UNIVERSITY OF KERALA
COMPUTER SCIENCE AND ENGINEERING
SCHEME OF STUDIES AND EXAMINATION AND SYLLABUS FOR B. TECH DEGREE
III to VIII SEMESTERS 2003 SCHEME

Semester III		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	**Subject**	**L**	**T**	**D/P**		Hours	Maximum Marks	
03.301	Engineering Mathematics II	3	1	0	50	3	100	4
03.302	Problem Solving and Programming in C (R,F)	2	2	0	50	3	100	4
03.303	Discrete Structures (R,F)	2	1	0	50	3	100	3
03.304	Electronic Circuits (R,F)	2	1	0	50	3	100	3
03.305	Logic System Design (R,F)	2	2	0	50	3	100	4
03.306	Control and Instrumentation	2	1	0	50	3	100	3
03.307	Electronic Circuits Lab (R,F)	0	0	4	50	3	100	4
03.308	Programming Lab	0	0	4	50	3	100	4
Total		**13**	**8**	**8**	**400**		**800**	**29**

Semester IV		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	**Subject**	**L**	**T**	**D/P**		Hours	Maximum Marks	
03.401	Engineering Mathematics III	3	1	0	50	3	100	4
03.402	Humanities	3	0	0	50	3	100	3
03.403	Computer Organization (R,F)	3	1	0	50	3	100	4
03.404	Object Oriented Techniques (R,F)	2	1	0	50	3	100	3
03.405	Data Structures & Programming Methodology (R,F)	2	2	0	50	3	100	4
03.406	Database Design (R,F)	2	1	0	50	3	100	3
03.407	Data Structure Lab (R,F)	0	0	4	50	3	100	4
03.408	Logic Design Lab	0	0	4	50	3	100	4
Total		**15**	**6**	**8**	**400**		**800**	**29**

Semester V		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	**Subject**	**L**	**T**	**D/P**		Hours	Maximum Marks	
03.501	Engineering Mathematics IV	3	1	0	50	3	100	4
03.502	Advanced Mathematics & Queuing Models (R,F)	3	1	0	50	3	100	4
03.503	Operating Systems (R,F)	2	1	0	50	3	100	3
03.504	Systems Programming (R,F)	2	1	0	50	3	100	3
03.505	Microprocessors and Interfacing (R,F)	2	1	0	50	3	100	3
03.506	Computer Hardware Design	3	1	0	50	3	100	4
03.507	Mini Project (OOP Lab)	0	0	4	50	3	100	4
03.508	Database Lab (R,F)	0	0	4	50	3	100	4
Total		**15**	**6**	**8**	**400**		**800**	**29**

Semester VI		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	Subject	**L**	**T**	**D/P**		Hours	Maximum Marks	
03.601	Compiler Design (R,F)	2	1	0	50	3	100	3
03.602	Computer Communication (R,F)	2	1	0	50	3	100	3
03.603	Theory of Computation (R,F)	2	1	0	50	3	100	3
03.604	Computer Graphics	3	1	0	50	3	100	4
03.605	Advanced Microprocessors	3	1	0	50	3	100	4
03.606	Elective I	3	1	0	50	3	100	4
03.607	Microprocessor Lab	0	0	4	50	3	100	4
03.608	System Software Lab	0	0	4	50	3	100	4
Total		**15**	**6**	**8**	**400**		**800**	**29**

Semester VII		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	Subject	**L**	**T**	**D/P**		Hours	Maximum Marks	
03.701	Computer Networks (R,F)	3	1	0	50	3	100	4
03.702	Algorithm Analysis and Design	2	1	0	50	3	100	3
03.703	Computer Peripherals and Interfacing	2	1	0	50	3	100	3
03.704	Principles of Programming Languages	2	1	0	50	3	100	3
03.705	Elective II	3	1	0	50	3	100	4
03.706	Elective III	3	1	0	50	3	100	4
03.707	Algorithm Design and Graphics Lab	0	0	4	50	3	100	4
03.708	Project Design and Seminar	0	0	4	100	-	-	4
Total		**15**	**6**	**8**	**450**		**700**	**29**

Semester VIII		Hours / Week			Maximum Sessional Marks	University Exams		Credits
Course Code	Subject	**L**	**T**	**D/P**		Hours	Maximum Marks	
03.801	Internet Technology	2	1	0	50	3	100	3
03.802	Computer Architecture & Parallel Processing	3	1	0	50	3	100	4
03.803	Software Engineering	2	1	0	50	3	100	3
03.804	Distributed Systems (R,F)	2	1	0	50	3	100	3
03.805	Elective IV	3	1	0	50	3	100	4
03.806	Elective V	3	1	0	50	3	100	4

03.807	Operating systems and Networking Lab	0	0	4	50	3	100	4
03.808	Project Work and Viva Voce	0	0	4	100	3	100	4
Total		**15**	**6**	**8**	**450**		**800**	**29**

Elective I	
1	Multimedia Systems
2	Digital Signal Processing
3	Simulation and Modeling
4	Software Project Management

Elective II	
1	Digital Image Processing
2	Natural Language Processing
3	Information System for Managers
4	Data Mining and ware housing

Elective III	
1	E – Commerce
2	Computational Geometry
3	Advanced Data Base Management Systems
4	Computer Systems Design

Elective IV	
1	Embedded Systems
2	Neural Computing
3	Cryptography and Networks Security
4	Real time Systems

Elective V	
1	Artificial Intelligence and Expert System
2	Graph Theory
3	VLSI System Design
4	Wireless Networks

03.301 ENGINEERING MATHEMATICS II (CMPNUETRH) 3 – 1 – 0

MODULE 1: Ordinary Differential Equations

Differential equations of the first order and higher degree: Equations solvable for p-Equations solvable for x-Equations solvable for y-Clairut's Equation.

Linear Differential Equations: Higher order with constant coefficients-Method of variation of parameters-Homogeneous linear equations (Cauchy's and Legender's)-
Simultaneous linear equations with constant coefficients.

Orthogonal Trajectories: Cartesian form only.

MODULE 2: Fourier Series And Multiple Integrals

Fourier Series: Dirichlet's conditions-Euler's Formula-Functions with periods 2π and $2l$-Even and odd functions-Half range sine and cosine series.

Multiple Integrals: Evaluation-Change of order of integration-Transformation to polar coordinates-Area as double integral-Volume as triple integral (cartesian coordinates only).

MODULE 3: Vector Calculus

Vector differentiation: Derivative of a vector function-Velocity and acceleration-Scalar and vector fields-Gradient-It's geometrical interpretation-Directional derivative-Divergence and Curl-Their physical meaning-Relations involving ∇ -Solenoidal and irrotational fields-Scalar potentials(simple problems).

Vector Integration: Line integral, surface integral and volume integral-work done by a force-Statement and verification of Green's theorem, Stoke's theorem and Gauss' Divergence theorem-their use in evaluating the integrals.

References:

1. Engineering Mathematics, Vol 2: S.S Sastry, Prentice Hall of India (P) Ltd.
2. Higher Engineering Mathematics: B. S. Grewal, Khanna Publishers
3. Engineering Mathematics: Sarveswara Rao Koneru, Universities Press
4. Advanced Engineering Mathematics: Michael D. Greenberg, Pearson Education

Note: The question paper consists of two parts. Part A (40 marks). Ten compulsory questions of 4 marks each. Part B (60 marks). Students must answer one out of two questions from each module. Each question carries 20 marks

03.302 PROBLEM SOLVING AND PROGRAMMING IN C (R) 2 - 2- 0

Module 1

Introduction to digital computer – functional units – storage – primary storage – secondary storage. Introduction to programming languages – types of programming languages – high level languages – assembly language – machine language. Problem solving concepts – flow charts and algorithms – problem definition phase – general problem solving strategies – top-down design – breaking a problem into sub problems – choice of a suitable data structure. Documentation of programs – debugging of programs – program testing.

Module 2

Important C concepts. Preprocessor directives – header files – data types and qualifiers – operators and expressions – enumerations – data input and output – control statements – arrays and strings – structures and unions – working with bits in C – storage classes.

Module 3

Pointers – arrays of pointers – structures and pointers. Memory allocation functions. Function – function definition – function prototypes – function call by value and call by reference – recursive functions. Data files – formatted, unformatted and text files. Low level programming in C. command line arguments.

Text Books:

1. computer Programming in C – V. Rajaraman, PHI
2. Programming with C – Byron S.Gottfried, Schaum's Series.
3. Programming Techniques through C – M.G. Venkateshmurthy, Pearson Education India.
4. Problem Solving and Program Design in C – J.R. Hanly and E.B. Koffman, Pearson/Addison Wesley

References:

1. The C Programming language – Keringhan B.W. and Ritche D.M., PHI 1990.
2. Spirit of C - Cooper.
3. Programming with ANSI and Turbo C – Ashok N. Kamthane, Pearson Education India

4. Introduction to Computer Science an Algorithmic approach – J.P. Trembly and R.B. Bunt, Mc Graw Hill.

Note:

Question papers consists of two parts.

Part A (40 marks), compulsory ten short questions(10 x 4)

Part B (60 marks), three modules, Students must answer one out of two from each module.

03.303 DISCRETE STRUCTURES (R) 2 – 1 – 0

Module 1

Statement calculus: Statements, atomic statements, logical connectives, truth table, conditional and bi-conditional, well formed formulas, tautologies and contradictions, duals of logical formulas, tautological implications and equivalences.

Predicate calculus: Predicates, simple and compound statement functions, quantifiers, well formed formula of predicate calculus, predicate formulas, free and bound variables.

Sets: Operations on sets, power set. Cardinality of a set, countable and uncountable sets. Cantor's theorem of power set. Principles of inclusion and exclusion. Relations – reflexive, transitive, symmetric, equivalence, compatibility. Functions – one – to – one, on to, bijection, composition of functions and relations. Mathematical induction, Pigeonhole principle.

Module 2

Partially ordered sets, Complete partial ordering (CPO), chain, lattice. Boolean and pseudo Boolean lattices. Graph: Directed and undirected. Eulerian chains and cycles. Hamiltonian chains and cycle. Trees, labeled trees. Computer representation of digraphs, connectivity, planarity and colourability. Applications. Recurrence relations, generating functions. Applications.

Module 3

Groups, semigroups and monoids. Cyclic semigroups and submonoids. Subgraphs and cosets. Congruence relations on semigroups, morphism, structur of cyclic group, permutation groups. Elementary applications in coding theory. Rings and subrings morphism of rings. Euclidean domains. Integral domains and fields. Boolean Algebras – direct product, morphisms. Boolean sub algebra. Boolean rings. Applications of Boolean algebra in logic circuits and switching functions.

