistance, relation between and study of the effect of leakage current, maximum ratings of the transistor.
4. Rectifying circuits: FW Rectifier – HW Rectifier – FW Bridge Rectifier Filter circuits – capacitor filter , inductor filter and FT section filter (Measurement of ripple factor maximum ratings of the devices)
5. Study of RC and RLC circuits – Frequency response, pulse response, Filter Characteristics, Differentiating circuit and integrating circuit.
6. Clipping and clamping circuits using diodes/transistors

### B. DIGITAL

1. Transfer characteristics and specifications of TTL and MOS gate.
2. Design of half adder and Full adder using NAND gates, set up R-S & J-K flip flops using NAND gates.
3. Asynchronous UP/DOWN counter using J-K F/Fs.
4. Study of shift registers and design of Ring counter using it.
5. Study of IC counter 7490,7492,7493 and 74192.
6. Study of MUX & DEMUX

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## CS/IT 308 OBJECT ORIENTED PROGRAMMING LABORATORY

Exercises to make the students understand the following concepts

- Difference between struct and class
- Data abstraction
- Data encapsulation and information hiding
- Inheritance
  - Single inheritance
  - Multiple inheritance
  - Multilevel inheritance
  - Hierarchical inheritance
- Abstract class
- Operator overloading
- Function overloading
- Over-riding
- Pointers and arrays
- Files

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## EB/EC/EE/EI/CE/CS/IT/ME/SE 401 ENGINEERING MATHEMATICS III

### Module 1

*Complex Analytic functions and conformal mapping:* curves and regions in the complex plane, complex functions, limit, 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 like  $Z^2$ ,  $e^z$ ,  $\sin z$ ,  $\cos z$ ,  $\sin hz$ , and  $\cos hz$ ,  $Z+1/Z$ .

### Module 2

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

### Module 3

*Partial differential equations:* Formation of partial differential equations. Solutions of equations of the form  $F(p, q) = 0$ ,  $F(x,p,q)=0$ ,  $F(y,p,q)=0$ ,  $F(z,p,q)=0$ ,  $F_1(x,p) = F_2(y,q)$ , Lagrange's form  $Pp+Qq = R$ . Linear homogeneous partial differential equations with constant co-efficients.

### Module 4

*Vibrating string :* one dimensional wave equation, D'Alembert's solution, solution by the method of separation of variables. *One dimensional heat equation,* solution of the equation by the method of separation of variables, *Solutions of Laplace's equation* over a rectangular region and a circular region by the method of separation of variables.

### Text Books:

1. R.K.Jain, S.R.K.Iyengar: Advanced Engineering Mathematics, Narosa Publishers.1991
2. C.R.Wilie & L.C.Barrett: Advanced Engineering Mathematics, MGH Co.

### References:

1. Ervin Kreyszig, Wiley Eastern , Advanced Engineering Mathematics
2. Complex Variables & Applications: Churchill R.V, Mgh Publishers.
3. M.C.Potter, J.L.Goldberg , Advanced Engineering Mathematics, Oxford University Press

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 402 MICROPROCESSOR ARCHITECTURE AND SYSTEM DESIGN

### Module I

Introduction to microprocessors: Intel 8085 architecture – CPU Registers- ALU, Decoders, Bus system- Tristate Logic – Opcode and operands – Instruction word size – Instruction cycle – Timing diagram. Instruction set: Addressing modes – Status flags – Intel 8085- Instruction set

### Module II

Memory and I/O- Interfacing memory sections – Timing Analysis –DMA structure - I/O Interfacing – Intel 8085 I/O structure – programming examples. Interrupt structures: Need for interrupt structures – Handling of specific source of interrupts – Software interrupts – Hardware interrupts – Programmable interrupts controllers – 8259- PIC – Asynchronous and synchronous interrupt driven data transfer – Multiple interrupts.

### Module III

Peripheral devices: I/O ports – Programmable peripheral interface- Intel 8255 – Programmable DMA controller – 8257-8279 keyboard/display controller – ADC/DAC Interface – stepper motor control

### Module IV

Advanced Microprocessor: Introduction to Pentium & Pentium pro architectures : RISC concepts –Bus operation –super scalar architecture pipelining –Branch Prediction – Instruction and data caches –FPU – comparison of Pentium and Pentium pro architecture Introduction to Pentium II and Pentium III and Pentium IV processor – Introduction to Intel and AMD 64 Bit architecture RISC architecture :definition of RISC – properties of RISC system – Practices in RISC system- Register windowing – Advantages and Short coming –comparison with CISC architecture

### Text Book

1. R.S.Gaonkar : Microprocessor architecture programming & Application
2. Douglas V Hall, “Microprocessors & Interfacing” 2<sup>nd</sup> edition, Tata Mc GrawHill

### References:

1. Ghosh and Sridhar: 0000 to 8085 Microprocessors for Engineers and Scientists
2. Barry B.: The Intel Microprocessor 8085 to Pentium 4 Architecture and programming and Interface
3. James .I Antonacos , An Introduction to Intel Family of Microprocessor ,3/e Pearson Education 2002
4. Mohammed Rafiqzaman : Microprocessor & Microcomputer System Design, Wiley Publication

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 403 OPERATIONS RESEARCH

### Module I

Linear Algebra : Review of the properties of matrices and matrix operations, partitioning of matrices, vectors and Euclidean spaces , unit vectors , sum vectors, linear dependence, bases, spanning set , rank, product form of inverse, simultaneous equations , basic solutions, point sets, lines and hyper planes, convex sets, extreme points, fundamental theorem of linear programming.

### Module II

Linear Programming : Statement of LP problem, slack and surplus variables, basic feasible solutions, reduction of feasible solutions to basic feasible solutions, artificial variables, optimality conditions, unbounded solutions, Charne's M method, two phase method, degeneracy, duality. Rectangular zero sum games : Von Neumans' theorem, saddle points, pure and mixed strategies , formulation of primal and dual LP problem for mixed strategies, dominance graphical solution.

### Module III

Transportation, Assignment & Game problems : the transportation problem, the coefficient matrix and its properties , basic set of column vectors , linear combination of basic vectors, the tableau format, stepping stone algorithm, U-N method , inequality constraints, degeneracy in transportation problem , Koenig's method

### Module IV

Queueing theory : Basic structure of queueing models, exponential and poisson distribution, the birth and death process , queueing models based on poissons input and exponential services time, the basic model with constant arrival rate and service rate, finite queue, limited source Q models involving non exponential distributions, single service model with poisson arrival and any services time distribution , poisson arrival with constant service time , poisson arrival with constant service time , poisson arrival and Erlang service time priority disciplines.

### References

- 1) Hamdy.A Taha : Operation Research, 8<sup>th</sup> Edition, Pearson Education
- 2) Hadely G. : Linear Programming( Addison Wesley)
- 3) Hiller & Lieberman : Operation Research (Holden – Day – Inc)
- 4) Sasieni, Yaspen & Friedman : Operation Research
- 5) Gue & Thomas : Operation Research
- 6) S.Kalavath : Operation Research-Vikas Thomson Learning Publishing, NewDelhi
- 7) N.G.Nair : Resource Management-Vikas Thomson Learning Publishing, NewDelhi
- 8) C.R.Kothari : Introduction to Operational Research- Vikas Thomson Learning Publishing, NewDelhi

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 404 AUTOMATA LANGUAGES AND COMPUTATION

### Module 1

Finite state systems NFA DFA, Equivalence of NFA and DFA, Equivalence of NFA and NFA with epsilon moves, regular expression, Equivalence of regular expression and finite automata, Finite automata with output associated with state, Finite automata with output associated with transition, Equivalence of finite automata with output ,applications of Finite automata, Pumping Lemma , closure properties of Regular sets, Decision algorithms , My Hill Nerode theorem ,minimization of DFA

### Module 2

Context Free grammars derivations parse Trees, ambiguity Simplification CNF,GNF,PDA DPDA, equivalence of PDA and CFL, pumping lemma for CFL, Closure Properties, decision algorithms, CYK algorithm

### Module 3

Turing machine, Techniques for construction of TM , storage in finite control, multiple tracks ,shifting over ,checking of symbols ,subroutines, NDTM , undecidability, universal TM

### Module 4

Recursive and recursively enumerable languages, Properties, halting problem of TM Chomsky Hierarchy ,equivalence of regular grammar and FA , equivalence of unrestricted grammar and TM , equivalence of LBA and CSL relation between languages

### Text Books:

1. J E Hopcroft and J D Ullman Introduction to Automata Theory and Languages and Computation, Addison Wesley
2. Michael Sipser, Introduction to the Theory of Computation, Thomson Learning

### References:

1. Misra and Chandrasekharan, Theory of Computation, Prentice Hall
2. H R Lewis Papadimitrou, Elements of Theory of Computation PHI
3. John Martin, Introduction to Language and Theory of Computation, TMH
4. Peter Linz, An Introduction to Formal Languages and Automata Narosa Publication

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 405 DATA STRUCTURES& ALGORITHMS

### Module 1

Introduction to Data structures - Arrays & sparse matrices – representation, Searching - linear, binary, Fibonacci – Sorting – selection, bubble, insertion, quick, merge, heap, Introduction to external sorting, Hash tables – Hashing functions

### Module 2

Linked lists – singly, doubly and circular lists, Application of linked lists – Polynomial manipulation, Stacks – Implementation of stacks using arrays and lists – Typical problems – Conversion of infix to postfix – Evaluation of postfix expression . Queues & Deques – implementation., priority queues

### Module 3

Trees, Definition and mathematical properties. Representation – sequential, lists - Binary trees – Binary tree traversals – pre-order, in-order & post-order, Expression trees . Threaded binary trees . Binary Search trees . AVL trees

### Module 4

Graphs – Graph representation using adjacency matrices and lists – Graph traversals – DFS, BFS - shortest path – Dijkstra’s algorithm, Minimum spanning tree – Kruskal Algorithm, prims algorithm – Binary search, B trees and B+ trees.