Text Books

1. Discrete mathematical structures for Computer Science – Kolman B., prentice Hall, 1988.
2. Discrete mathematical structures with applications to computer science – J.P. Tremblay and R. Manohar, Tata McGraw Hill
3. Elements of Discrete Mathematics - C.L. Liu, Tata McGraw Hill

References:

1. Modern Algebra – Herstein.
2. Algorithmic graph theory – Gibbons, Cambridge University Press, 1985.
3. Graph theory – Harary.
4. The art of computer programming vol. I Fundamental algorithms – Knuth D.E., 2nd Edn Reading mass – Addison – Wesley 1973.
5. Universal Algebra for Computer Scientists. EATCS Monographs on Theor. Computer Science Vol. 25 Springer verlag. Barlin 1991.

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.304 ELECTRONIC CIRCUITS (R) 2 – 1 – 0

Module 1

Design and analysis of Rectifiers, Filters, Clippers, Clampers, Regulators, Differentiators, Integrators-RC circuits- response of high pass / low pass RC to sine wave, pulse and square wave inputs- principle of operation of inverters, uninterrupted power supplies, switched mode power supplies

Module 2

Transistor amplifiers- classification – small signal analysis – voltage divider bias – emitter follower configuration- feed back configurations- RC phase shift, wein bridge, Colpitts, Heartly oscillator, Multivibrators- monostable, bistable and astable- 555 timer and applications- Op-amps- parameters, common mode and difference mode- summing amplifier, differential amplifier, inverting, non inverting amplifiers

Module 3

Digital ICs- Logic families- TTL NAND, open collector, totem pole, tristate logic, sinking and sourcing currents, CMOS inverter, CMOS NAND, CMOS NOR, ECL OR-NOR, IIL gates, parameters and characteristics, comparison, manufacturing of integrated circuits, NMOS ICs, bipolar technology- diodes, resistors, capacitors, layout, CMOS technology, twin tube process, pseudo NMOS logic, dynamic NMOS, domino logic gates

Text Books:

1. Electronic Devices and Circuits Theory- Boylestead and Nashelky – PHI
2. Digital Electronics and Logic Design – B Somanathan Nair –PHI

References:

1. Op-amp and Linear Integrated Circuits- 4th Edition- Gayakwad – Pearson Education
2. Electronics: Analog and Digital – J.Naganath – PHI

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.305 LOGIC SYSTEM DESIGN (R) 2-2- 0

Module 1

Number systems – Decimal, Binary, Octal and Hexadecimal – conversion form systems to another representation of negative numbers – representation of BCD numbers – character representation – character coding schemes – ASCII – BBCDIC etc. – Algorithms for addition subtraction, multiplication and division of binary and BCD number – Addition and subtraction of octal and hexadecimal numbers. Representation of floating point numbers – precision – addition, subtraction, multiplication and division of floating point numbers.

Module 2

Postulates of Boolean algebra – Logic functions – logic gates – methods of minimization of logic functions – Karnaugh map method and tabulation method – realization using ligic gates. Design of combinatorial logic circuits – adder, subtractor, binary parallel adder, decimal adder, code converter, magnitude comparator, decoder, multiplexer, demultiplexer, parity generator – design examples.

Module 3

Sequential Logic Circuits – Flip flops RS, D, JK & T type – Master slave flip flop. Analysis and design of clocked sequential circuits – state diagram – state reduction and assignment – design with state equations – shift registers – serial adder – Design of synchronous and asynchronous Counters – Timing Sequencies.

Text Books

1. Digital Logic and Computer Design – Morris Mano – PHL.

References:

1. Gothman W.H. Digital Electronics – An introduction to theory and practice – Prentice hall of India.
2. J. Peatman – Design of systems – Mc Graw Hill International students edition, Kogakusha, Tokyo.
3. Bartee T, Digital computer Funtamentals, Fifth edition, Mc Graw Hill 1979.
4. V. Rajaraman and T. Radhakrishnan – An introduction to digital computer design, Prentice Hall.

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.306 CONTROL AND INSTRUMENTATION (R) 2 – 1 – 0

Module 1

Open loop and closed loop control systems: Transfer function – Poles and zeros – Transfer function of linear systems – Simple electrical, mechanical, and electromechanical systems – Block diagram representation – Block diagram reduction – Signal flow graph – Mason's gain formula.

Module 2

Time domain analysis: Standard test signals – Order of a system – Time response of first and second order systems – Damping ratio – Natural frequency – Time domain specifications – Steady state errors – Static error constants – Generalized error series. *Frequency domain analysis*: Frequency domain specifications – Frequency response of a second order system – Gain margin and phase margin. *Concept of stability*: Routh Hurwitz criterion – Nyquist stability criterion.

Module 3

Generalized measurement system: Functional elements. *Basic characteristics of measuring devices*: Accuracy – Precision – Sensitivity – Resolution – Errors – Linearity – Hysteresis – Calibration. *Characteristics of instrumentation system*: Zero, first, and second order systems. *Transducers*: Active and passive transducers. *Displacement measurement*: Variable resistance, inductance, and capacitance displacement transducers – Digital transducers. *Strain gauges*: Types – Principle of operation of resistance strain gauges – strain gauge circuits – Force measurement. *Pressure measurement*: Diaphragms – Bellows – Bourdon tubes – Potentiometric, inductive, and capacitive transducers – Photoelectric, piezoelectric, and digital transducers. *Flow measurement*: Electromagnetic flow meter – Ultrasonic flow meter. *Temperature measurement*: Platinum resistance thermometer – Thermistors – Thermocouples – Optical pyrometer – Solid state sensors.

Text Books

1. I. J. Nagarath and M. Gopal, Control Systems Engineering, New Age International (P) Limited, New Delhi.
2. C. S. Rangan, G. R. Sarma and V. S. V. Mani, Instrumentation Devices and Systems, Tata Mcgraw-Hill Publishing Company Limited, New Delhi.

References:

1. K. Ogata, Modern Control Engineering, Prentice-Hall of India (P) Limited, New Delhi.
2. B.C. Kuo, Automatic Control Systems, Prentice-Hall of India (P) Limited, New Delhi.
3. R. C. Dorf and R. H. Bishop, Modern Control Systems, Addison Wesley Longman (P) Limited, New Delhi/Pearson Education Asia (P) Limited.
4. A.K. Ghosh, Introduction to Instrumentation and Control, Prentice-Hall of India (P) Limited, New Delhi.
5. J. P. Bentley, Principles of Measurement Systems, Addison Wesley Longman (P) Limited, New Delhi/Pearson Education Asia (P) Limited.
6. A. K. Tayal, Instrumentation and Mechanical Measurements, Galgotia Publications (P) Limited, New Delhi.

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.307 ELECTRONIC CIRCUITS LAB (R) 0 – 0 – 4

Tracing of hysterisis loop using CRO, Measurement of frequency and phase angle using CRO, Characteristics of diode, Zener diode, transistors and FET.

Clipping and clamping circuits. Differentiating and integrating circuits. Rectifier circuits. R.C. coupled amplifier, Astable, Monostable and Bistable circuits using discrete / IC componets. Voltage regulator.

03.308 PROGRAMMING LAB (R) 0 – 0 – 4

Familiarization of operating systems like DOS and Windows.

Programming exercises in C which are covered in course 03.302

(Problem solving and Programming in C).

03.401 ENGINEERING MATHEMATICS III 3 – 1 – 0

MODULE 1: Partial Differential Equations

Formation of P.D.E-Solution by direct integration-solution of Lagrange's linear equations-Nonlinear equations of first order-Types $f(p,q)=0, f(z,p,q)=0, f(x,p)=g(y,q)$-

Homogeneous P.D.E with constant coefficients-solution by the method of separation of variables.

MODULE 2: Application of partial differential Equations

Derivation of one dimensional wave equation-solution of the wave equation by the method of separation of variables –Boundary value problems involving wave equation-Derivation of one dimensional heat equation-solution by the method of separation of variables-Problems with zero and nonzero boundary conditions-Solution of Laplace equation in two dimensions (cartesian only)-Problems on finite and infinite strips.

MODULE 3: Fourier Transforms and Optimization Techniques

Fourier Transforms: Fourier integral Theorem(no proof)-Fourier sine and cosine integrals-Fourier Transforms-complex form-Sine and cosine Transforms-Inversion Formula-simple problems.

Optimization techniques: Linear Programming Problems-Formulation-Graphical solution-General L.P.P-Slack and Surplus variables-Basic feasible solution-Solution of L.P.P. using Simplex method-Big-M-method-Duality-Dual Simplex method.

References:

1. EngineeringMathematics,Vol.3:V.Sunderam, .Balasubramanian, K. A. Lakshminara-yanan, Vikas Publishing House (P) Ltd.
2. Higher Engineering Mathematics: B.S.Grewal, Khanna Publishers.
3. Advanced Engineering Mathematics: Michael D Greenberg, Pearson Education.
4. Engineering Mathematics,Vol2: S.S.Sastry, Prentice Hall Of India(P)Ltd.
5. Engineering Mathematics: Sarveswara Rao Koneru,Universiries Press. Quantative Techniques: P. C. Tulsian and Vishal Pandey, Pearson Education.

Note:

The question paper consists of two parts. Part A (40 marks). Ten compulsory questions of 4 marks each. Part B (60 marks). Students must answer one out of two questions from each module. Each question carries 20 marks

03.402 HUMANITIES 3 – 0 – 0

Part I – Economics (2 Periods per week)

Module I

1. Definition and scope of Economics- Definition of basic terms-Goods-wants and their classifications-wealth-Income –Money- -Near money- Credit money- Utility, features and kinds of utility – National Income and related concepts as GNP, NNP, -Disposable Income Resource Allocation, Technological choice & production possibility curve. Indifference curve analysis- the concept of supply- Supply curves-Cost curves – loss of returns.
2. Basic laws in Economics – Law of Diminishing marginal utility – Demand, Law of Demand and demand curve- The concept of supply- Supply schedule and supply curve**.**

Module II

3. Market structure – Classifications – Pricing under different markets as perfect competition, monopoly and oligopoly. Pricing under monopolistic competition.
4. Inflation – Measures to control inflation – Monetary measures and fiscal measures – Effects of inflation.
5. Tax – Classification of Taxes – Direct & Indirect taxes specific and AdValorem taxes – personal income tax – characteristics of a good tax system – Tax evasion.

Module III

6. International Monetary Fund – Issues & Challenges – International liquidity – Special Drawing Rights - India & IMF.
7. Welfare Economics – Old Welfare Economics -Pigou's Analysis – New Welfare Economics Pareto's welfare criterion**.**

Books for Study : Part-I

Dewtt.K.K Modern Economic theory

Books for References:-

1. Prof. G.Narendrababu " Elements of Ecomic Analysis"
2. Sundaran K.P.M " Money, Banking . Trade & Finance "

Part II – Communicative English (1 period per week)

Reading- Skimming-scanning-detailed reading-predicting content-interpreting charts and tables-identifying stylistic features in texts - evaluating texts-understanding discourse coherence-guessing meaning from the context- note making / transferring information.

Word formation with prefixes and suffixes-discourse markers and their functions-degrees of comparison- expressions relating to recommendations and comparisons-active and passive voice-antonyms-tense forms- gerunds- conditional sentences-modal verbs of probability and improbability-acronyms and abbreviations - compound nouns and adjectives-spelling-punctuation.
Sentence definition-static description-comparison and contrast-classification of information-recommendations-highlighting problems and providing solutions-formal and informal letter writing-using flow-charts/diagrams paragraph writing-editing.

Defining, describing objects-describing uses/functions-comparing-offering suggestions-analysing problems and providing solutions-expressing opinions (agreement/ disagreement) –expressing possibility/certainty – framing questions-providing answers.

Text Books: Part II

1. " English for Engineers and Technologists ", Volume I. Authors : Humanities and Social Science Department, Anna University, Published by Orient Longman Ltd., 1990.
2. Sarah Freeman, Written communication in English, Orient Longman, 1977.

References:

1. Narayanaswami, V.R, .Strengthen Your Writing, Orient Longman Ltd., Chennai 1996 (Revised Edition)
2. Pickett and Laster, Technical English, Writing, Reading and Speaking, New York Harper and Row Publications.
3. Swan, Michael, Basic English Usage, Oxford University Press, 1984.
4. Bhatnagar and Bell, Communication in English, Orient Longman, 1979.
5. Pravin.S.R.Bhatia, A.M.Sheikh, Professional Communication skills, S.Chand and Company Ltd., 2003.

University Question

Note: Part I and Part II to be answered in separate answer books.

Part – I Humanities

Part A – 30 Marks (short answers) Covering entire syllabus (3x10=30)

Part B – 40 Marks (50% choice – One out of two or two out of four from each module.)

Part - II Communicative English

30 marks (50 % choice)

03.403 COMPUTER ORGANIZATION (R) 3 – 1 – 0

Module 1

Basic Structure of digital computer, functional units, basic operational concepts, bus structures, software, addressing methods and machine program sequencing, instruction formats, instruction sequencing addressing modes, assembly language, PDP – II addressing modes and instructions, simple I/O programming, stacks, subroutines.

Module 2

Processing unit – fundamental concepts, execution of a complete instruction, sequencing of control signals, I/O organization – Accessing of I/O devices, DMA, Interrupts, handling, I/O channels.

Module 3

Memory organization – basic concepts, semiconductor RAM memories, memory system considerations, semiconductor ROM memories, multiple module memories and interleaving, cache memory, Virtual memory segmentation, paging, Associative memory, Computer peripherals.

Text Books

1. Computer Organization – V. Carl Hamacher, S. Venko G. Vranesic and Safwat G. Zaky, Mc Graw Hill Publishing Company.
2. Computer Organization and Design – Pal Chaudhuri, Prentic hall of India Pvt. Ltd.

References:

1. Computer Organization Programming – C.W. Gear, Mc Graw Hill International Student Edition.
2. Introduction to Computer Systems using PDP – II and Pascal – Glenn H. Mac Even, Mc Graw Hill.

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.404 OBJECT ORIENTED TECHNIQUES (R) 2 – 1 – 0

Module 1

Fundamentals of object-oriented Design : Data Abstraction, Encapsulation, classes, Inheritance and Polymorphism, class Hierarchies.

Designing and object-oriented system; Identifying the classes, Assigning Attributes and Behaviour, finding Relation ship between classes, Arranging classes into hierarchies : A design example. A first look at C++: Using streams for input and output.

C++ enhancements to C : Default Function Arguments, Placement of variable declarations, the scope resolution operation, the "Const" Qualifier, overloaded functions, OODBMS.

References: References as Aliases, references and pointers similarities and differences, references as function parameters, references as return values.

Module 2

Introduction to classes : Declaring and using classes, class members, creation and destruction of objects, accessing data members, returning a reference, "Const" objects and member function.

Classes and dynamic memory allocation: New, delete operators, "this" pointer.

Static members, friends, array of class objects.

Module 3

Inheritance and polymorphism: Derived class and base class, derived class constructors, overriding member functions, public and private inheritance, virtual functions, polymorphism, multiple inheritance, classes within classes.

Operator overloading : Overloading unary operator, overloading binary operator, data conversion. Generic functions, generic classes. File processing – formatted – unformatted and random files. Microsoft foundation classes : Strings, data structure.

Text Books

1. Object Oriented Programming – Barkakti.
2. Object Oriented Programming.

References:

1. Object Oriented Programming in Microsoft C++ - Rober Lafore – Galgotia Book House 1994.
2. Object Oriented Programming in Microsoft C++ - Balaguruswamy.

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B(60 marks)Three modules. Students must answer one out of two from each module.

03.405 DATA STRUCTURES AND PROGRAMMING METHODOLOGY (R) 2 – 2 – 0

Module 1

Introduction to programming methodologies – structured approach, stepwise refinement techniques, programming style, documentation – analysis of algorithms: frequency count. Study of basic data structures – vectors, arrays, records, stacks, queues and dqueues.

Module 2

Logic characteristics of strings, physical representation for strings – linked lists – trees, binary tree traversals – graphs – applications. Storage management – free storage lists, reference counters, garbage collection, storage compaction, boundary tag method.

Module 3

Internal and external sorting techniques – selection, bubble, insertion, merge sorting, partition exchange sorting, heap sort. Searching – linear and binary – hashing. External sorting – sorting with disks, sorting with tapes.

Text Books

1. Introduction to data structures with applications Tremblay and Sorensons, TMH.
2. Fundamentals of data structures in Pascal – Horowitz and Sahni

References:

1. Theory and problems of data structures – Seymour Lipschuts, Schaum's series.
2. Algorithms + data Structures = Programs – M. Wirth, Prentice hall Englewood cliffs.
3. A structured approach to Programming – J.K. Hugges J.I. Michtm, prentice Hall.

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.406 DATABASE DESIGN (R) 2 – 1 – 0

Module I

Introduction to database- traditional file system- data and need for information- sequential, random and indexed sequential files- data organization- single and multilevel indexes- B trees and B+ trees- secondary storage devices- database approach–data models- schemas and instances- Data independence – 3 schema architecture – Data base languages – Data base users – Classification of data base systems – E-R modeling– Attributes and keys – E-R diagrams – Weak entities – extended E-R model- mapping ER model to relational model

Module II

Introduction to Relational model: Basic concepts: Domains Attributes, keys, tuples, relations – Relational data base schemas – relational Algebra operations, SQL in queries – views- Over view of relational calculus- Conceptual design of relational data base – Normalization theory- Functional dependencies- membership and minimal covers- Loss less decomposition of relations- First, Second, Third and Boyce – Cod normal forms – Multi valued dependencies and Fourth normal form – Join dependencies and Fifth normal form.

Module III

Security issues in database- DBMS and web security – Transaction management –properties of transactions- database architecture- concurrency control- serializability – locking methods- time stamping methods- database recovery- introduction to object oriented DBMS and distributed DBMS – emerging trends

Text Books:

1. Henry F. Korth and Abraham Silbershatz- Database System Concepts- Mc Graw Hill
2. Thomas Connolly and Carolyn Begg - Database systems 3rd edition – Pearson Education

References:

1. Database management systems- Alexis Leon and Mathews Leon- Vikas publishing
2. Ramez Elmasri and Shakant B. Navathe- Fundamentals of Database Systems- Pearson Education.
3. Jeffry D. Ullman - Principles of Database Systems - Galgotia Publications.

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.407 DATA STRUCTURE LAB (R) 0 – 0 – 4

Algorithm development – non-numeric application of computers – development of recursive programs for sorting, searching and text editing using different methods – development of application programs using arrays, strings, stacks, queues, list, trees and files. Programs are to be developed in C.

03.408 LOGIC DESIGN LAB (R) 0 – 0 – 4

1. Realization of Logic Circuits using basic gates.
2. Flip-Flops and Latches – R.S, D, T, J.K and master-slave.
3. Arithmetic circuts – Half adder, Full Adder, 4 bit Adder/Subtractor units, BCD Adders.
4. Shift Registers – UP/DOWN – Ripple counters – Synchronous and asynchronous counters.
5. Sequence generator.
6. Wave form generation using shift registers.
7. BCD to Decimal and BCD to / segment decoder.
8. Multiplexers/ Demultiplexers.
9. Timer circutes.
10. Study of ROM, RAM.

03.501 ENGINEERING MATHEMATICS IV 3 – 1 – 0

MODULE 1: Complex Analysis-Differentiation

Differentiation of functions of complex variable-Analytic functions-Cauchy-Riemann Equations(cartesian only)-Harmonic function-Orthogonal system-velocity potential

Conformal mapping-Mapping by $w=1/z, w=z^2, w=e^z, w=z+1/z, w=\sin z, w=\cos z$.

Bilenear Transformation-fixed points-Problems to find the transformation when three points and their images are given.

MODULE 2: Complex Analysis-Integration

Line integrals-simple problems-Statements of Cauchy's integral theorem,Cauchy's integral formula-Formula for higher derivatives-Evaluation of integrals using the above results.

Taylor series and Laurent's series(no proof)-simple problems.

Singularities-Residues-Cauchy's Residue theorem(no proof)-problems.

Evaluation of real definite integrals of the following types:

$\int_0^{2\pi} f(\sin\theta,\cos\theta)d\theta$, $\int_0^{\infty} [f(x)/F(x)]dx$, $\int_0^{\infty} [\sin mx/f(x)]dx$, $\int_0^{\infty} [\cos mx/f(x)]dx$

MODULE 3: Probability and statistics

Random variable-continuous and discrete distribution-mean and variance-

Binomial distribution-mean and variance-fitting a Binomial distribution-Problems.

Poisson distribution-Poisson distribution as a limiting case of the Binomial distribution-mean and variance-Problems.

Normal distribution-Properties-Problems

Curve fitting-Fitting of a straight line and a second degree parabola,by the method of least squares.

Testing of Hypothesis-Types of errors-Null hypothesis-level of significance-Confidence limits-Large sample tests-testing of proportion of attributes-confidence limits for unknown mean-test of significance for means of two large samples-Use of Student's t distribution for small sample tests-Significance test of a sample mean-Significance test of difference between sample means.

References:

1.Higher Engineering Mathematics:B.S.Grewal,Khanna Publishers
2.Engineering Mathematics,Vol.2:S.S.Sastry,Prentice Hall of India(P)Ltd.
3.Complex Variables Theory And Applications:H.S.Kasana,Prentice Hall of India(P)Ltd
4.Advanced Engineering Mathematics:Michael D Greenberg,Pearson Education
5.Probability and Statistics for engineers ;Miller & Freund ,Pearson Education

Note:

The question paper consists of two parts. Part A (40 marks). Ten compulsory questions of 4 marks each. Part B (60 marks).Students must answer one out of two questions from each module. Each question carries 20 marks.