### Text Book:

1. Michael Waite and Robert Lafore, “Data Structures and Algorithms in Java” , Techmedia, NewDelhi, 1998.
2. Sartaj Sahni, 'Data Structures, Algorithms, and Applications in Java", McGraw-Hill
3. Adam drozdek,” Data Structures and Algorithms in Java” ,Thomson Publications, 2nd Edition

### References:

1. Aaron M.Tanenbaum, Moshe J.Augenstein, “Data Structures using C”, Prentice Hall InternationalInc., Englewood Cliffs, NJ, 1986
2. Ellis Horowitz and Sartaj Sahni, “ An introduction to Data Structures”, Computer Science Press,Rockville, MA, 1984
3. Mark Allen Weiss, “Data Structures and Algorithm Analysis in C++”, Benjamin/CummingsPublishing Company Inc., Redwood City, CA, 1991
4. Jean Paul Tremblay and Paul G Sorenson, “An introduction to Data Structures with Applications”,McGraw-Hill, Singapore, 1984

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 406 DATA COMMUNICATION

### Module 1

Data transmission: Communication model-Data Transmission: Concepts and Terminology- Analog and Digital Data Transmission- Transmission Impairments-Guided transmission media- Wireless Transmission- Line-of-sight Transmission. Channel Capacity-Band width and Shannon's capacity equation

### Module 2

Signal Encoding Techniques: *Digital Data, Digital Signals*:-Unipolar. Polar: NRZ-RZ-Biphase-Manchester-Differential Manchester. Bipolar: AMI-B8ZS-HDB3.

*Digital Data, Analog Signals*:-Aspects of Digital to Analog Conversion: Bit rate and Baud rate-Constellation pattern. ASK-FSK-PSK-QPSK-QAM-Bandwidth of ASK,FSK,PSK and QAM. Modems-Types of modem-Modem standards

*Analog Data, Digital Signals*:- Sampling principles-Quantization-Nyquist Theorem. PAM-PCM-Delta Modulation

*Analog Data, Analog Signals*:-AM-FM-PM-Bandwidth of AM,FM and PM.

*Data Compression*:- Frequency dependent coding-Huffman coding-LZW Coding

### Module 3

Digital Data Communication Techniques: Asynchronous and Synchronous Transmission-Types of Errors-single bit and burst errors-Error Detection: Redundancy- LRC-VRC-CRC-Capabilities and performance of CRC-Error Correction: single bit error correction – Hamming code- Burst error correction-convolution code.

Data Link Control: Line discipline-Flow control-Error control: ARQ-stop and wait ARQ-Continuous ARQ-Line utilization of different ARQs-Link management-HDLC

### Module 4

Multiplexing: Frequency-Division Multiplexing-Synchronous Time-Division Multiplexing-Statistical Time-Division Multiplexing-Asymmetric Digital Subscriber Line-xDSL Spread Spectrum: The Concept of Spread Spectrum-Frequency Hopping Spread Spectrum-Direct Sequence Spread Spectrum-Code-Division Multiple Access

### Text Books:

William Stallings, *Data and Computer Communication*, 8/e ,Pearson education,2006.

### References:

Behrouz A. Forouzan, *Data Communication and Networking 4/e*, TMG,2006.

Fred Halsal, *Data Communication Computer Network and Open Systems*, 4/e, Person education ,2005.

William A. Shay, *Understanding Data Communication & Networks*, 2/e, Thomson Learning,2003

Jmaes Irvin & David Harle, *Data communication and Networks: an Engineering approach*, Wiley,2006.

### Type of questions for University Examination

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 407 PC HARDWARE AND MICROPROCESSOR LAB

### Part A - PC HARDWARE

Study of SMPS, TTL and composite type monitor circuits, Emulator, Logic state analyser, Serial port, Parallel port, Mother board, CGA card, Floppy disk controller, Hard disk controller, Printer Interface, Keyboard Interface

Diagnostic Software, Diagnostic card, Designing and programming add on cards

Floppy Disk drive: Alignment, Programming, Formatting

Hard Disk drive: Partitioning, Familiarisation of disk maintenance, Software Tools.

Trouble shooting and maintenance: Preventive and maintenance, Common maintenance problems

Familiarisation: Device drivers, Microcontrollers, Transputers

### Part B - MICROPROCESSOR

1. Study of typical microprocessor trainer kit
2. Simple Programming examples using 8085 instruction set to understand the use of various instructions and addressing modes – Monitor routines – at least 20 examples
3. Programming examples to initialise 8251 and to understand it's I/O operations
4. Programming examples to initialise 8255 and to understand it's I/O operations
5. Programming examples to initialise 8279 and to understand it's I/O operations
6. A/D and D/A counter Interface
5. Interface and programming of 8255(e.g. Traffic light control, burglar alarm, stop water)

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## CS/IT 408 DATA STRUCTURES LABORATORY

1. Simple programming exercises in Java
2. Study of algorithms and implementation in Java programming language for the following:
  - Searching and Sorting
  - Linked Lists- Singly and doubly
  - Stacks – various applications
  - Queues
  - Trees
  - Graphs

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## EB/EC/EE/EI/CE/CS/IT/ME/SE 501 ENGINEERING MATHEMATICS IV

### **Module 1**

*Probability distributions:* random variables (discrete & continuous), probability density, mathematical expectation, mean and variance of a probability distribution, binomial distribution, Poisson approximation to the binomial distribution, uniform distribution, normal distribution. *Curve fitting:* method of least squares, correlation and regression, lines of regression.

### **Module 2**

*Sampling distributions:* population and samples, the sampling distribution of the mean (unknown,  $\sigma$  known), the sampling distribution of the mean ( $\sigma$  the sampling distribution of the variance, point estimation, interval estimation, tests of hypotheses, null hypotheses and significance tests, hypothesis concerning one mean, type I and type II errors, hypotheses concerning two means. The estimation of variances : Hypotheses concerning one variance - Hypotheses concerning two variances.

### **Module 3**

*Finite difference Operators:*  $\nabla$ ,  $\Delta$ ,  $E$ ,  $\delta$ ,  $\mu$ ,  $x^{(n)}$ . Newton's Forward and Backward differences interpolation polynomials, central differences, Stirlings central differences interpolation polynomial. Lagrange interpolation polynomial, divided differences, Newton's divided differences interpolation polynomial. *Numerical differentiation:* Formulae for derivatives in the case of equally spaced points. *Numerical integration:* Trapezoidal and Simpson's rules, compounded rules, errors of interpolation and integration formulae. Gauss quadrature formulae (No derivation for 2 point and 3 point formulae)

### **Module 4**

*Numerical solution of ordinary differential equations:* Taylor series method, Euler's method, modified Euler's method, Runge-Kutta formulae 4th order formula. *Numerical solution of boundary value problems:* Methods of finite differences, finite differences methods for solving Laplace's equation in a rectangular region, finite differences methods for solving the wave equation and heat equation.

### **Text Books:**

1. Irvin Miller & Freund : Probability And Statistics For Engineers, Prentice Hall Of India
2. S.S.Sastry: Numerical Methods, PHI Publishers.

### **References:**

1. P.Kandaswamy K.Thilagavathy, K.Gunavathy: Numerical Methods, S.Chand & Co.
2. A.Papoulis: Probability, Random Variables And Stochastic Processes, MGH Publishers

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 - There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 502 SYSTEM PROGRAMMING

### **Module 1**

Assemblers: Overview of the assembly process - Machine dependent assembler features- Machine independent assembler features-Design of two pass assembler-single pass assembler.

### **Module 2**

Loaders and linkers -Loader functions-program relocatability- absolute and bootstrap loader- Overview of linkage editing-linking loader-Dynamic linking-Design of the linkage editor.

### **Module 3**

Macroprocessors - macro definition and usage-Schematics for Macro expansion- Generation of unique labels- Conditional macro expansion- Recursive macro expansion- Design of a Macro pre-processor-Design of a Macro assembler.

### **Module 4**

Operating Systems – Basic Operating Systems functions – Types of Operating Systems – User Interface – Run-time Environment. Operating Systems Design Options – Hierarchical Structures – Virtual Machines – Multiprocessor Operating Systems – Distributed Operating Systems – Object Oriented Operating Systems.

### **Text Books:**

1. Leland L.Beck, “System Software - An Introduction to System Programming”, Addison Wesley

### **References:**

1. D.M.Dhamdhere, "System Programming and Operating Systems", 2nd Ed., Tata Mcgrawhill
2. John J. Donovan, “Systems Programming”, McGraw Hill.

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 503 SOFTWARE ENGINEERING

### Module 1

Software Life Cycle - Water fall model – Prototyping – Spiral model – pros and cons of each model.

Requirements Analysis - SRS – DFD – ER Diagrams – Decision tables – Decision Trees – Formal specification techniques: Axiomatic and Algebraic specifications.

### Module 2

Software Design: Design Heuristics – Cohesion and Coupling

Design Methodologies - Structured analysis and design, Architectural Design, Interface design, Component Level design.

Software Maintenance, Software Reuse

### Module 3

Introduction to Software Quality Management, Software Testing - Objectives of testing – Functional and Structural testing – Generation of test data - Test Plan - Unit testing – Integration testing – System testing – Test reporting. Software Quality Management - Overview of SQA Planning – Reviews and Audits – Software configuration management - Quality Standards - Study of ISO9000 & CMM

### Module 4

Software Project Management - Brief study of various phases of Project Management – Planning – Organizing – Staffing – Directing and Controlling

Software Project Cost Estimation – COCOMO model – Software Project Scheduling

CASE tools: CASE definitions – CASE Classifications – Analysis and Design Workbenches, Testing Workbenches

### Text Book:

1. Rajib Mall , Fundamentals of Software Engineering –, PHI.
2. Pankaj Jalote , Software Engineering – Narosa Publications

### References:

1. Ali Behferooz and Frederick J. Hudson, Software Engineering Fundamentals -, Oxford University Press India.
2. Roger S. Pressman , Software Engineering – Mc GrawHill International Edition
3. Ian Sommerville, Software Engineering – Pearson Education
4. Alka Jarvis & V. Crandall, In roads to Software quality –
5. Richard Thayer - Software Project Management –
6. Bass , Software Architecture Interactives -, Pearson Education 2003

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 504 COMPUTER GRAPHICS AND ANIMATION

### MODULE I

Computer – Aided Design, Presentation graphics, Computer art, Entertainment , Education & Training, Visualization, image- Processing, Graphical User Interfaces, Over view of graphic systems. Points and Lines, Line drawing algorithms, Circle Generating algorithms, Ellipse generating algorithms, Parallel curve algorithms, Attributes of output primitives.

### MODULE II

Basic transformations, Matrix representations and homogeneous co-ordinates, Composite transformations, other transformations, Raster methods for transformations. The viewing Pipe-Line , Viewing Co-ordinate reference frame, Window-to-viewport co-ordinate transformation, 2-D viewing functions, Clipping operations.

### MODULE III

3-D Display methods, 3-D Graphics packages. Polygon surfaces, Curved lines and surfaces, spline representations, Bezier curves and surfaces, B-spline curves and surfaces, Beta splines, Relational splines, Conversion between spline representations, Displaying spline curves, Sweep representations, Constructive Solid-Geometry Methods, Octrees, BSP trees, Fractal Geometry methods.