03.502 ADVANCED MATHEMATICS AND QUEUEING MODELS (R) 3 – 1 – 0

MODULE 1: Special Functions

Beta and Gamma functions-Bessel'equation-Bessel function-recurrence formula-generating function for $J_n(x)$-Legender equation-Legender Polynomials-Rodrigue's formula-generating function for $P_n(x)$-recurrence formula for $P_n(x)$.

MODULE 2: Network scheduling

Construction of network-event-activity-Fulkerson'rule-**CPM** network-time calculations-slack-float-total float-free float-critical path-**PERT-**time calculations-critical path-probability of meeting the time schedule.

MODULE 3: Queuing Models

Characteristics of a queuing model-Kendall's notation-types of queuing models-

(M/M/1):(∞/FIFO) model-$P_n=\rho^n P_0$(no proof)-Derivation of the following characteristics (a) Probability that queue size $\geq n$ (b)Average number of customers in the system(c)Average length of the waiting line-

Waiting time distribution(no proof)-waiting time in the system-waiting time in the queue-Little's formulae-problems based on the above results.

(M/M/1):(N/FIFO) model-Formulae(with out proof) for the average number of units in the system and in the queue and the average waiting time-problems.

(M/M/c):(∞/FIFO) model-standard results(no derivation)-problems.

References:

1. Advanced Engineering Mathematics:Michael D.Greenberg,Pearson Education.
2. Higher Mathematics for Engineering&Science:M.K.Venkataraman,The National Publishing Company.
3. Operations Research:Hamdy A.Taha,Prentice Hall Of India(P)Ltd.
4. Operations Research:S.Kalavathy,Vikas Publishing House(P)Ltd.
5. Quantitative Techniques Theory And Problems:P.C.Tulsian and Vishal Pandey, Pearson Education.
6. Operations Research:P.K.Gupta and D.S.Heera,S.Chand and Company Ltd.

Note:
The question paper consists of two parts. Part A (40 marks). Ten compulsory questions of 4 marks each. Part B (60 marks). Students must answer one out of two questions from each module. Each question carries 20 marks.

03.503 OPERATING SYSTEMS (R) 2 – 1 – 0

Module 1
Introduction : Basic concepts - terminology Historical perspective - early system - simple monitor - performance - types of OS - batch processing - multiprogramming - time sharing - real time system - Protection - different classes of computers - functions and components of an operating system - OS structure - Multiprocessor system - distributed system. Operating system services.
Information management : File concepts file support - file system - directory structure - gaining access to files - basic file system calls - sharing and security - operation on files - file protection - allocation methods - implementation issues - case study.

Module 2
Processor management : CPU scheduling - Review of Multiprogramming concepts - scheduling concepts - scheduling algorithm - Multiprocessor scheduling , Concurrent process - precedence graph - hierarchy of process - The critical section problem - Semaphores - process coordination - determinant program Modularization - Synchronization - concurrent languages - Structured and Modular concurrent programming.
Memory management : Preliminaries - Memory architecture evolution - Bare machine - objectives - Resident monitor - Swapping - fixed partitions - variable partitions - paging - segmentation - combined system - virtual memory concepts - overlay - demand paging - page replacement - space allocation policies - segmented paging dynamic linking - caching of secondary storage information.

Module 3
Device management : Physical characteristics – FCFS, SST , C- SCAN selecting a disk scheduling algorithm - sector queuing. I/O scheduling policies - terminal I/O handling - channels and control units - virtual devices.
Dead locks : The dead lock problem characteristics prevention avoidance - detection - Recovery from dead lock - combined approach to dead lock handling.
Protection : Goals of protection - Mechanisms and policies - domain of protection - access matrix and its implementation. Dynamic protection structures, Language based protection - security. Case study : Typical Operating System Characteristics MS DOS, WINDOWS, WINDOWS NT, NETWARE & UNIX.

Text Books :
1. Operating system concepts – J.L. Peterson and A. Siberachits, Addison Wesley 1983.
2. Operating systems - S. Madnick and J.J. Donovan, Mc Graw Hill International student edition, Kogokuzha, Tokyo, 1977.

References :
1. Operating System Principle – P. Brinch Hanson, Prentice Hall of India.
2. The Logical design of operating systems – A.C. Shaw, Prentice Hall
3. Operating system principles – H.M. Deite, Addison - Wesley, 1983

Note :
Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.504 SYSTEMS PROGRAMMING (R) 2 – 1 – 0

Module 1
Systems Programming – What is systems programming, Difference between systems programming and application programming – Dependence on systems programming on hardware – System software and Machine architecture.

Traditional (CISC) machines – VAX architecture, Pentium Pro architecture, RIC machine – ultra SPARK, Power PC, Cray architecture.

Module 2

Assemblers – Basic assembler functions – machine dependent assembler features – machine independent assembler features – assembler design options – one pass assembler, multi pass assembler – assembler implementation – MASM, SPARC assemblers.

Loaders and Linkers basic loader functions, machine dependent loader features, machine independent loader featured, loader design options – linkage editors, dynamic linkage editors, dynamic linking, bootstrap loaders, examples – DOS linker.

Module 3

Macro processors – basic macro processor functions – machine dependent and machine independent macro processor architectures – design options – implementation examples – MASM, ANSI C macro processors.

Introduction to Compilers

Text Editors – overview of the editing process – user interface, editor structure.

Debuggers – debugging functions and capabilities, relationship with other parts of the system – user interface criteria.

Text Books

1. System Software – An Introduction to System Programming – Leland L. Beck, Addison Wesley Publishing.

References:

1. Systems Programming – John J. Donovan.
2. Operating Systems and Systems Programming – Dumdare.

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.505 MICROPROCESSORS AND INTERFACING (R) 2 – 1 – 0

Module 1

Introduction to Microcomputers – Types, overview of structure and operation. Microprocessors – Evolution and Types. 8085 Microprocessor – Internal Architecture, Addressing modes, 8085 assembly Language programming – development steps, machine code construction. Assembly language program development tools assembler directives.

Module 2

8085 system connections, Timing – 8085 bus activities during a read/write machine cycle. Addressing memory and ports, ROM/RAM/Port decoder. 8085 interrupts and interrupt responses, hardware interrupt applications, software interrupt applications, 8254 software programmable timer/counter, 8259A priority interrupt controller, A/D and D/A converters and interfacing.

Module 3

Digital interfacing – 8255 – Programmable parallel port device, display and key board intefacing with 8279, 8237 DMA controller, 8251A USART 8086 – Internal architecture, including addressing modes.

Text Books

1. Interfacing & applications of Microprocessors – Gaonkar, Prentice Hall
2. Microprocessors and Interfacing – Douglas V. Hall, Mc Graw Hill.

References:

1. Introduction to Microprocessor methods.
2. The indispensable PC Hardware Book – Hans Peter Messmer

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.506 COMPUTER HARDWARE DESIGN (R) 3 – 1 – 0

Module 1

Arithmetic Algorithms: Algorithms for addition and subtraction of binary and BCD number – carry look ahead adder – multilevel carry look ahead adder – multiplication and division algorithms of binary and BCD numbers – array multiplier – booth's multiplication algorithm – restoring and nonrestoring division – Floating point addition, subtraction, multiplication and division.

Module 2

Processor Logic Design: Register transfer logic – Interregister transfer – Arithmetic logic and shift microoperations – Conditional control statements – processor organization – Design of arithmetic unit, logic unit arithmetic logic unit and sifter – status register – Processor unit – design of accumulator.

Module 3

Control Logic Design – Control organization – Design of hardwired control – Control of Processor unit – PLA control – Microprogram control – microinstructions – Horizontal and vertical micro instructions – Nanomemory and nanoinstructions – microprogram sequencer – microprogrammed CPU organization.

Text Books

1. Digital Logic and Computer Design – M. Morris Mano PHI Edition.
2. Computer Organization and Design – P. Pal Chaudhuri, Prentice Hall India.

References:

1. Computer Organization and Architecture – William Stallings, Prentice Hall.
2. Computer Architecture and Organization – H.P. Hayes Mc Graw Hill.
3. Computer Architecture and parallel processing – K Ilawang & Briggs Mc Graw Hill.
4. Switching and finite Automata Theory – ZVI Kohavi TMH Edition.
5. Computer System Architecture – M. Morris Mano PHI Edition.

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.507 MINI PROJECT (OOP LAB) (R) 0 – 0 – 4

Design and implementation of a software project in C++. The student should identity the area, conduct a system study, develop the design using object oriented principles and implement the data base. The project should be properly documented and final report is to be presented.

03.508 DATABASE LAB (R) 0 – 0 – 4

1 Database Customisation
2 Creating Databases/Table spaces
3 Create Objects
4 Moving Data
5 Recovery
6 Locking
7 Preparing Applications for Execution using a front end tool
8 Application Performance Tool

03.601 COMPILER DESIGN (R) 2 – 1 – 0

Module 1

Introduction to compilers and interpreters – Overview of compilation, Issues in compilation – structure of a compiler – compiler writing tools – bootstrapping – notations and concepts for languages and grammars – regular expressions – context free grammar, derivations and parse trees, BNF notations. Context of a lexical analyzer – construction of lexical analyzer, deterministic and non deterministic finite automata.

Module 2

Compile time error handling, error detection, reporting, recovery and repair. Basic parsing techniques – Top down parsing – recursive descent parser, predictive parser simple LL(1) grammar. Bottom up parsers, operator precedence parser, LR grammar, LR(0), SLR(1), LALR(1) parsers.

Module 3

Syntax directed translation schemes, intermediate codes, translation of assignments, translation of array reference, Boolean expressions, case statements, back patching, code optimization, loop optimization and global optimization, sources of sample code generation.

Text books:

1. Principles of Compiler design – Alfred V Aho and Jeffery D Ullman, Addison Wesley
2. Compilers Principles, Techniques and Tools – Alfred V Aho, Revi Sathi, Jeffery D Ullman, Addison Wesley
3. The theory and Practice of Compiler Writing – Jeann Paul Trembly and Sorenson, Mc Graw Hill

Reference

Compiler construction – Principles and Practice – Louden, Vikas Publishing Company

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.602 COMPUTER COMMUNICATION (R) 2 – 1 – 0

Module 1

Time Domain - Frequency Domain, Analog & Digital data and signals - Transmission Impairments - Attenuation, Delay distortion, noise - Different types of noise - Channel capacity - Shannon's Theorem - Transmission media - twisted pair, Coaxial cable, optical fiber, terrestrial microwave, satellite microwave - synchronous and Asynchronous transmission - simplex, half duplex and full duplex transmission.

Module 2

Sampling theorem - Encoding digital data into digital signal - NRZ, Biphase, Multilevel binary - Encoding digital data into analog signals - ASK, FSK, PSK - Encoding analog data into digital signals - PCM, PM - Encoding analog data into analog signals - AM, FM, PM - Multiplexing - TDM, FDM.

Module 3

Error Detecting and correcting codes, Hamming codes, block codes, convolution codes, parity check, CRC, Forward error correction, ARQ techniques - Concepts of Computer communication - point to point, multidrop lines - basic principles of switching - circuit switching, packet switching, message switching.

Text Books :

1. Data and Computer Communications - William Stallings - Maxwell Macmillian Int.

References :

1. Computer Networks – Tanenbaum

Note:

Question papers consists of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.603 THEORY OF COMPUTATION (R) 2 – 1 – 0

Module 1

Introduction to theory of computation, Finite state automata – description of finite automata, Properties of transition functions, Designing finite automata, NFA, 2 way finite automata, equivalence of NFA and DFA, Mealy and Moor machine, finite automata with epsilon moves, Regular sets and regular grammars, regular expressions, pumping lemma for regular languages, closure properties of regular sets and regular grammars, Application of finite automata, Decision algorithms for regular sets, Minimization of FSA.

Module 2

Chomsky classification of languages, CFGs, Derivation trees, ambiguity, simplification of CFLs, normal forms of CFGs, pumping lemma for CFGs, decision algorithms for CFGs, designing CFGs, PDA – formal definition, examples of PDA, equivalence with CFGs, PDA and CFG, Chomsky hierarchy.

Module 3

Turing machines basics and formal definition, Language acceptability by TM, examples of TM, variants of TMs – multitape TM, NDTM, Universal Turing Machine, offline TMs, Equivalence of single tape and multitape TMs, recursive and recursively enumerable languages, decidable and undecidable problems – examples, halting problem, reducibility.

Text Books :

1. Introduction to automata theory, languages and computation – Hopcroft and Ullman.

References:

1. Mathematical theory of computation – Manna, Mc Graw Hill
2. Introduction to automata theory and formal languages – Peter Linz, Narosa Publishing
3. Switching and Finite automata theory – Kohavi, Tata Mc Graw Hill

Note :

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.604 COMPUTER GRAPHICS (R) 3 – 1 – 0

Module 1

Basic concepts in Computer Graphics - Types of Graphic Devices - Interactive Graphic inputs - Basic Raster Scan Graphics - Line Drawing Algorithms - Circle Generation Algorithms - Scan Conversion - frame buffers - solid area scan conversion - polygon filling.

Module 2

Two dimensional transformations - Homogeneous coordinate systems - matrix formulation and concatenation of transformations - Windowing concepts - two dimensional clipping.

Module 3

Introduction to graphics in three dimension - plane projections - vanishing points - specification of a 3D view - introduction to Bezier curves, B-Splines and surfaces - 3D transformations and clipping - hidden line elimination - shading - Graphical User Interfaces. Introduction to multimedia systems.

Text Books :

1. Computer Graphics – Donald Hearn and M. Pauline Baker
2. Principles of Interactive Computer Graphics - William M. Newman and Robert F. Sproull.

References :

1. Procedural Elements for Computer Graphics – David F. Rogers
2. Multimedia systems – Johm F. Kodgel Buford, Addison Wesley.
3. Multimedia making it works – Tay Vaughan.

Note :

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.605 ADVANCED MICROPROCESSORS (R) 3 – 1 – 0

Module 1

Overview of Intel 8086 Microprocessor – Memory address space and data organization. Addressing modes of 8086. Assembly language programming of 8086 – machine code construction procedures and macros. Assembler directives. Comparison of 8088 Minimum mode and Maximum mode – system timing. Interrupts and interrupt priority management in 8086. Architecture and functions of 8087 numeric processor.

Module 2

Intel 80286 Microprocessor – Architecture, signals and system connection. Memory management schemes. Conventional 32 bit Microprocessors – 80386, 80486 – Architecture – Modes – Real, protected and virtual 8086 mode – Memory – management of tasks – interrupts and exceptions – I/O privilege levels – advanced instructions. Pentium processor – Functional units and its working – Super scalar architecture – Concepts like intelligent branch prediction and U – V pipelining – Burst mode of data transfer – Introduction to Pentium pro and its Architecture.

Module 3

Introduction to micro controllers – comparison with microprocessors – Study of microcontroller (MCS 51 family) – Architecture, instruction set, addressing modes and its programming.

Text books :

1. Microprocessors & Interfacing – Douglas V. Hall

References :

1. Advanced 80836 & 80386 Programming Techniques – James L Hardey,.
2. Intel Users manual for 8086, 80386 & 80486, Pentium & Pentium pro.

Note :

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.606.1 MULTIMEDIA SYSTEMS (ELECTIVE I) (R) 3 – 1 – 0

Module 1

Multimedia – definition, applications, introduction to making multimedia, multimedia Requirements, multimedia hardware – connections memory and storage devices, Input devices, output hardware, communication devices, multimedia software, basic tools, making instant multimedia.

Module 2

Multimedia building blocks, text, sound, images, animation and video compression techniques, inter frame and intra frame compression. JPEG image compression standard and MPEG motion video compression standards, Fractal compression.

Module 3

Object oriented multimedia, multimedia framework, frame work overview, media, transform, format and component classes; integrated multimedia systems. Multimedia and internet, multimedia on the web, tools for the World Wide Web.

Text books:

1. Multimedia making it work – Tay Vaughan, Tata Mc Graw Hill
2. Multimedia Programming objects, Environments and frameworks – Simon J Gibbs and Dionysios C Tsichritziz, Addison Wesley.
3. Multimedia Systems – John F. Koegd Buford, Addison Wesly.

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.606.2 DIGITAL SIGNAL PROCESSING (ELECTIVE I) (R) 3 – 1 – 0

Module 1

Discrete - Time signals and systems : Discrete Signals - sequences, linear shift - invariant systems stability and casuality - Difference equations Frequency domain representation - Fourier transform and its properties - sampling of continuous time signals - Review of Z transforms.

Module 2

Discrete Fourier Transform : Representation of discrete Fourier Series - Properties of discrete Fourier Series - Discrete Fourier Transform, Introduction to Fast Fourier Transform (basic concept only) Flow graph and Matrix representation of Digital Filters:- Basic network structure for IIR and FIR filters - parameter quantization effects.

Module 3

Digital Filter Design Techniques:- Design of IIR Filters from analog filters - Design example. Properties of FIR filters - Design of FIR using windows - comparison of IIR and FIR filters. Finite word length effect in Digital Signal Processing.

References :

1. Theory and Application of Digital Signal Processing – Rabiner and Gold, Prentice Hall of India, New Delhi.
2. Digital Filters: analysis and Design – Antoniqu, Tata Mc.Graw Hill, 1980.

Note:
Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.606.3 SIMULATION AND MODELING (ELECTIVE I) (R) 3 – 1 – 0

Module 1

System Models - Continuous and discrete models - Static and Dynamic Models - Principles used in modeling - system studies - system analysis - design and postulation. System simulation : Techniques of simulation - Monte Carlo Method - Comparison of analysis and simulation - Types of system - Simulation Numerical computation for simulation - Applications of digital analog and hybrid computers in continuous system simulation - Real time simulation.

Module 2

Exponential growth models, exponential decay models - Logistic curves - Generation of growth models - system models - system dynamic diagrams - Multisegment models Representation of time - delay - Review of probability concepts - Arrival pattern and service times - poisson arrival patterns - Exponentiations, Erlang and Hyper Exponential Distribution - Mathematical studies of Queuing problems.

Module 3

Discrete system Simulation : Discrete events - Generation of arrival patterns - Simulation of telephone systems - Simulation languages - GPSS programming General description - simscript programs, simscript system concept.

Text Book :

1. System simulation – Geoffrey Gordon, Prentice Hall of India Pvt. Ltd.

References :

1. Digital Computer Simulation – Maryanski F., CBS Distributors.
2. Discrete Event System Simulation, Bank and Carson, Prentice Hall Inc.

Note:
Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.606.4 SOFTWARE PROJECT MANAGEMENT (ELECTIVE I) (R) 3 – 1 – 0

Module 1

Product: The evolving role of software-an industry perspective-aging software plant- software competitiveness. Software - characteristics-components-application-crisis on the horizon-software myths.

Process: Process-methods-tools-a generic view of software Engineering-software process models-linear sequential model-proto typing model- RAD model- incremental, spiral, component, assembly and concurrent development models. Project Management concept: People – Product-Process-Project

Module 2

Software process and project metrics: - Measures- Metrics and indicators- Software measurements-metrics for software quality- integrating metrics within the software process.

Software project planning: Planning objectives - software scope-resources-software project estimation-Decomposition Techniques –Empirical estimation models- COCOMO model-automated estimation tools. Risk management: software risks-risk identification-risk projection-risk mitigation, monitoring and management-safety risks and hazards-RMMM plan.

Module 3

Project scheduling and tracking: Basic concepts-relation between people and effort-defining task set for the software project-selecting software engineering task-refinement of major task-defining a task network-scheduling-project plan. Software quality assurance-quality concepts-software reviews-formal technical review-Formal approaches to SQA- software reliability-SQA plan-the ISO 9000 quality standards. Software configuration management: baselines-software configuration item-the SCM process-identification of objects in software configuration-version control-change control-configuration audit-status reporting-SCM standards.

Text Book:

1. Software Engineering – Royson S. Pressman, McGraw Hill International

References:

1. Software Project management: A unified framework – Walker Royce, Pearson Education
2. Software Project management in practice – Pankaj Jalote, Pearson Education
3. Software Project management: A concie study – S A Kelkar, PHI
4. Software Project management – Mike Cottorell and Bob Hughes
5. Software engineering – Sommerville I, Addison Wesley
6. Quality software project management – Robert t Futrell, Donald F Shafer and Linda I Shafer, Person Education

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.607 MICROPROCESSOR SYSTEMS LAB (R) 0 – 0 – 4

1. a) Study of 8085 trainer kit and different groups of instruction by executing simple programs.
   b) Write and Execute machine language programs of 8085 to perform the following operations.
   (a) Number Conversion.
   (b) Sorting.
   (c) Binary searching.
   (d) Expression evaluation using subroutines
2. a) Study of MASM and debug commands.
   b) Develop assembly language programs based on Intel 8086/8088 to perform the following.
   (a) Addition of a set of 32 – bit numbers.
   (b) Sorting.
   (c) Count the occurrence of a given character in the given string and display the result.
   (d) Develop a program (8086) for matrix multiplication.
3. a) Study and demonstration of different modes of operation of programmable peripheral interface chip 8255 using simple experiments.
   b) Experiments using peripheral devices – Stepper motor, A/D Converter, D/A Converter, Keyboard and display interface.
   c) Interfacing microprocessor kit with personal computer using RS232.

03.608 SYSTEM SOFTWARE LAB (R) 0 – 0 – 4

1. Design of a single pass assembler for a hypothetical Machine.
2. Design of a 2 – pass assembler for a hypothetical machine.
3. Design of assembler which generates code with relocation option.
4. Design of absolute loader.
5. Design of relocating loader.
6. Design of macro processor.
7. Design of macro processor integrated assembler.
8. Lexical analysis.
9. Operator precedence relations.
10. Recursive descent parser.
11. First and follow.
12. Intermediate code generation.
13. Code generation.