### MODULE IV

Transformation, Rotation scaling, Other transformations , composite Transformations, 3-D Transformation functions, Modeling and co-ordinate transformations, 3-D Viewing concepts. Classification of visible surface detection algorithms, Back-face detection, Depth-Buffer method, A-Buffer method, Scan-Line method, Depth-Sorting method, BSP-Tree method, Area subdivision method, Octree methods, Ray-Casting methods, Curved surfaces, Wireframe methods, Visibility- Detetction functions, Illumination models and surface rendering methods, colour applications, Computer Animation.

### TEXT BOOK

Donald Hearn & M.Paulin Baker, Computer Graphics- Eastern Economy Edn, 1995

### REFERENCES :

1. William .M.Newmann & Robert.F.Sprull- Principles of Interactive Computer Graphics, McGraw Hill Inc. 1981
2. Roy .A. Plastock & Gordon Kelly- Computer graphics, Schaum’s Series in Computers , Int Edn.
3. Steven Harrington- Computer Graphics – A Programming Approach McGraw Hill ,Int Edn.4.
4. Anirban Mukhopadhyay, ”Introduction to Computer Graphics”, Vikas Thomson Learning Publishing, N Delhi
5. Peter Ratner, “Human Modeling & Animation”, Wiley Dream Tech India P Ltd, N Delhi

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 505 DATABASE MANAGEMENT SYSTEMS

### Module 1

Introduction: Characteristics of the Database approach – Data models, schemas and instances – DBMS architecture – Data independence – Database languages and interfaces – Database administrator – Data modeling using Entity - Relationship (ER), Entity sets, attributes and keys - Relationships, Relationship types, roles and structural constraints - Weak Entity types - Enhanced Entity-Relationship (EER) and object modeling. Sub classes, super classes and inheritance - Specialization and generalization.

### Module 2

Record storage and file organizations: Placing file records on disks – Fixed length and variable length records Spanned Vs unspanned records – Allocating file records on disk– Files of unordered records(Heap files), Files of ordered records(Sorted files).- Hashing Techniques. Indexed structures for files – Types of single level ordered index, multi-level indexes.

### Module 3

The Relational model: Relational model concepts – Relational model constraints - The Relational Algebra – Relational calculus – Tuple Relational calculus, Domain Relational calculus. - SQL. Database Design: Functional dependencies – Basic definitions – Trivial and non trivial dependencies –Closure of a set of dependencies – Closure of a set of attributes – Irreducible sets of dependencies – Nonloss decomposition and Functional dependencies. First, Second and Third normal forms – Boyce-Codd normal form.

### Module 4

Transaction Management- Concurrency Control-Lost Updates- Uncommitted Data-Inconsistent Retrievals-The Scheduler-Concurrency Control with Locking Methods – Concurrency Control with Time Stamping- Concurrency Control with Optimistic Methods- Database Recovery Management.

Introduction to object oriented databases, Active databases. Data warehouses – Data mining

### Text Books:

- 1) Elmasri and Navathe, “*Fundamentals of Database Systems*”, 3/e, Addison-Wesley.
- 2) A Silberschatz, H. F. Korth, and S Sudarshan, “*Database System Concepts*”, McGraw Hill
- 3) Peter Rob, Carlos Coronel, *Database Systems*, Thomson Learning.

### References:

- 1) Patrick O’Neil, Morgan Kaufman, Database –Principles, Programming & Performance,
- 2) Thomas Connolly ,Carolyn Begg “ Database Systems”,3/e,Pearson Education.
- 2) C.J Date, “ *An Introduction to Database Systems* “, Addison-Wesley
- 4) Margaret.H.Dunham ,”*Data Mining. Introductory and advanced topics*”, Pearson Education,2003.
- 5) Hector Garcia-Molina,Jeffret D. Ullman, Jenniffer Widom ,”*Database System implementation*”, Prentice Hall International, Inc, 2000.

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 506 KNOWLEDGE ENGINEERING

### Module I

History and Applications of AI, Knowledge Representation, Propositional Calculus, Predicate Calculus, Rule Based Knowledge Representation, Unification, Forward and backward Chaining, Resolution, Symbolic reasoning under uncertainty, Non-monotonic reasoning, Baye's Theorem, Knowledge representation issues.

### Module II

Search: Heuristic Search, Admissibility, Monotonicity, Informedness, Heuristic Classification, Intelligent Agents, State space search, Depth-first search, Breadth first search, Pattern directed search, Production systems, Learning, Natural language processing, Applications of search techniques in Game Playing and Planning.

### Module III

LISP, S-expressions, List manipulation functions, Program Control in LISP, Iteration Constructs, Input, Output and local variables, Matching of patterns, LISP as a problem solving tool.

### Module IV

Artificial Neural Networks: Artificial Neurons, Supervised Learning, Feed forward Neural Networks, Back propagation Neural Network, Hopfield Network, Back propagation training Algorithms.

### Text Book:

1. N. P. Padhy, Artificial Intelligence and Intelligent Systems, Oxford Univ Press.
2. Nils J. Nilson, Artificial Intelligence – A New Synthesis, Elsevier

### Reference:

3. Stuart Russell and Peter Norvig: Artificial Intelligence, A Modern Approach, Pearson Education
4. E. Rich and K Knight, Artificial Intelligence, Tata Mc Graw hill.
5. Dan W Peterson, Introduction of Artificial Intelligence and Expert Systems, PHI
6. M Tim Jones, "A I Applications Programming", Wiley Dreamtech India P Ltd.
6. John. F .Sowa, Knowledge Representation-Logical, Philosophical & Computational Foundation, Vikas Thomson Learning Publishing, N Delhi

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## IT 507 MINI PROJECT – RDBMS BASED

Any of the following projects or similar one using relational database systems like DB2, UNIFY, INGRESS, ORACLE, SYBASE, INFORMIX, Visual Foxpro etc

1. Hospital Automation
2. Bank Transaction Management
3. Hotel Management
4. Scheduling in Power Plant
5. Promotion Management for a Firm
6. Manufacturing System Database
7. Placement Center Database Management
8. Gas Agency Management
9. Office Automation
10. Railway Reservations
11. Computerizing Course Reservation
12. Hostel Management
13. Managing of Research Laboratory Activities
14. Business Transaction in an Industry
15. Inventory Management
16. Cricket Board Database
17. Carrier Planning
18. Employee Database
19. Production Management
20. Natural Resources Database
21. Salary Payment Database
22. Airless Reservations
23. Finance Database Management
24. Transport Management System
25. Library Management System
26. College Admission
27. Question Paper Bank

Each batch comprising of 3 to 5 students shall design. Each student shall submit a project report at the end of the semester. The project report should contain the design and engineering documentation including the Bill of Materials and test results. Product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations and aesthetics / ergonomic aspects taken care of in the project shall be given due weight.

*Guidelines for evaluation:*

- |   |    |
|---|----|
| i) Attendance and Regularity                      | 10 |
| ii) Work knowledge and Involvement                | 30 |
| iii) End-Semester presentation & Oral examination | 20 |

iv) Level of completion and demonstration of functionality/specifications	25
v) Project Report	15
<i>Total</i>	100 marks

*Note: External projects and R&D projects need not be encouraged at this level. Points (i) & (ii) to be evaluated by the project guide & co-ordinator and the rest by the final evaluation team comprising of 3 teachers including the project guide.*

## IT 508 SYSTEMS PROGRAMMING LAB

1. MASM Lab:
  - Basic programming in 8086 programs
2. Generate Assemblers:
  - One pass assembler
  - Two pass assembler
3. Compiler:
  - Generation of lexical Analyzer
  - Generation of parser
  - Generation of Intermediate Code Generator
  - Symbol Table

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## IT 601 FINANCIAL MANAGEMENT AND E-BANKING

**MODULE I** The basic concepts of Accounting: The separation of ownership and control, The users of accounts, Computers and users of accounts, Accounting concepts and conventions, Accounting equation, Balance sheet, Classifying items, The processing function. Book-Keeping: The double-entry system, Double-entry of expenses, Asset of stock, Capital and revenue expenditure, Balancing accounts on computers, The trial balance, The final accounts, Depreciation, Bad debts and provision for bad debts, Division of the ledger, Books of original entry, Source documents, Accounting systems, Interpretation of accounts.

**MODULE II** Costing: Cost Accounting, Classifying costs, The implications for programming, The operating statement, the cost of raw materials, the cost of direct labour, the cost of overheads, job costing, Break-even analysis, Break-even graphs, Budgeting, Standard costing, Variance analysis, Marginal costing. Ratio Analysis: Ratio meaning, profitability ratios, profit in relation to sales, profit in relation to investments, Liquid ratios, Solvency ratios, other ratios, Activity ratios, Eps, DuPont Financial analysis, ratios for predicating bankruptcy, Inter-firm comparison, ratios limitations.

**MODULE III** Fund Flow Statement : Meaning, Importance , Definition of terms, Funds and Flow, Sources and use of funds, Changes in working capital, Preparation of funds flow statements, cash flow statements, Sources and uses, preparation. Cost Reduction: Difference between cost control and cost reduction, Prerequisites for an effective cost reduction, Concept of value analysis- crux of the cost reduction, steps involved in introducing a cost reduction program, some examples of cost reduction, Common limitations.

**MODULE IV E-BANKING** Changing Dynamics in the Banking Industry, Changing Consumer Needs, Cost Reduction, Demographic Trends, Regulatory Reform, Technology Based Financial services products.Home Banking Implementation Approaches, Home Banking Using Bank's Proprietary Software, Banking via the PC Using Dial-Up Software, Banking via Online Services, Banking via the Web:Security First Network Bank.Open versus Closed Models, Management Issues in Online Banking, Differentiating Products and Services, Managing Financial Supply Chains, Pricing Issues

in Online Banking, Marketing Issues: Attracting Customers, Keeping Customers, Back-Office Support for Online Banking, Integrating Telephone Call Centers with the Web.

#### REFERENCES

1. Nand Dharmeja & K.S. Sastry Finance & Accounting for ,Managerial Competiveness Weeler Publishing, Allahabad
2. Eugene .F. Brigham & Joel F Houston - Fundamentals of Financial Management – Thomson Learning.
3. P.H. Bassett - Computerised Accounting, NCC Blackwell Ltd. , Oxford, 1994
4. M.C Shukla & T.S.Grewal, Advanced Accounts- S.Chand & Co. , New Delhi
5. Ravi Kalkota,Andrew B. Whinston,Electronic Commerce A Manager's Guide - Pearson Education 2006.
6. Khan and Jain - Theory and Problems in Tata Mc Graw Hill Financial Management
7. I.M.Pandey - Financial Management ,Vikas Thomson Learning - Publishing, NewDelhi

#### ***Type of questions for University Examination***

***Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module***

***Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks***

## IT 602 INTERNET PROGRAMMING

### Module I

Introduction to Web Programming, XML: Creating XML documents, Parsing an XML document, Writing well – formed Documents, Organizing elements with Namespaces, Defining elements in a DTD, Declaring Elements and Attributes in a DTD.

### Module II

CGI/Perl: Creating link to a CGI script, Using a link to send data to a CGI script, Parsing data sent to a Perl CGI script, Using CGI script to process form data, Using Scalar variables in Perl, Using arithmetic operators in Perl, Associating a Form with a Script.

### Module III

Event driven programming using Java applets, JavaServer Pages: JSP Scripting elements, Linking to external files, JSP declarations, JSP Expressions, JSP Scriptlets, Processing client requests, JavaBeans: Accessing and setting Bean properties, JavaBean scope, Accessing a database from JSP

### Module IV

PHP: Defining PHP variables, Variable types, operators, control flow constructs in PHP, Establishing connection with MYSQL database, managing system data, Passing data between pages.

### TEXT BOOKS:

1. Xue Bal et. al, The Web Warrior Guide to Web Programming, Thomson Learning.

### REFERENCE:

1. H.M.Deitel, P.J.Deitel, A.B.Goldberg, Internet & World Wide Web- How to Programme, 3<sup>rd</sup> Edition, Pearson Education.
2. Kalata, Internet Programming with VBScript and JavaScript, Thomson Learning
3. Mohler, Designing Interactive Websites, Thomson Learning
4. Elliotte Rusty Harold, " XML bible", IDG Books
5. Ash Rofail; Tony Martin, "Building N-Tier Applications with COM and Visual Basic 6.0", John Wiley & Sons, Inc
6. Daniel. J. Berg, J. Steven Fritizihger, "Advanced Techniques for Java Development" Johnwiley & Sons, Inc.

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 603 OPERATING SYSTEMS

### Module I

Introduction to Operating Systems. Processes - Interprocess Communication - Race Conditions - Critical Sections – Mutual Exclusion - Busy Waiting - Sleep And Wakeup - Semaphores - Event Counters - Monitors - Message Passing. Process Scheduling - Round Robin Scheduling - Priority scheduling -multiple queues - Shortest Job First - Guaranteed scheduling - Two- level scheduling.

### Module II

Memory management. Multiprogramming. Multiprogramming and memory usage - Swapping - multiprogramming with fixed and variable partitions - Memory management with bit maps, linked lists, Buddy system - allocation of swap space. Virtual memory - paging and page tables, associative memory - inverted page tables. Page replacement algorithms.

### Module III

File systems and I/O files. Directories - File system implementation - security and protection mechanisms.

Principles of I/O hardware - I/O devices - device controllers - DMA. Principles of I/O software - interrupt handlers - device drivers - Disk scheduling - clocks and terminals.

I/O Buffering - RAID- Disk Cache.

### Module IV

Deadlock - conditions for deadlock. Deadlock detection and recovery. Deadlock avoidance - resource trajectories - safe and unsafe states - bankers algorithm. Deadlock prevention. Two phase locking – non-resource deadlocks - starvation.

**Case Study:** UNIX / LINUX operating system

### Text Book

1. William Stallings, “Operating systems”, Pearson Education, Fifth edition
2. D.M.Dhamdhere, “Operating Systems”, 2<sup>nd</sup> Edition, Tata McGraw-Hill

### Reference

1. Garry Nutt, “Operating Systems – A Modern perspective ”, Third Edition, Pearson Education
2. Andrew S. Tanenbaum, “Modern Operating Systems”, Prentice Hall
3. Bach, M.J., “Design of UNIX Operating System”, Prentice Hall
4. Charles Crowley, “Operating systems – A Design Oriented Approach”, Tata McGrawhill, 1997
5. Michel Palmer “Guide o Operating Systems”, Vikas Thomson Learning Publishing, NDelhi

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 604 ANALYSIS AND DESIGN OF ALGORITHMS

### Module 1

Analyzing Algorithms and problems. Classifying functions by their asymptotic growth rate. Recursive procedures. Recurrence equations - Substitution Method, Changing variables, Recursion Tree, Master Theorem. Design Techniques- Divide and Conquer, Dynamic Programming, Greedy, Backtracking

### Module 2

Analysis of searching and sorting. Insertion sort, Quick sort, Merge sort and Heap sort. Binomial Heaps and Fibonacci Heaps, Lower bounds for sorting by comparison of keys. Comparison of sorting algorithms. Amortized Time Analysis. Red-Black Trees – Insertion & Deletion.

### Module 3

Graphs and graph traversals. Strongly connected components of a Directed graph. Biconnected components of an undirected graph. Transitive closure of a Binary relation. Warshalls algorithm for Transitive closure. All pair shortest path in graphs. Dynamic programming. Constructing optimal binary search trees.

### Module 4

Complexity Theory - Introduction. P and NP. NP-Complete problems. Approximation algorithms. Bin packing, Graph coloring. Traveling salesperson Problem.

### Text Books:

1. T. H. Cormen, C. E. Lieserson, R. L. Rivest, Introduction to Algorithms, Prentice Hall India, 2004
2. Allen Van Gelder, Sara Baase, "Computer Algorithms - Introduction to Design and Analysis", 3<sup>rd</sup> Edition, 2004

### References:

1. Anany Levitin, "Introduction to the design and analysis of algorithms", Pearson Education
2. A.V.Aho, J.E.Hopcroft and J.D. Ullman, "The Design and Analysis of Computer Algorithms", Addison Wesley Publishing House, Reading, MA
3. E Horowitz and S Sahni, "Fundamentals of Computer Algorithms", Computer Science Press, Rockville
4. Jeffrey H.Kingston, "Algorithms and Data Structures - Design, Correctness and Analysis ", Addison Wesley, Singapore, 1990
5. Knuth, "Art of Computer Programming Vol II, Sorting and Searching," , Prentice Hall

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 605 OBJECT ORIENTED MODELLING AND DESIGN

### Module I

Introduction to UML and Unified Process. Use case modeling: Actors and Use cases, Use case specification, Actor generalization, Use case generalization. Objects and classes, Relationships, Inheritance and Polymorphism, Packages.

### Module II

Use case realization: Interactions, Sequence diagrams, Communication diagrams, Interaction occurrences. Activity diagrams: Activity semantics, activity partitions, Sending signals and accepting events, Interaction overview diagrams.

### Module III

Design: Design workflow, well-formed design classes, Refining analysis relationships. Interfaces and components. State machine diagrams, Composite states, submachine states.

### Module IV

Implementation workflow, Deployment, Introduction to OCL: Why OCL? OCL expression syntax, Types of OCL expressions. Introduction to Software Architecture, Architecture description language (ADL)

### Text Book:

1. Jim Arlow and Ila Neustadt, UML 2 and the Unified Process: Practical Object oriented Analysis and Design, Second Edition, Pearson Education.

### Reference:

1. Craig Larman, Applying UML and Patterns, 3<sup>rd</sup> Edition, Pearson Education.
2. Grady Booch, James Rumbaugh, Ivar Jacobson .A.W - The Unified Modeling Language User Guide
3. Bruegge, Object Oriented Software Engineering using UML patterns and Java, Pearson Education
4. James Rumbaugh et. al., Object Oriented Modelling and Design –PHI
5. Ivar Jacobson, Grady Booch, James Rumbaugh A.W, The Unified Software Development Process.
6. DeLillo, Object Oriented Design in C++, Thomson Learning

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

# CS/IT 606 COMPUTER NETWORKS

## Module 1

### *Evolution of Computer Networks*

Types of Networks: Broadcast and Point-to-point, LAN, MAN, WAN, Wireless networks. Protocols & Standardization, ISO/OSI Reference model, TCP/IP Reference Model.

### *Application Layer*

Application layer protocols:-WWW and HTTP, FTP, DNS, SMTP, SNMP, RPC, P2P File sharing, Domain Name system (DNS)

## Module 2

### *Transport layer and Network Layer*

Transport Layer Services, Relationship with Network Layer, Relationship with Application Layer, Multiplexing and De multiplexing, UDP, TCP: Header ,Segment Structure, Services, Connection establishment and termination, Flow control and window size advertising, TCP time out and re-transmission, Congestion Control, TCP Fairness, Delay Modeling.

Network layer Services, Datagram and Virtual circuit services, IP datagram format and Types of Services, Datagram encapsulation and Fragmentation, Reassembly and fragmentation

## Module 3

### *Routing and Datalink Layer*

Routing: Link state routing, distant vector routing, hierarchical routing, multicast routing, Data link layer services: Error detect and correction techniques, Elementary Data link layer protocols, sliding window protocols, HDLC ,Multiple access protocols, TDM, FDM, CDMA Random access protocols: ALOHA, CSMA,CSMA/CD,CSMA/CA. Circuit and Packet Switching, Virtual Circuits, Switching Technology for LAN, Ethernet switches, Virtual LAN

## Module 4

### *Physical Layer, High speed Networks and Network programming*

Physical Layer services, Transmission media, Data encoding schemes. ISDN, BISDN, Frame relay, Fast Ethernet and Gigabit Ethernet, FDDI, SONET .NETBIOS programming, TCT/IP and Socket programming. Network Performance: Analytical Approaches-Network Traffic Monitoring-simulations

### **Text Book:**

1. Youlu Zheng and Shakil Akhtar, *Networks for Computer Scientist and Engineers*, Oxford University Press,2006
2. 1.James F. Kurose and Keith W. Ross, *Computer Networking – A Top-Down Approach Featuring the Internet*,2/e Pearson Education ,2003

### **References:**

1. Larry L Peterson & Bruce S Dave, *Computer Networks*, 3rd Edn, Elsevier
2. S. Keshav, *An Engineering Approach to Computer Networking*, Pearson education ,2002
3. F. Halsall, *Data Communication, Computer Networks and Open Systems*, Addison Wesley, 1996
4. Andrew S. Tanenbaum, *Computer Networks* , 4/e, Pearson education, 2003
5. Behrouz A. Fourouzan ,*Data Communications and Networking*, 2/e Tat McGrawhill,2000
6. Leon-Garcia and I. Widjaja, *Communication Networks*, Tata McGraw Hill, 2000
7. Bertsekas and Gallagar , *Data Networks*, 2/e, PHI, 1992
8. Douglas E Comer ,*Computer Networks and Internet's*, 2/e Pearson Education,2004

### *Type of questions for University Examination*

**Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module**

**Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks**

## IT 607 COMPUTER GRAPHICS LAB

This lab exercises are to be done in JAVA language

1. Program to draw line using Bresenham's algorithm for all quadrants.
2. Program to draw a circle.
3. Program to draw an ellipse.
4. Program to draw a spiral using Bresenham's circle drawing algorithm.
5. Procedure to move a line around the circle.
6. Procedure to rotate a wheel.
7. Procedure to translate a circle.
8. Program to show 2D clipping and windowing.
9. Development of 2D graphics package.
10. Segmentation.