03.701 COMPUTER NETWORKS (R) 3 – 1 – 0

Module 1

Introduction – Uses – Network Hardware – LAN –MAN – WAN – Wireless networks, Inter networks – Network Software – Protocol hierarchies – Design issues for the layers – Interface & Service – Service Primitives. Reference models – OSI – TCP/IP.

Physical layer – ISDN Services – Broad band ISDN – Narrow band ISDN ATM Networks – ATM Switches – Data Link layer Design Issues – Error & Error Detection & Correction – Flow Control Example Data link Protocols. HDLC DLL in Internet – DLL in ATM.

Module 2

MAC Sub layer – IEEE 802 FOR LANs & MANs 802.3, 802.4, 802.5 & 802.6 Bridges – High Speed LANs – FDDI.

Module 3

Network layer – Routing – Shortest path routing – Flooding – Flow based Routing – Routing for mobile hosts – Congestion control algorithms – Internetworking – Network layer in internet & ATM. Transport Layer – Elements of Transport Protocol – TCP & UDP. ATM adaptation layer – application layer – Cryptography. DNS, SNMP – Electronic mail – World Wide Web.

Text Books:

1. Computer Networks – Andrew S Tanenbaum, PHI.
2. Computer Networks and Internets – Douglas, Addison Wesly.

References:

1. Data and Computer Communications – William Stallings, PHI.
2. Hand book of Computer Communications Standards, Volume 1 – Willman Stallings, PHI.
3. An Engineering Approach to Computer Networks – Keshav, Addison Wesley.

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.702 ALGORITHM ANALYSIS AND DESIGN (R) 2 – 1 – 0

Module 1

Concepts in algorithm analysis – the efficiency of algorithms, average and worst – case analysis, Asymptotic notation, time and space complexity, Recurrences – substitution method, iteration method and master method, Analysis of sorting algorithms insertion sorting, heaps, maintaining the heap property, building heap, heap sort algorithm, priority queues, Description of quick sort, randomized version of quick sort.

Module 2

Red – Black trees – Height balanced trees – AVL TREES, rotations, Definition of B – trees – basic operations on B – trees, Algorithm for sets – Union and Find operations on disjoint sets, Graphs – DFS and BFS traversals, Spanning trees – Minimum Cost Spanning Trees, Kruskal's and Prim's algorithms, Shortest paths – single source shortest path algorithms, Topological sorting, strongly connected components.

Module 3

Algorithm Design and analysis Techniques – Divide – and – Conquer, Merge Sort, Integer multiplication problem, Strassen's algorithm, Dynamic programming – Matrix multiplication problem, Greedy algorithms – Knapsack problem, Back – tracking – 8 Queens problem, Branch and Bound – Travelling Salesman problem.
Defenitions and Basic concepts of NP – completeness and NP – Hendress. Study of NP – Complete problems.

Text Books:

1. Introduction to Algorithms – Thomas H. Cormen, Charles E. Leiserson and Ronald L. Rivest, Prentice Hall of India.
2. Fundamentals of Computer Algorithms – Horowitz and Sahni, Galgotia Publication.
3. Fundamentals of sequential and parallel algorithms – Kenneth A. Merman and Jerome L. Paul, Vikas Publishing Company

References:

1. The Design and Analysis of Computer Algorithms – A.V Aho, J.E. Hopcroft and J.D. Ullman, Addison Wesley Publishing Company.
2. Fundamentals of Algorithms – Gilles Brassard and Paul Brately, Prentice Hall of India.
4. Computer algorithms - Introduction to design and Analysis – Sara Baase, Allen Van Gelder
5. Data Structures and Algorithms – A.V. Aho, J.E. Hopcroft and J.D. Ullman, Addison Wesley Publishing Company.

Note :

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.703 COMPUTER PERIPHERALS AND INTERFACING (R) 2 – 1 – 0

Module 1

Computer system peripherals – video display units – raster scan CRT displays-display adapter-monochrome and color-vector scan CRT displays-accelerator chips-AGP-Serial access mass storage devices-magnetic tapes and streamer tapes-Random access mass storage devices—Magnetic-Magneto Optical – Data organization and coding-Storage interfaces – ATA-SCSI-IDE-Floppy Disk Interface-Hard disks-Floppy Disk-Compact Disks-CDROM-CD-Recordable-CD-Erasable-VideoCD-DVD-Tape-catridges.

Module 2

Input / Output Devices – Keyboards – Mice – Track balls – Joysticks and Paddles – Scanners – printers – Impact and Non Impact – Line printers – Character printers – Dot matrix – laser – Inkjet and thermal printers – Plotters. Serial data communication, introduction – Asynchronous data communication – RS232 and RS422 protocol – Universal Asynchronous Receiver Transmitter (UART). Synchronous data communication: General format, Universal Synchronous Receiver and Transmitter (USART), High level Data link control (HDLC) protocol and Synchronous Data Link Control (SDLC) protocol.

Module 3

Parallel Data Communication: Introduction, Asynchronous bus protocol, centronics, VME bus, MCA bus. Synchronous bus: protocol, SCSI, EISA (Extended Industry Standard Architecture), USB.

Text books:

The indispensable PC Hardware Book – Hans peter Messmer
Win Rosch Hardware Bible.

Note :

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.704 PRINCIPLES OF PROGRAMMING LANGUAGES (R) 2 – 1 – 0

Module 1

Programming languages – characteristic features – Important aspects of programming languages – Language design issues – language translation issues – Binding and binding times – study of data types – elementary and structured specification, implementation, Declaration and checking.

Module 2

Subprogram, encapsulation and information hiding, sequence control within expression and between statements. Different types of subprogram sequence control – sequence control and data structures. Data control – Referencing environment. Static and dynamic scopes, block structure – Local and shared data.

Module 3

Case studies Innovative features and design philosophies – comparative look, simple procedural languages, FORTRAN, C, block structured procedural language Pascal object based languages Ada, C++, Functional language LISP, Logic programming language Prolog.

Text books:

1. Programming languages Design and Implementation – Terrence W. Pratt, Prentice Hall.

References:

1. Principles of programming Languages – R.D. Tennet
2. programming language Concepts and constructs – Ravi Sethi.

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.705.1 DIGITAL IMAGE PROCESSING (ELECTIVE II) (R) 3 – 1 – 0

Module 1

Introduction – Fundamental steps in image processing – Components of image processing system – *Digital image fundamentals* – Image sensing and acquisition – Image sampling and quantization – Digital image representation – Basic relationship between pixels – *Mathematical preliminaries* – Linear operations – Orthogonal transforms – Fourier transform – Discrete Fourier transform – Discrete cosine and Sine transforms – Hartley transform – Walsh-Hadamard transform – Haar transform – Karhunen-Loeve transform.

Module 2

Image enhancement – Contrast stretching – Histogram processing – Enhancement using arithmetic/logic operations – Spatial filtering – Smoothing spatial filters – Linear filters – Ordered statistic filters – Sharpening spatial filters – Laplacian and gradient operators – Filtering in the frequency domain – Smoothing frequency domain filters – Low pass filters – Sharpening frequency domain filters – High pass filters – Laplacian in the frequency domain – *Image restoration* – Minimum mean square error restoration – Least square error restoration – Constrained least square error restoration – inverse filtering.

Module 3

Image compression – image compression models – Elements of information theory – Lossy compression – Lossless compression – *Image segmentation* – Detection of discontinuities – Point detection – Line detection – Edge detection – Thresholding – Region based segmentation.

Text Books :

1. R. C. Gonzalez and R. E. Woods, Digital Image Processing, Addison Wesley Longman (P) Limited, New Delhi/Pearson Education Asia (P) Limited.
2. 2. B. Chanda and D.D. Majumdar, Digital Image Processing and Analysis, Prentice-Hall of India (P) Limited, New Delhi.

References :

1. A. Rosenfeld and A. C. Kak, Digital Picture Processing (2^{nd} Edition), Vol – 1, Academic Press, New York
2. A. K. Jain, Fundamentals of Digital Image Processing, Prentice-Hall of India (P) Limited, New Delhi.
3. R. J. Schalkoff, Digital Image Processing and Computer Vision, John Wiley and Sons, New York.
4. W. K. Pratt, Digital Image Processing, John Wiley and Sons, New York.

Note:

Question papers consist of two parts. Part A (40 marks) Compulsory ten short questions (10 x 4). Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.705.2 NATURAL LANGUAGE PROCESSING (ELECTIVE II) (R) 3 – 1 – 0

Module 1

Introduction to Natural Language Processing, Words – Regular Expressions and Automata, Basic Regular Expressions, Regular Expression Patterns, Disjunction, Grouping and Precedence, A simple Example, Advanced Operators, Regular Expression Substitution, Memory and ELIZA .

Finite State Automata- Using an FSA to recognize SheepTalk, formal languages, Example, Nondeterministic FSAs, Using an NFSA to accept Strings, Recognition as Search, Relating deterministic and nondeterministic Automata, Regular Language and FSAs.

Morphology and Finite state Transducers-Survey of English Morphology, Finite state morphological parsing, combining FST Lexicon and Rules, Lexicon – free FSTs

N-grams –counting words in Corpora, Simple N-grams, Smoothing, Backoff,

Deleted Interpolation, N-grams for spelling & pronunciation, Entropy

Module 2

Syntax- Word classes and Part-of -Speech Tagging, Context free grammars for English, Parsing with context free grammar-Parsing as search, A Basic top-down parser, Problem with the Basic top-down parser, Earley Algorithm

Features & Unification-Feature structures, Unification of Feature structures, Feature structures in the grammar, Implementing Unification

Module 3

Semantics-Representing Meaning-Computational desiderata for representations, Meaning structure of Language, First Order Predicate Calculus, Linguistically relevant concepts, Related Representational Approaches, Alternative approaches to meaning

Semantic Analysis –syntax-driven semantic analysis,

Attachments for a fragment of English, Integrating Semantic Analysis into the Earley Parser, Idioms and Compositionality

Pragmatics-Discourse, Natural language Generation

Text Book:

An Introduction to Natural Language Processing, Computational Linguistics, and Speech Recognition - Daniel Jurafsky & James H .Martin – Pearson Education

References

1. Natural Language Understanding –James Allen, The Benjamin/Caming Publishing company
2. Foundations of Statistical Natural Language Processing- Christopher D Manning and Hinrich Schutze-The MIT Press
3. Natural Language Processing for online applications

03.705.3 INFORMATION SYSTEM FOR MANAGERS (ELECTIVE II) (R) 3 – 1 – 0

Module 1

Introduction to information systems – system life cycle – Role of system analyst – tools for system analysis and design and data collection. System flow charts – decision tables, HIPO, Sampling.