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## IT 608 MINI PROJECT – INTERNET BASED

Design and development of an online web oriented commercial site.

Concepts: Server side scripting through ASP or JSP or PHP, Client side scripting through Java Script or VBScript, Web servers like IBM Web Sphere or Tomcat or IIS or Apache, Web Application development framework using IBM Web sphere studio or PHP Triad or Visual studio .Net, Web concepts to mobile devices using WML, WAP, XML. Students can do any of the following sample projects or similar ones:

1. Online auction management system
2. Online ticket reservation system
3. Online banking
4. Online academic softwares like Tutors, Admission, Examination etc.
5. Mobile programming using web services. Here a web service can be a cricket score, weather forecast, railway timing and so on.
6. News aggregators
7. Download managers
8. Email software
9. Mobile – Website communication using SMS
10. Online file repositories.

Each batch comprising of 3 to 5 students shall design. Each student shall submit a project report at the end of the semester. The project report should contain the design and engineering documentation including the Bill of Materials and test results. Product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations and aesthetics / ergonomic aspects taken care of in the project shall be given due weight.

### *Guidelines for evaluation:*

i) Attendance and Regularity	10
ii) Work knowledge and Involvement	30
iii) End-Semester presentation & Oral examination	20
iv) Level of completion and demonstration of functionality/specifications	25
v) Project Report	15

*Total* 100 marks

**Note:** External projects and R&D projects need not be encouraged at this level. Points (i) & (ii) to be evaluated by the project guide & co-ordinator and the rest by the final evaluation team comprising of 3 teachers including the project guide.

## CS/EB/EC/EE/EI/IT 701 INDUSTRIAL ORGANIZATION AND MANAGEMENT

### Module 1

Organisation: Introduction, definition of organization, system approach applied to organization, necessity of organization, elements of organization, process of organization, principles of organization, formal and informal organization, organization structure, types of organization structure .

Forms of business organization: Concept of ownership organization, types of ownership. Individual ownership, partnership, joint stock Company, private and public limited company, co-operative organizations, state ownership, public corporation

### Module 2

Basic concept of management: Introduction, definitions of management, characteristics of management, levels of management, management skills

Management theory: Scientific management, contribution of Gilbreth. Gantt, Neo-classical theory, modern management theories

Functions of management: Planning, forecasting, organizing, staffing, directing, motivating, controlling, co-coordinating, communicating, decision making.

### Module 3

Personnel management: Introduction, definition, objectives, characteristics, functions, principles and organization of personnel management

Markets and marketing: Introduction, the market, marketing information, market segmentation, consumer and industrial markets, pricing, sales, physical distribution, consumer behaviour and advertisement.

Financial management: the basics , financial accounts, inflation, profitability, budgets and controls, cost accounting, valuation of stock, allocation of overheads, standard costing ,marginal costing

### Module 4

Productivity and production: Measurement of productivity, productivity index productivity improvement procedure

Materials management and purchasing: Objectives, functions, importance of materials management. Stores and storekeeping

Inventory control: Classification, functions, inventory models, inventory costs, EOQ, Materials requirement planning

### References:

1. Fraidoon Mazda, Engineering Management-, Addison -Wesley
2. Koontz and O'Donnell, Essentials of Management, Mc Graw Hill
3. Kotlar P, Marketing Management, Prentice Hall India
4. Prsanna Chandra , Finance Management, TMH.5<sup>th</sup> ed.,
5. Monks J.G Operations Management ,MGH

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 702 MULTIMEDIA COMPUTING

### ***Module I***

Introduction to Multimedia-media and Data streams-properties of a multimedia system- Data streams characteristics-information units- Multimedia Hardware platforms-Memory and storage devices-Input and output devices-Multimedia software tools.

### ***Module II***

Multimedia Building blocks- Audio: Basic sound concepts- Music-speech-audio file formats- Images and graphics: Basic concepts- computer image processing- Video and Animation: Basic concepts- Animation techniques.

### ***Module III***

Data compression: Storage space and coding requirements- source, entropy and Hybrid coding- Basic compression techniques- JPEG- H.261- MPEG- DVI- Multimedia Database systems- Characteristics of Multimedia Database Management system- data analysis- Data structure- operations on data- Integration in a database Model.

### ***Module IV***

Multimedia Documents- Hypertext and Hypermedia- document architecture SGML- Document architecture ODA- MHEG. Multimedia applications- Introduction- Media preparation- Media composition- Media Integration- Media communication – Media consumption – Media entertainment- trends.

### **Reference:**

1. Ralfsteinmetz and KlaraNahrstedt Multimedia Computing , communications &Applications- Pearson Edn.
2. Rajan Parekh, Principles of Multimedia, Tata Mc Graw Hill
3. J F Koegel Buford- -Multimedia syatems Addison Wesley -
4. T Vaughan-,Multimedia: Making it work Tata Mc Graw Hill

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 703 ADVANCED COMPUTER NETWORKS

### Module 1

Network Technologies : -WAN and LAN - Ethernet Technology: Fast And Gigabit Ethernet -10/100/1000 Ethernet - Properties of an Ethernet - interoperability & collision domains – Ethernet Hardware Addresses - Ethernet Frame Format - Extending An Ethernet With Bridges - Switched Ethernet -VLAN. Class full Internet Addresses: The Original Class full Addressing Scheme Dotted Decimal Notation - Subnet And Classless Extensions - IP Multicast Addresses .ARP: Resolution Through Direct Mapping - Resolution Through Dynamic Binding - ARP Protocol Format- ARP Implementation . RARP.

### Module 2

Internet Routing: Routing Between Peers (BGP)-Routing Within An Autonomous System (RIP, OSPF).Internet Multicasting : Ethernet Multicast- IP Multicast- IGMP-DVMRP-PIM. Understanding Router Components: Ports-Queuing- Scheduling-shaping-policing-marking. QoS in IP network IPv6: Frame formats-Comparison with IPv4. Introduction to ICMP,DHCP and NAT. Network Management: SNMP and RMON models

### Module 3

Wireless transmission: Frequencies for radio transmission-Signals-Antennas-Signal propagation-Multiplexing-Modulation-Spread spectrum-Cellular systems. Medium access control: SDMA-FDMA-TDMA-CDMA-Comparison of S/T/F/CDMA.

### Module 4

Telecommunications systems. Architecture and working principle of GSM,GPRS and UMTS network . Wireless LAN: Infrared vs radio transmission-Infrastructure and ad-hoc network-IEEE 802.11a,b,g, 802.15 and 802.16 protocol standards –Bluetooth - Principle of WiMax . Mobile IP.

### Text Books:

1. Douglas E.Comer, Internetworking With TCP/IP Volume 1: Principles Protocols, and Architecture, 5/e ,Prentice Hall,2006. (Module I and II)
2. Schiller, *Mobile Communication*, 2/e , Addison Wesley, 2005 (Module III and IV)

### References:

1. Youlu Zheng and Shakil Akhtar, Networks for Computer Scientist and Engineers, Oxford University Press,2006
2. James.F.Kurose & Keith W.Ross , Computer Networking –A Top Down approach featuring Internet, 3/e, Pearson Education,2005.
3. Douglas E.Comer, Computer Network and Internets, 2/e, Pearson education ,2003.
4. Andrew S.Tanenbaum, Computer Networks ,5/e Edition, Pearson education,2003
5. William Stallings, Wireless Communication Networks, 2/e, Pearson Education,2003.
6. Nathan J. Muller, Bluetooth Demystified, McGraw-Hill Professional Publishing,2000

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 704 DISTRIBUTED COMPUTING

### Module 1

Characterization of Distributed systems – Introduction- Examples of Distributed Systems- Challenges-System Models –Architectural models-Fundamental Models – Interprocess communication-The API for the Internet protocols-External Data representation and Marshalling-Client Server Communication- group communication. Interprocess communication in UNIX. Distributed Objects and Remote Invocation – Communication between distributed objects-Remote Procedure Call- Events and Notifications- Java RMI, Case study

### Module 2

Operating System Support-The Operating system layer – Protection- Processes and Threads-Operating System architecture  
Distributed file Systems-Introduction-File Service architecture– Case study sun NFS. Name service SNS and DNS.

### Module 3

Time and co-ordination. Synchronizing physical clocks -logical time and logical clocks. Distributed co-ordination –distributed mutual exclusion – elections. Replication – basic architectural model –consistency and request ordering.

### Module 4

Distributed DBMS Architecture- Distributed Database Design –Query Decomposition and Data Localization -Distributed transactions – concurrency control in distributed transactions– distributed deadlocks – transaction recovery.

### Text Book

1. George Coulouris, et. al., “Distributed Systems – Concepts and Design”, Fourth Edition., Pearson Education

### References

1. M.Tamer Ozsu,Patrick Valduriez, “Principles of Distributed Database Systems”, Second Edition ,Pearson Education.
2. C.A.R.Hoare, “Communicating Sequential Processes”, Prentice Hall, 1980
3. Dimitri P.Bertsekas, John N.Tsitiklis, “Parallel and Distributed Computation : Numerical Methods”, Prentice Hall International, Inc., 1989
4. Douglas Comer and David L.Stevens, “Internetworking with TCP/IP Vol III: Client server Programming and Applications”, Prentice Hall, New York, 1990
5. Gerard Tel, “Introduction to Distributed Algorithms”, Cambridge University Press, 1994
6. H.S.M.Sedan, “Distributed Computer systems”, Butterworths, London, 1988
7. M.Sasikumar, et.al., "Introduction to Parallel Processing", PHI, New Delhi, 2000

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 705 (A) PARALLEL COMPUTER ARCHITECTURE & PROGRAMMING

### Module I.

Introduction to Parallel Processing-Shared Memory Multiprocessing-Distributed Memory-Parallel Processing Architectures- Introduction-Parallelism in sequential Machines—Abstract Model of Parallel Computer – Multiprocessor Architecture- Array Processors.

### Module II.

Pipelining and Super Scalar Techniques-Linear Pipeline Processors-Non-Linear Pipeline processors-Instruction pipeline design-Arithmetic pipeline Design- Super Scalar and Super pipeline Design.

### Module III.

Programmability Issues-An Overview-Operating system support-Types of Operating Systems-Parallel Programming models-Software Tools-Data Dependency Analysis-Types of Dependencies-Program Transformations.

### Module IV.

Shared Memory Programming-Thread –based Implementation-thread Management-Attributes of Threads- Mutual Exclusion with Threads- Mutex Usage of Threads- Thread implementation-Events and Conditions variables-Deviation Computation with Threads-Java Threads Distributed Computing –Message Passing Model-General Model-Programming Model- PVM.

### Text Books

1. Kai Hwang, “Advanced Computer Architecture: Parallelism, Scalability, Programmability”, McGrawHill International Edition, 1993.
2. M.Sasikumar, et.al., "Introduction to Parallel Processing", PHI, New Delhi, 2000

### References

1. P. Pal Chaudhuri , “Computer Organisation and Design”, PHI, New Delhi, 1994.
2. Parthasarathy, Advanced Computer Architecture, Thomson Learning
3. William Stallings, “Computer Organisation and Architecture”, PHI, New Delhi, 1996.
4. “Proceedings of Third International Conference on High Performance Computing”, IEEE, Computer Society Press , California, USA, 1996.
5. “Parallel Processing”, Learning Material Series, Indian Society for Technical Education, New Delhi, 1996.
6. V.Rajaraman, C. Siva Ram Murthy, "Parallel Computers Architecture and Programming", PHI, New Delhi, 2000

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/IT 705 (B) INFORMATION RETRIEVAL

### Module 1

Introduction – Information versus Data Retrieval. Modeling of Information retrieval. Formal characterization of Information retrieval – Alternate set theoretic models. Alternate algebraic models. Alternate probabilistic models. Structured text retrieval models. Models for Browsing. Retrieval Evaluation

### Module 2

Query languages. Text Operations- Document pre processing. Text compression. Indexing and searching. Inverted files. Suffix trees and suffix arrays. Boolean queries. Sequential searching. Pattern matching. Structural queries. User interface and visualization.

### Module 3

Parallel and Distributed Information Retrieval. Implementation of inverted files, suffix arrays and signature files in MIMD architecture. Implementation of Inverted files, suffix arrays and signature files in SIMD architecture.

### Module 4

Searching the web – modeling the web . Search engines –architecture, user interfaces, ranking, crawling, indices. Web Directories-Metadata- Metasearchers-Web as graph-Hubs and Authorities- Case study - google search engine

### Text Books:

1. Ricardo Baexa-Yates & Berthier Ribeiro-Neto  
Modern Information Retrieval, Addison Wesley Longman, 1999

### References

1. Sergey Brin and Lawrence page, The anatomy of large scale hyper textual(Web) search engine, Computer Networks and ISDN systems, Vol 30, No 1-7
2. J Kleinberg, et. Al, The Web as a graph: Measurements, models and methods, Lecture notes in computer science , Springer Verlag, 1999

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/EB/IT 705 (C) ARTIFICIAL NEURAL NETWORKS

### Module 1

Introduction to neural networks. Artificial neural networks. Biological neural networks- Comparison , Basic building blocks of ANN. Activation functions. McCulloch-Pitts Neuron Model, Hebb net. Learning Rules-Hebbian Learning Rules, Perceptron, Delta, Competitive, Boltzmann. Perceptron networks- single layer, multilayer –algorithm.

### Module 2

Feedback Networks, Discrete Hopfield nets, Continuous Hopfield nets. Feed Forward Networks: Back Propagation Networks, Learning Rule, Architecture, training algorithm. Counter Propagation Network: Full CPN, Forward only CPN, architecture, training phases.

### Module 3

Adaptive Resonance Theory, architecture, learning in ART, Self Organizing feature maps: Kohonen SOM, Learning Vector Quantization, Max net, Mexican Hat, Hamming net. Associative memory networks Algorithms for pattern association Hetero associative networks, Auto associative memory networks Bidirectional associative memory networks Energy Function.

### Module 4

Special networks: Probabilistic neural networks, Cognitron, Simulated Annealing, Boltzmann machine, Cauchy machine, Support Vector Machine Classifiers. Application of Neural networks In Image Processing and classification. Introduction to Fuzzy systems, Neuro fuzzy systems.

### Text books:

1. Laurene Fausett: “*Fundamentals of neural networks*”, Prentice Hall, New Jersey,1994.
2. James A. Freeman, David M. Skapura: *Neural Networks Algorithms, Applications and Programming Techniques*, Addison-Wesley, 1990.

### References:

1. S N Sivanandan: “*Introduction to neural networks using “MATLAB”*”, TataMcGrawHill New Delhi.,2004
2. Kevin Gruney: “*An Introduction to neural networks*”, CRC Press,1997.
3. D. L.Hudson & M. E. Cohen: “*Neural Networks and Artificial Intelligence in Biomedical Engg.*”, Prentice Hall Of India, New Delhi.,1999
4. James A. Anderson, “*An Introduction to Neural Networks*”, Prentice Hall of India,1995.
5. Simon Haykin: “*Neural Networks*”, Pearson Education1998
6. Yegnanarayana: “*Artificial Neural Networks*”, Prentice Hall of India2004.
7. Jack M. Zureda, *Introduction to Artificial Neural Systems*,1992

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 705(D) CRYPTOGRAPHY AND DATA SECURITY

### Module I

Cryptography and Cryptanalysis – aspects of security – cryptanalytic attacks – Transposition ciphers – substitution ciphers – the Hagelin Machine – Statistics and Cryptanalysis – The information theoretical approach – general scheme – information measure and absolute security – The unicity distance – Error probability and security – Practical security.

### Module II

The DES algorithm-Characteristics of DES-Alternative Descriptions-Analysis of DES-The modes of the DES-Future of DES-International Data Encryption Algorithm-Stream and Block Enciphering –The theory of finite state machines-shift registers-Random properties of shift register sequences-the generating function-Cryptanalysis of LFSRs-Non-linear Shift registers.

### Module III

Public Key Systems-The RSA system-The knapsack system-cracking the knapsack system-Public key systems based on elliptic curves. Authentication and Integrity-Protocols-message integrity with the aid of Hash functions-Entity authentication with symmetrical algorithm-Message authentication with digital signatures-Zero knowledge techniques.

### Module IV

Key Management and Network Security – General aspects of key management – key distribution for asymmetrical systems – key distribution for symmetrical algorithms-Network security-Fair cryptosystems.

### References :-

1. Jan C A – Basic Methods of Cryptography –Cambridge University Press
2. Thomas Calabrese, Thomson Learning - Information Security Intelligence: Cryptographic Principles & Applications .
3. Wenbo Mao, Modern Cryptography: Theory and Practice –Pearson Education
4. Dorothy Elizabeth Robling Denning, Cryptography and Data Security - Addison Wesley Publishing Co
5. Fine Worlds and Encryption - TMH
6. Niels Ferguson, Wiley - Bruce Schneier's Practical Cryptography
7. Micheal Welschenbac - Cryptography in C & C++
8. Rich Helton, Wiley = Cryptography & Algorithm

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 705(E) DATA MINING AND WAREHOUSING

### MODULE I

Definition Data Mining, Data Mining- On What kind of Data, Data Mining Functionalities, Classification of Data Mining Systems, Major Issues in Data Mining.

### MODULE II

Data Warehouse and OLAP Technology: What is Data Warehouse, A Multidimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, From Data Warehouse to Data Mining.

### MODULE III

Data Preprocessing: Why preprocess the data, Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation.

### MODULE IV

Concept Description: Definition, Data Generalization and Summarization – Based Characterization, Analytical Characterization, Mining Class Comparisons, Mining Descriptive Statistical Measures in Large Databases, Association Rule Mining, Mining Single-Dimensional Boolean Association Rules from Transactional Databases.

### TEXT BOOK:

1. Jiawei Han & Micheline Kamber, “*Data Mining Concepts*”, Morgan Kaufmann Publishers

### REFERENCE:

1. Pudi, Data Mining & Data warehousing, Oxford
2. Alex Berson, Stephen J. Smith, "Data Warehousing, Data Mining and OLAP", McGraw Hill.
3. Margaret.H.Dunham , "Data Mining. Introductory and advanced topics", Pearson Education,2003.
4. Pieter Adriaans, Dolf Zantingo, "Data Mining", Addison Wesley, 1998
5. Pang- Ning Tan, Michael Steinbach & Vipin Kumar, “Introduction to Data Mining” Addison Wesley, 2006
6. Amitesh Sinha, Data Warehousing, Thomson Learning

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 706 COMPUTER NETWORK LAB

1. Familiarisation/Introduction to:
  - (a) Network components such as Modem, Gateways, Routers, Switches, Cables etc.
  - (b) Various network softwares, services and applications.
  - (c) Network trouble shooting Techniques.
2. Serial Port Programming
3. Parallel Port Programming
4. TCP/IP and socket Programming
5. Winsock Programming
6. RPC Programming
7. Performance modelling of networks.

### **Text Book:**

1. Youlu Zheng and Shakil Akhtar, Networks for Computer scientists & Engineers/Lab manual, Oxford Univ. Press
2. Douglas E.Comer, Hands on Networking with Internet Technologies, Pearson Education

**Note: 50% Marks is earmarked for continuous evaluation and 50% marks for end semester examination to be assessed by two examiners. A candidate shall secure a minimum of 50% marks separately for the two components to be eligible for a pass in that subject.**

## IT 707 MINI PROJECT - MULTIMEDIA BASED

Multimedia project involving Painting and 3D Animation , 3D Titling, 3D Modeling and Animation, Working with sound, Frame and Video Capturing and special Effects, Authoring and Presentation. Projects can be done using software's like 3D Studio Max.

( Each student has to do separate project )

Each batch comprising of 3 to5 students shall design. Each student shall submit a project report at the end of the semester. The project report should contain the design and engineering documentation including the Bill of Materials and test results. Product has to be demonstrated for its full design specifications. Innovative design concepts, reliability considerations and aesthetics / ergonomic aspects taken care of in the project shall be given due weight.

*Guidelines for evaluation:*

i) Attendance and Regularity	10
ii) Work knowledge and Involvement	30
iii) End-Semester presentation & Oral examination	20
iv) Level of completion and demonstration of functionality/specifications	25
v) Project Report	15
<i>Total</i>	100 marks

*Note: External projects and R&D projects need not be encouraged at this level. Points (i) & (ii) to be evaluated by the project guide & co-ordinator and the rest by the final evaluation team comprising of 3 teachers including the project guide.*

## **IT 708 SEMINAR**

Each student shall give a 45 minute presentation of a topic followed by a 15 minutes discussion and elaboration. Marks will be awarded considering the relevance of the topic, report preparation, presentation, technical content, depth of knowledge, quality of references and the participation in the seminar.