Survey & feasibility study – technical feasibility cost - benefit analysis – feasibility report.

Module 2

Information Revolution, fourth critical resources. Application other than number crunching management involvement in setting information system strategy. Islands of computation – components of management information system. Important characteristics. Hardware requirements for MIS. Guideline for hardware and software organizational changes – problems of behavior.

Module 3

Importance of RDMS concepts – different information system model :- Transaction processing systems, factors for designing TPS – case studies from manufacturing firm, Service sector etc. – Decision support system, Types of decision support system – Design of integrated system – typical examples – economics of information – cost of information – calculation of value of information cost. Benefit analysis – examples charging of computer services.

References :

1. Management information system James Emery Oxford University Press 1987
2. Management information system Jerome kanmter PHI Pvt. Ltd, New Delhi.
3. The analysis, design and Implementation of Information systems Henry C. Lucas Jr. Fourth edition Mc Graw Hill International.

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.705.4 DATA MINING AND WAREHOUSING (ELECTIVE II) (R) 3 – 1 – 0

Module 1

Introduction to data warehousing- evolution of decision support systems- data warehouse environment- modeling a data warehouse- granularity in the data warehouse- data warehouse life cycle- building a data warehouse- online analytical processing

Module 2

Data mining – demands potential and major issues- classification of data mining techniques- generalization, summarization and characterization- discovery and analysis of patterns, trends and deviations- mining knowledge in database systems

Module 3

Data mining models- decision trees- genetic algorithms- neural nets – data mining process- data preparation – defining a study- data cleaning- prediction- enabling data mining through data warehouse- integration of data mining tolls with database systems- data mining applications – future trends

Text Books:

1. Data warehousing in the real world – Anahory and Murray, Addison Wesley
2. Building the data warehouse – W H Inmon, John Wiley & sons

References:

1. Modern data warehousing , mining and visualization- George M Marakas, Peason education
2. Data mining: introductory and advanced topics – Margaret H Dunham, Pearson Education

3. Advances in knowledge recovery and data mining – U.M. Fayyad G P and Shapiro – MIT press
4. Decision support systems in the 21st century – George M Marakas, Pearson education

03.706.1 E – COMMERCE (ELECTIVE III) (R) 2 – 1 – 0

Module 1

Internet and World Wide Web- origin, commercial use of internet, growth of Internet. Economic Forces – Transaction cost, forces against vertical integration. Mark Up Languages – HTML, XML, Web Server, clients.
Client server architecture – intranet, extranet, Web based Tools – Web server hardware, Web server software features, Site Development and Management. Search engines

Module 2

Electronic commerce - Tools, Web hosting, Java, Java Applets, Java Script, Active X control, E-mail –attachments. Communication channel threats, Encryption algorithms standards, Secure sockets layer, Firewalls.

Module 3

Electronic payment system – Electronic cash, e-Wallets Smart card Brand creation on the web. Web Auction strategies Legal environment of e-commerce. Cultural Issues Social Implication. Impact on world economy.

Text book:

1. Frontiers of e-commerce – Kalakota, Addison Wesley Publications
2. Creating a winning E – Business , H.A. Napier, P.J. Judd, O.N. Rivers, S.W. Wagner, Vikas Publishing House

Reference :

1. Electronic Commerce – Gary P Schneider and James T Perry – Course Technology -Thomson Learning, Cambridge.

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.706.2 COMPUTATIONAL GEOMETRY (ELECTIVE III) (R) 2 – 1 – 0

Module 1

Geometric Preliminaries, DCEL (Doubly Connected Edge List) data structure, Geometric Duality, Geometric Searching - Planar Straight Line Graph (PSLG), Point Location Problem, Location of a point in a planar subdivision, Plane Sweep Algorithm, Slab method, Chain method, Regularization of PSLG , Range Searching Problems.

Module 2

Convex Hulls- Convex Hull Algorithms in the Plane -- Graham's Scan Algorithm, Jarvi's March, Divide and Conquer Algorithm, Dynamic Convex Hull Algorithm.
Triangulation—Triangulation of a point set, Triangulation Algorithms, Polygon Triangulation, Convexity, Helly's theorem, Delauny Triangulation, Voronoi Diagrams- Applications in the plane , Post Office Problem.

Module 3

Arrangements of Lines-- Zone Theorem, Many Faces in arrangements, Constructing the arrangements, Forbidden graph theorem, Bipartite graph for many face problems.
Linear Programming—Linear Programming in Two Dimensions, Prune-- Eliminate Redundant Half- Planes.
Introduction to Visibility Problems-- Definition of direct visibility, Point visibility and Edge visibility, Algorithm for computing point-visible region inside a polygon.

Text books :

1. *Computational Geometry An Introduction,* Franco P. Preparata, Michael Ian Shamos Texts and Monographs in Computer Science , Springer – Verlag
2. *Algorithms in Combinatorial Geometry*, Herbert Edelsbrunner , EATCS Monographs on theoretical computer science, Springer – Verlag.
3. *Art Gallery Theorems,* Joseph O' Rourke, Oxford Press.

References :

Computational Geometry and Computer Graphics in C++ , Michael J. Laszlo, Prentice- Hall of India, 1999.

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.706.3 ADVANCED DATABASE MANAGEMENT SYSTEMS (ELECTIVE III) (R) 3 – 1 - 0

Module I

Overview of relational database concepts- distributed DBMS – concepts and design- functions and architecture of DDBMS- distributed relational database design- transparencies in DDBMS- distributed transaction management- concurrency control deadlock management- distributed database recovery- replication servers- query optimization- mobile database

Module 2

Object DBMS- weaknesses of RDBMS- object oriented concepts- storing objects in relational database- OODBMS concepts and design – perspectives- persistence- issues in OODBMS- advantages and disadvantages- object group- object database standard – object store object-relational database examples

Module 3

Web technology and DBMS- web as application platform – data warehousing concepts – data warehouse architecture- online analytical processing – OLAP benchmarks, applications, benefits and tools – introduction to data mining

Text Book:

Database systems, a practical approach to design implementation and management – Thomas Connolly and Carolyn Begg, Pearson education

References:

1. Fundamentals of database systems – Elmasri and Navathe – Addison Wesley
2. Object oriented interfaces and databases – Rajesh Narang – PHI
3. Object oriented database systems: approaches and architectures – C S R Prabhu – PHI
4. Database management systems – R Panneerselvam, PHI
5. Data Warehousing – C S R Prabhu, PHI

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.706.4 COMPUTER SYSTEM DESIGN (ELECTIVE III) (R) 3 – 1 – 0

Module 1

Fundamentals of computer design- measuring and reporting performance- concept of memory hierarchy- hardware and software issues in the dsign of computer system- instruction set principles- memory addressing-type and size of operands- pipelining

Module 2

Advanced pipelining and instruction level parallelism- memory hierarchy design- storage systems- I/O performance measures- reliability- availability and RAID- designing an I/O system

Module 3

Interconnection networks- multiprocessors- RISC architecture- system development using a processor- evolving system dsign tools such as assembler- simulator- debug monitor- built in self test- board level design

Text Book:

Computer architecture: A quantitative approach – David A Patterson and John L Hennessey, Morgan Kauffmann
Refernece:

1. Computer system design and architecture- Vincent P heuring and Harry P Jordon – Pearson education
2. Advanced computer architecture: A design space approach – Deszo Sima, , Terence Fountain and Peter Kacsuk – Addison Wesley
3. Computer systems: A programmer's perspective – Randal E Bryant and David O'Hallaron – Pearson education

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.707 ALGORITHM DESIGN AND GRAPHICS LAB (R) 0 – 0 – 0 – 4

Line drawing algorithm, circle drawing algorithm, problems related to 2D transformations – Scaling, translation and rotation. Line clipping and polygon clipping algorithms. Polygon filling and hatching algorithms. Alphanumeric character generation. Animation, Transformation and projections of 3D objects, back face removal algorithm.

Representation of graphs using adjacency lists – implementation of graph searching algorithms – DFS and BFS. Generation of tree edges.

Implementation of Dijkstra's shortest path algorithm and graphic simulation.

Dynamic programming – matrix chain ordering and multiplication . All pair shortest path algorithm using dynamic programming.

Height balanced trees (Red-black tree) - insertion and deletion operations. Implementation of scan line algorithm for hidden surface elimination using height balanced trees.

03.708 PROJECT DESIGN AND SEMINAR (R) 0 – 0 – 4

PROJECT DESIGN : Students are to carry out detailed study of project they have to under take in the eighth semester. The preliminary work of the project viz. literature, survey, collection of materials and fabrication methodology etc. are to be investigated and make a report. The report will be evaluated for the award of sessional marks.

SEMINAR: Each student is required to select a topic connected with the branch of study and get it approved for a seminar to be presented in the class. Each student should also prepare a well documented report on the seminar as per an approved format and submit to the department at the time of his/her seminar presentation. The seminar and report will be evaluated for the award of sessional marks.

03.801 INTERNET TECHNOLOGY (R) 2 – 1 – 0

Module 1

Computer networks and the internet-principles i\of application layer protocols-HTTP-FTP- email –DNS-socket programming –web servers-web pages- Multimedia networking:-applications-streaming stored audio and video-internet telephony- RTP- scheduling and policing mechanisms- integrated services-RSVP-differentiated services-network management-the internet management frame work

Module 2

Network security-e-mail security-privacy-S/MIME –IP security-overview-architecture-authentication-header and payload-combining security associations-key management-web security-SSL and transport layer security-SET-systems security-intruders and viruses-firewalls-design-trusted systems

Module 3

Mobile internet-mobile network layer-mobile IP-dynamic host configuration protocol-ad hoc networks-mobile transport layer-implications of TCP on mobility-indirect TCP-snooping TCP- mobile TCP transmission-selective retransmission-transaction oriented TCP-support for mobility-file systems-WAP protocols-WML -wireless telephony applications

Text Books:

1.Computer Networking: A top down approach featuring the internet – Kurose J F and Ross K W, Addison Wesley

2.Cryptography and network security - Stallings W, Pearson education

3.Mobile communications – Schiller J, Addison Wesley

References:

1. Internet and world wide web: How to program – Dietel H M and Dietel Pj and Nieto T R, Pearson education
2. The wireless application protocol – Singhal S, Pearson education
3. Firewalls: A complete guide – Goncalves M, Tata McGraw Hill

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.802 COMPUTER ARCHITECTURE AND PARRALLEL PROCESSING (R) 3 – 1 – 0

Module 1

Introduction to parallel processing – Evolution, parallelism in uniprocessor systems, parallel computer structures, classification, schemes, principles of pipelining and vector processing – principles of designing pipelined processors – vector processing requirements, vectorization methods, the architecture of Cray – 1 Cyber 205.

Module 2

Structure and algorithms for array processors – SIMD processors, interconnection networks, associative array processing, The Iliac IV systems architecture – The MPP system architecture, Performance enhancement methods.