Students shall individually prepare and submit a seminar report on a topic of current relevance related to the field of Computers either hardware or software. The reference shall include standard journals, conference proceedings, reputed magazines and textbooks, technical reports and URLs. The references shall be incorporated in the report following IEEE standards reflecting the state-of-the-art in the topic selected. Each student shall present a seminar for about 30 minutes duration on the selected topic. The report and presentation shall be evaluated by a team of internal experts comprising of 3 teachers based on style of presentation, technical content, adequacy of references, depth of knowledge and overall quality of the seminar report

## IT 709 PROJECT DESIGN

The major project work shall commence in the seventh semester and completed by the end of eighth semester. Students are expected to identify a suitable project and complete the analysis and design phases by the end of seventh semester.

Each batch comprising of 3 to 5 students shall identify a project related to the curriculum of study. At the end of the semester, each student shall submit a project synopsis comprising of the following.

- Application and feasibility of the project
- Complete and detailed design specifications.
- Block level design documentation
- Detailed design documentation including circuit diagrams and algorithms / circuits
- Bill of materials in standard format and cost model, if applicable
- Project implementation action plan using standard presentation tools

*Guidelines for evaluation:*

i) Attendance and Regularity	10
ii) Quality and adequacy of design documentation	10
iii) Concepts and completeness of design	10
iv) Theoretical knowledge and individual involvement	10
v) Quality and contents of project synopsis	10
<i>Total</i>	50 Marks

**Note:** Points (i)-(iii) to be evaluated by the respective project guides and project coordinator based on continuous evaluation. (iv)-(v) to be evaluated by the final evaluation team comprising of 3 internal examiners including the project guide.

## IT 801 ELECTRONIC BUSINESS AND SERVICES

### Module I

**E-COMMERCE TO E-BUSINESS:** Linking Business with Technology - e-Business-Structural Transformation- Flexible Business Designs -Traditional Definitions of Value - Value in Terms of Customer Experience – Engineering the End-to-End Value Stream – Create the New Techno-Enterprise

**E-BUSINESS TREND SPOTTING:** Increase Speed of Service - Self-Service – Provide Integrated Solutions-Integrate Sales and Service - Customization and Integration - Customer Service Consistent and Reliable - Service Delivery - Contract Manufacturing - Increase Process Visibility -Employee Retention -Integrated Enterprise Applications - Multichannel Integration

### Module II

**E-BUSINESS DESIGN:** Technology -Constructing an e-Business Design - Self-Diagnosis - Reversing the Value Chain -Choosing a Narrow Focus -Case Study

**E-BUSINESS ARCHITECTURE:** Functional Integrated Apps -Integrating Application Clusters into an e-Business Architecture –Aligning the e-Business Design with Application Integration.

**CUSTOMER RELATIONSHIP MANAGEMENT:** Integrating Processes to Build Relationships -Customer Relationship Management -Definition -Organizing around the Customer -CRM Architecture -CRM Infrastructure -Implementing CRM -CRM Trends - Building a CRM Infrastructure

### Module III

**CHAIN MANAGEMENT:** Transforming Sales into Interactive Order Acquisition -Defining Selling-Chain Management - Business Forces Driving the Need for Selling -Technology Forces Driving the Need for Selling -Managing the Order Acquisition Process

**ENTERPRISE RESOURCE PLANNING:** The e-Business Backbone -ERP Decision - Enterprise Architecture Planning- ERP Implementation.

### Module IV

**SUPPLY CHAIN MANAGEMENT:** Inter enterprise Fusion -Defining Supply Chain Management – Basics of Internet-Enabled SCM- e-Supply Chain Fusion- Management Issues

**E-PROCUREMENT:** The Next Wave of Cost Reduction - Isolated Purchasing to Real-Time Process Integration -Operating Resource Procurement- Lack of Process Integration

### TEXT BOOKS:

1. Ravi Kalakota and Marcia Robinson, "e-Business : Roadmap for Success", Addison Wesley,1998
2. Gary P Schneider, Electronic Commerce, Thomson Learning

### REFERENCE:

1. Daniel Menasce, Virgilio Almeida, "Scaling for E-Business: Technologies, Models, Performance, and Capacity Planning", Prentice Hall,2000
2. Harvey Deitel, Paul Deitel , T. Nieto, Complete e-Business and e-Commerce Programming Training Course, Prentice Hall- Student Edition, 2001

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 802 REAL TIME SYSTEMS

### Module I

Introduction: Basic Model, Characteristics and applications of real time systems, Safety and Reliability, Types of Real Time Tasks, Timing Constraints. Real Time Task Scheduling: clock driven scheduling, event driven scheduling, Rate monotonic algorithm. Scheduling Real time Tasks in Multiprocessor and distributed systems. Clocks in distributed real time systems.

### Module II

Resource sharing among real time tasks, Priority inversion, Priority Inheritance protocol, Highest Locker Protocol, Priority Ceiling Protocol, Handling task dependencies. Real Time operating system features, Unix as a real time operating system, Windows as a real time operating system, POSIX, Benchmarking real time systems.

### Module III

Real Time Communication: Basic concepts, Real time communication in a LAN, Bounded access protocols for LANs, Real time communication over packet switched networks, Routing, Resource reservation, Rate control, QoS Models.

### Module IV

Real Time data bases: Applications of real time data bases, real time database application design issues, characteristics of temporal data, concurrency control in real time databases, locking based concurrency control protocols, optimistic concurrency control protocols, speculative control protocols.

### Text Book:

1. Rajib Mall, Real Time Systems: Theory and Practice, Pearson Education, 2007

### Reference:

1. Jane W S Liu, Real Time Systems, Pearson Education
2. K.V.K.K Prasad, *Embedded / RealTime systems: "Concepts, Design and programming"*, Dreamtech Software Team, Wiley Dreamtech
3. K.V.K.K Prasad, *Programming for Embedded Systems*, Dreamtech Software Team, Wiley Dreamtech, 2005
4. Bruce Powel Douglass, Real Time UML, 3<sup>rd</sup> edition, Pearson Education
5. David E. Simon, *An Embeded Software Primer*, Pearson Education

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 803 SOFTWARE PROJECT MANAGEMENT

### Module I

Project Management Organisation and Functions; Management products Management Organisation, Technical Organisation , Job Descriptions and Objectives, Setting Objectives for each project role. Project Planning Techniques – I : Steps in Planning, Product Breakdown Structure, Product Flow Diagrams, Activity Breakdown Activity Network (Arrow Diagram & Precedence Diagram), Other allied techniques like Gantt Chart, check list etc. Project Planning Techniques-II : Outline Product Descriptions, using standard Methods (SSADM, COMPACT), Prototyping, Turnkey Projects Procurement, Resource Allocation and Scheduling. Sizing and Estimating : Approaches to Sizing and Estimating, COCOMO Model Function Point Analysis.

### Module II

Planning the Software Project : Structure of Plan Components (Technical Plan, Resource Plan, Quality Considerations), Levels of Planning (Project Plans, State Plans, Detailed Plans, Individual Work Plans, Exetion Plans), Planning Guidelines. Project Monitoring and Control : Project Initiation, End-Stage Assessment, Mid- Stage Assessment, Checkpoints, Project closure Project Measurement and Review, Quality Review, Technical Exceptions, Configuration Management. Quality Assurance, Quality Concepts, Quality Planning, Quality Review, Quality Characteristics, Technical Exceptions.

### Module III

Configuration Management : Configurations Identification, Configuration control, Configuration Status, Accounting, Configuration Audits.

### Module IV

Productivity Guidelines : Software Packages, Productivity Attributes, Productivity Tools and their selection, Establishing a Productivity Improvement Program. Team Management : Motivation Theories, Motivation Factors for Software Development, Leadership, Performance Evaluation.

### References :-

1. Harold Kerzner, Program Management-A System Approach Planning Scheduling And Controlling, CBS
2. Schwalbe, Information Technology Project Management Thomson Learning
3. Cleland D.L & King W.R :System Analysis And Project Management, Mcgraw Hill
4. Meredith J.R :Project Management-A Management Approach, Wiley-Ny
5. Charles.S.Parker, Management Information Systems – Strategy and Action, Mcgraw Hill
6. Annelies Von Maryrhause, Software Engineering Methods and Management, Academic Press.
7. Jame.R.Johnson, The Software Factory, QED Info.Sciences Inc.
8. Rogor.S.Pressman, Software Engineering, Mcgraw Hill, Int.Ed.
9. Kieron Conway, Software Project Management, From Concept to Deployment

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

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## IT 804(A) SOFTWARE TESTING METHODS AND TOOLS

### Module I

Principles of Testing-White Box Testing- Static Testing – Structural Testing – Black Box Testing – Integration Testing – System and Acceptance Testing – Functional and Non Functional Testing- Regression Testing.

### Module II

Testing of Object-Oriented Systems- Differences in OO Testing-Usability and Accessibility Testing- People and Organizational Issues in Testing-Common people Issues-Organization Structures for Testing Teams

### Module III

Test Management and Automation-Test Planning- Test Management- Test Process- Test Reporting- Software Test Automation-What to Automate-Scope of Automation- Design and Architecture for Automation- Generic Requirement for Test Tool/Framework-Process Model for Automation- Selecting a Test tool.

### Module IV

Test Metrics and Measurements- What are Metrics and Measurement?- Why Metrics in Testing-Types of Metrics- Project Metrics-Efforts Variance- Schedule Variance-Effort Distribution Across Phases – Progress Metrics – Test Defect Metrics – Development Defect Metrics –Productivity Metrics-Release Metrics.

### TEXT BOOKS:

1. Srinivasan Desikan, Gopaldaswamy Ramesh, "Software Testing: Principles and Practices, Pearson Education, 2006.

### REFERENCE:

1. Graham, Dorothy Graham, Mark Fewster, Brian Marick, "Software Test
2. Automation: Effective Use of Test Execution Tools" Addison-Wesley
3. Tamres, Introducing Software Testing, Pearson Education
4. Michael R. Lyu, "Handbook of Software Reliability Engineering", McGraw-Hill
5. Kit, Software Testing in Real World, Pearson Education

*Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## CS/EB/EC/IT 804 B BIOINFORMATICS

### Module I

Basic Concepts of Molecular Biology: Cells - Chromosomes, DNA, RNA, Proteins, Central dogma of molecular biology, Genomes and Genes - Genetic code, Transcription, Translation and Protein synthesis. Web based genomic and proteomic data bases: NCBI, Gene Bank

### Module II

Sequence alignments – Dot plot-Pair-wise sequence alignments - local and global - Sequence similarity and distance measures - Smith-Waterman algorithm, Needleman-Wunch algorithm, Multiple sequence alignment –Sum-of-Pairs measure - Star and tree alignments – PAM and BLOSUM, Phylogenetic analysis

### Module III

Informational view of Genomic data, Genomic Signal Processing, DNA Spectrograms, Identification of protein coding regions, Gene expression, Microarrays, Microarray image analysis

### Module IV

Gene structure in Prokaryotes and Eukaryotes: Molecular Structure Prediction: Basic concepts and terminologies related to molecular structures, Basic molecular Visualization, RNA secondary structure prediction, Protein folding problem, Protein Threading, Protein Visualization, Introduction to Drug Discovery.

### Case Study

Software Tools: Use of Tools for basic and specialized sequence processing such as: BLAST, FASTA, RasMol, Phylip, ClustalW

### Text Books:

1. Setubal & Meidanis, *Introduction to Computational Molecular Biology*, Thomson:Brooks/Cole, International Student Edition, 2003
2. Claverie & Notredame, *Bioinformatics - A Beginners Guide*, Wiley-Dreamtech India Pvt Ltd, 2003.

### References:

1. Lesk, *Introduction to Bioinformatics*, Oxford University Press, Indian Edition, 2003
2. Higgins and Taylor, *Bioinformatics: Sequence, structure and databanks*, Oxford University Press, Indian Edition, 2003
3. Bergeron, *Bioinformatics Computing*, Prentice hall of India, 2003
4. Jiang, Xu and Zhang, *Current topics in Computational Molecular Biology*, Ane Books, New Delhi, 2004
5. S.C Rastogi & Namitha Mendiratta, *Bioinformatics method and application Genomics, Protinomics & drug discovery*, Prentice-Hall India Ltd, 2nd ed.
6. Dov Stekel, *Microarray, Bioinformatics*, Cambridge University Press, 2003

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

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## IT 804(C ) SOFT COMPUTING

### Module I

INTRODUCTION: Neuro-Fuzzy and Soft Computing.

FUZZY SET THEORY: Fuzzy Sets -Fuzzy Rules and Fuzzy Reasoning - Fuzzy Inference Systems.

### ModuleII

REGRESSION AND OPTIMIZATION: Least-Squares Methods for System Identification - Derivative-Based Optimization- Derivative-Free Optimization.

NEURAL NETWORKS: Adaptive Networks - Supervised Learning Neural Networks - Learning from Reinforcement – Unsupervised learning and Other Neural Networks.

### Module III

NEURO-FUZZY MODELING: ANFIS: Adaptive-Networks-based Fuzzy Inference Systems -Coactive Neuro-Fuzzy Modeling: Towards Generalized ANFIS.

**ADVANCED NEURO-FUZZY MODELING:** Classification and Regression Trees - Data Clustering Algorithms - Rule base Structure Identification.

### Module IV

NEURO-FUZZY CONTROL: Neuro-Fuzzy Control I -Neuro-Fuzzy Control II

ADVANCED APPLICATIONS: ANFIS Application- Fuzzy-Filtered Neural Networks- Fuzzy Theory and Genetic Algorithms in Game Playing-Soft Computing for Color Recipe Prediction.

### TEXT BOOKS:

1. Jyh-Shing Roger Jang, Chuen-Tsai Sun & Eiji Mizutani, “Neuro Fuzzy and Soft Computing-A Computational Approach to Learning and Machine Intelligence”, Prentice Hall of India, 2004.

### REFERENCE:

1. John Yen and Riza Langrari, “Fuzzy Logic Intelligence Control& Information”, Pearson Education, 2003 .
2. Bart Kosko, “Neural Networks and Fuzzy Systems – A Dynamical System Approach to Machine Intelligence”, Prentice Hall of India Pvt Ltd, 1997.

### *Type of questions for University Examination*

*Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module*

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## IT/CS 804 (D) MOBILE COMPUTING

### **Module 1**

Review of wireless and mobile communication (covered in Advanced Computer Networks)-Mobile computing architecture-Pervasive Computing-Voice oriented data Communication, Operating System for Mobile Computing, Mobile Devices, cards and sensors, Mobile computing applications: messaging-SMS-MMS-GPRS applications-Mobile agents.

### **Module 2**

Wireless Internet-Mobile IP-wireless web-Web services and mobile web services-Wireless middleware-wireless gateway and mobile application servers-Wireless Access Protocol(WAP)-WAP protocol layers. Mobile database management:-data caching, transaction models, processing queries, Data recovery, QoS .Mobile Transport Layer

### **Module 3**

Cellular network- First Generation Networks-Second generation (2G): GSM-CDMA network .data over cellular network-2.5G network-GPRS-GPRS System Architecture and Protocol layers. EDGE. Third generation network(3G) network-MMS-introduction to 4G and 5G systems-Emerging wireless networks: Ultra wide band(UWB)-Free space optics(FSO)-Mobile ad-hoc network(MANET)-Wireless sensor networks-OFDM and Flash OFDM

### **Module 4**

Wireless security-WLAN security-cellular wireless network security-Mobile ad-hoc network security-Internet security protocols: VPNs and IPSec-Wireless middleware security-SSL for wireless web security-WAP security and WTLS. Client programming tools-using XML and UML for mobile computing –J2ME.

### **Text Book:**

1. Raj Kamal, *Mobile Computing*, Oxford University Press, 2007

### **References:**

1. Amjad Umar, *Mobile Computing and Wireless Communications*, NGE Solutions, 2004
2. Asoke Talukder, Roopa Yavagal, *Mobile Computing*, McGrawhill, 2006
3. Reza Behravanfar, Phillip Lindsay, Reza B'Far, *Mobile Computing Principles: designing and developing mobile applications with UML and XML*, Cambridge University Press, 2006.
4. U. HansMann, L Merk, M.S. Nicklous and T. Stober, *Principles of Mobile Computing*, 2/e- Spniyer, 2003
5. Schiller J, *Mobile Communications*, 2/e-Addison Wesley, 2003.

### **Type of questions for University Examination**

**Question 1 - 8 short answer questions of 5 marks each. 2 questions from one module**

**Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks**

## IT 804(E) GEOGRAPHICAL INFORMATION SYSTEMS

### Module I

**DATA AND INFORMATION:** Define a geographic information system-database operation from verbal descriptions - basic geographic data models from verbal descriptions -geographic information technologies.

**SCALES AND PROJECTIONS:** Calculate map scale using representative fractions -relationship between map scale and the detail and accuracy of geographic databases- Specify positions on the Earth's surface using geographic and plane coordinates - Recognize general categories and distortion characteristics of several common map projections - Plotting Map Projections.

### Module II

**CENSUS DATA AND THEMATIC MAPS:** Discriminate between different levels of measurement of attribute data -Use percentile and equal interval classification schemes to divide census attribute data into categories suitable for choropleth mapping -differences between counts, rates, and densities, and identify the types of map symbols that are most appropriate for representing each -metadata and the World Wide Web to assess the content and availability of attribute data produced by the Census Bureau.

**GEOCODING, TOPOLOGY:** address-referenced census data are matched to specific geographic locations -topology and encoded data -Files in terms of data model, features and attributes, and appropriate uses -Products that can be used for applications, including routing and allocation - Creating and Interpreting Thematic Maps.

### Module III

**LAND SURVEYS AND GPS:** key aspects of data quality, including resolution, precision, and accuracy -procedures land surveyors use to produce positional data, including traversing, triangulation, and trilateration . Global Positioning System satellites -calculating positions on the surface of the Earth- rationale and effects of selective availability.

**PHOTOGRAPHS AND REFERENCE MAPS:** Three dimensional view of the earth's surface from a stereoscopic view of two aerial photographs -difference between a vertical aerial photograph and an orthophoto -metadata and the World Wide Web to assess the content and availability of USGS topographic maps, Digital Raster Graphics, Digital Orthophoto Quadrangles, and Digital Line Graphs -Compare and contrast the characteristics and appropriate uses of DRGs, DOQs, DLGs - Choosing Geographic Data.

### Module IV

**REMOTELY SENSED IMAGE DATA:** Compare and contrast characteristics and applications of different types of remotely sensed data, including AVHRR, Landsat MSS and TM. and ERS Radar -World Wide Web to assess the availability, timeliness, and cost of satellite data - distinction between supervised and unsupervised means of automated image classification.

#### TEXT BOOK:

1. Christopher B. Jones, "Geographical Information Systems and Computer Cartography", Addison Wesley

#### REFERENCES:

1. Paul A. Longley, Michael F. Goodchild, David J Maguire, David W. Rhind, "Geographical Information Systems", John Wiley & sons Inc
2. Ian Hey wood, Sarah Cornelius, Steve Carver, "An Introduction to Geographical Information Systems", Addison Wesley
3. George B Korte, The GIS Book, 5<sup>th</sup> edition, Thomson Learning.

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*Question 2-5 – There will be two choices from each module .Answer one question from each module of 15 marks*

## IT 805 PROJECT WORK

The project work commencing from the seventh semester shall be completed and the project report shall be submitted by each student by the end of eighth semester. There shall be an internal examination of the project that includes a presentation, demonstration and oral examination of the project work.

Each batch of students shall develop the project designed during the VII semester. The implementation phase shall proceed as follows:

A detailed algorithm level implementation, test data selection, validation, analysis of outputs and necessary trial run shall be done.

Integration of hardware and software, if applicable, shall be carried out.

A detailed project report in the prescribed format shall be submitted at the end of the semester. All test results and relevant design and engineering documentation shall be included in the report.

The work shall be reviewed and evaluated periodically

The final evaluation of the project shall be done by a team of minimum 3 internal examiners including the project guide and shall include the following.

- Presentation of the work
- Oral examination
- Demonstration of the project against design specifications
- Quality and content of the project report

*Guidelines for evaluation:*

Regularity and progress of work	30
Work knowledge and Involvement	100
End semester presentation and oral examination	50
Level of completion and demonstration of functionality/specifications	70
Project Report – Presentation style and content	50
<i>Total</i>	300 marks

**Note:** Points (i) and (ii) to be evaluated by the respective project guide and the project coordinator based on continuous evaluation. (iii)-(v) to be evaluated by the final evaluation team comprising of 3 internal examiners including the project guide.

## **IT 806 VIVA-VOCE**

Each student is required to appear for a viva-voce examination, and he/she has to bring his seminar report and project report for the same. The evaluation panel should contain at least one external and two internal examiners appointed by the University. There can be more than one panel in case the number of students is large.