Module 3

Multiprocessor architecture – functional structures, interconnection networks – parallel memory organization – multiprocessor operating system – interprocess communication mechanisms – system – interprocess deadlock and protection, scheduling strategies, parallel algorithms, The C.mmp system architecture, The S – I multiprocessor system. Control flow versus data flow computers, data flow computer architecture, systolic array architecture.

Text books:

1. Computer Architecture and parallel Processing – K. Hawang & Briggs Mc Graw Hill International edition.

References:

1. Computer Architecture and Organization – H.P. Hayes, Mc Graw Hill.
2. The Architecture of pipelined Computer – P.M. Kogge Mc Graw Hill.
3. The Architecture of Symbolic Computers – Kogge Mc Graw Hill.
4. Advanced Computer Architectures – A design space approach – De ZSO Dima, Terence Fountain, Peter KACSUK.
5. Introduction to parallel processing – M Sasikumar, Dinesh Shikkare, P . Raviprakash- Prentice hall of India.
6. Parallel computers – Architecture and Programming : V Rajaraman , C Sivarama Moorthy - Prentice hall of India.

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.803 SOFTWARE ENGINEERING (R) 2 – 1 – 0

Module 1

Introduction to software engineering, scope of software engineering – historical aspects, economic aspects, maintenance aspects, specification and design aspects, team programming aspects. Software engineering a layered technology – processes, methods and tools. Software process models – prototyping models, incremental models, spiral model, waterfall model. Capability maturity model (CMM), ISO 9000. Phases in Software development – requirement analysis. Planning phase – project planning objective, software scope, empirical estimation, models, COCOMO, single variable model, staffing and personal planning.

Module 2

Risk management – risks, identification, risk projection, project planning and risk management. Software configuration management – configuration, identification, configuration control, software configuration management plans. Design phase – design objective, principles, data flow analysis, topdown, bottom up strategies, design methodology. Coding – programming practice, verification, size measures, complexity analysis, coding standards. Testing – fundamentals, white box testing, control structure testing, black box testing, basis path testing, code walkthroughs and inspection, testing strategies. Maintenance phase – management of maintenance.

Module 3

Introduction of object oriented design, pros and cons of object orientation, object oriented analysis & design methodology. GUI design, advantages, types of user interfaces. X – windows / motif systems and programming, Stepwise refinement, computer aided software engineering tools. Case study in software engineering.

Text books:

1. Software engineering – Rogger S Pressman, Tata Mc Graw Hill

References:

1. Software Engineering Fundamentals – Ali Behtorooz, Frederik J Huddson - Oxford University Press.
2. Software engineering with JAVA – Stephen R Schach Tata Mc Graw Hill

3. An integrated approach to software engineering – Pankaj jalote, Narosa publishers.
4. Software Engineering – Ian Sommerville, University of Lancastor, Addison Wesley.

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.804 DISTRIBUTED SYSTEMS (R) 2 – 1 – 0

Module 1

Characteristics of distributed System: Examples of distributed systems – resource sharing and web – world wide web – issues in the design of distributed system. System models: Architectural models and fundamental models. Networking and internetworking: Types of network – network principles – internet protocols

Module 2

Interprocess communication : the API for internet protocol – external data representation and marshalling – client server communication - group communication- case study: inter process communication in Unix. Distributed objects and remote invocation: communication between distributed objects – remote procedure call – Events and notification. Operating system support: Operating system layer – protection – processes and threads- communication and invocation – Operating system architecture security: Overview of security techniques

Module 3

Distributed file system: File service architecture - network file system- Andrew file system-recent advances Transactions and concurrency control: nested transactions-locks-optimistic concurrency control-comparison of methods for concurrency control-flat and nested distributed transactions- distributed deadlocks- transactions recovery. Replication System model and group communication- fault tolerant services-transactions with replicated data

Text Book:

Distributed Systems: Concepts and Design – George Coulouris, Jean Dollimore and Tim Kindberg, Pearson Education

References:

1. Distributed Systems: Principles and paradigms – Andrew S Tanenbaum and Maarten Van Steen – Pearson Education
2. Database Systems: A practical approach to design implementation and management – Thomas Connolly and Carolyn Begg - Pearson Education
3. Distributed Systems and Computer Networks – Morris Solomon and Jeff Krammer – PHI

Note:

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.805.1 EMBEDDED SYSTEMS (ELECTIVE IV) (R) 3 – 1 – 0

Module 1

Fundamentals of embedded systems- complex systems and microprocessors-
Embedded system design process – requirements- specifications- architecture design- design of hardware and software components- structural and behavioral description-
CPUs - i/o devices- i/o primitives- busy wait i/o- interrupts- supervisor mode- exception- traps- co-processors- caches- memory management- CPU performance.
Process and OS – multiple tasks- context switching- scheduling policies-, interprocess- communication mechanisms - Design examples**.**

Module 2

Embedded computing platform – CPU bus, memory devices- i/o devices- component interfacing- designing with microprocessor- Design & analysis of programs-Data flow graphs- basic compilation techniques- analysis & optimization of execution time- program size - Validation and testing- Design examples**.**

Module 3

Microcontrollers and embedded systems- microcontroller families- 8051 microcontroller-history- architecture- register banks and stack- instruction set- addressing modes- Programming- 8051 interrupts- interfacing 8051 to the keyboard.

Text books

1. Computers as components-principles of Embedded computer system design - Wayne Wolf, Morgan Kaufmann
2. The 8051 microcontroller and Embedded Systems - Muhammed Ali Mazidi,Janice Gillispie Mazidi, Pearson Education

References:

1. Fundamentals of Embedded system software - Daniel W Lewis, Pearson Education
2. Embedded system design - Steve Heath, Butter worth-Heinemann
3. Embedded system Design -Arnold. S. Berger - CMP Books

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.805.2 NEURAL COMPUTING (ELECTIVE IV) (R) 3 – 1 – 0

Module 1

Introduction – Brain and Computer – learning in biological systems and machines – the basic neuron – modeling a single neuron – learning in simple neurons – the perception – the perceptron learning rule – proof – limitations of perceptron – the multiplayer perceptron – Back Propagation network – Counter Propagation network.

Module 2

Kohnen self Organizing networks – introduction – the Kohnen algorithm – weight training – neighborhoods – reducing the neighborhood – the phonetic typewriter – Hopfield networks – introduction – the Hopfield model – the energy landscape – the Boltzman machine – constraint satisfaction.

Module 3

Adaptive resonance theory – architecture and operation – ART algorithm – training the ART network – classification – associative memory – Bi-directional associative memory – application of neural nets – pattern recognition.

Text Books :

Beale. R and Jackson. T, "Neural Computing – An Introduction" , Adam Hilger.

References :

1. Philip D. Wasserman, "Neural Computing – theory and practice", Van Nostrand and Reinhold, 1989.
2. James A. Freeman and David M. Skapura, "Neural Network Algorithms, application and programming techniques", Addison – Wesley publishing company, 1991.

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.805.3 CRYPTOGRAPHY AND NETWORK SECURITY (ELECTIVE IV) (R) 3 – 1 – 0

Module 1

Symmetric Cipher Models- Substitution techniques- Transposition techniques- Rotor machines- Steganography- DES: Simplified DES- Block Cipher principals- The Data Encryption Std.. The Strength of DES- Differential and linear Cryptanalysis- Block Cipher Design principles- Block Cipher modes of operations- IDEA: Primitive operations- Key expansions- One round, Odd round, Even Round- Inverse keys for description.

AES: Basic Structure- Primitive operation- Inverse Cipher- Key Expansion, Rounds, Inverse Rounds.

Module 2

Public key Cryptography and RSA functions:- Principles of Public key Cryptography Systems- RSA algorithms- Key Management - Diffie-Hellman Key Exchange, Elliptic curve cryptography- Authentication requirements- Authentication functions- Message authentication codes- Hash functions- Security of Hash functions and MACS- Digital signatures- Authentication protocols- Digital signature standards.

Module 3

Network security: Electronic Mail Security: Pretty good privacy- S/MIME

IP Security: Architecture- authentication Header- Encapsulating Security payload-

Combining Security associations- Key management- Web Security: Web Security considerations- secure Socket Layer and Transport layer Security- electronic translation. Firewalls-Packet filters- Application Level Gateway- Encrypted tunnels

Text Book:

Cryptography and Network Security – William Stallings, Pearson

References:

Network Security-Charlie Kaufman, Radia Perlman, Mike Speciner

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.805.4 REAL TIME SYSTEMS (ELECTIVE IV) (R) 3 – 1 – 0

Module 1

Architecture for computer Control Systems : Centralizes Architecture, Distributed Computer Control Architecture, Data Highway System, Digital Control Algorithms, Introduction to Computer Control, Self Tuning & Adaptive Algorithms, Supervisory Control Systems, Introduction , Multilayer Hierarchical Structures, System Decomposition, Open - loop Coordination and parameter estimation (ISOPE), Double Interactive strategies, Illustrative example.

Module 1

Construction of software for real time computer control system : Introduction, Problems of real time software construction, Design techniques and tools, MASCOT, Structures of Development of real times systems, Dependability, fault detection and fault tolerance, use of redundancy, fault tolerance in mixed hardware - software systems, fault detection measures, fault detection mechanisms, Damage containment and assessment, Provision of fault tolerance. Languages for real time control : Basic requirements, Software components, Creation and management of tasks, Interrupts and device handling, Communication between software components, Mutual exclusion, Exception handling, Expert systems in real time, Applications of knowledge based systems for process management.

Module 1

Real Time Operating Systems : Real Time Multitasking Operating Systems, Task Management, Task Scheduling and Dispatch, Task Co-Operation and Communication, Producer Consumer Problem, Distributed Processing : Distributed data, Distribute Control, Computer Aided Control System Design : Personal Computer Software Packages for Control System Design : An Introduction, Modeling sand simulation, Control System Analysis and Design Package, System Identification,, PC-MATLAB and PC-MATLAB based software packages : An Introduction, Basics of MATLAB, Matrix Operations and functions, Relational and Logical Operations, Vectors and subscript, Control Flow Constructs, M Files and Functions, Other Features, Control System Toolbox, System Identification Tool Box, Multivariable Frequency Domain Toolbox, Turning methods

Reference :

1 Distributed Computer Control Systems – S S lamba & Y P Singh, **“**

2 Real Time Systems Development – Sylvia Goldsmith, Prentice Hall

3 Real Time Systems – Ian Pyle, Peter Hruschka, et al, Wiley Series

Note:

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.806.1 ARTIFICIAL INTELLIGENCE AND EXPERT SYSTEM (ELECTIVE V) (R) 3 – 1 – 0

Module 1

Introduction to artificial intelligence – architecture of artificial intelligence system. Problem Solving :- problems and problem spaces, problem definition – production system – control strategies – search strategies – problem characteristics – production system characteristics.
Problem solving Methods :- Forward, backward reasoning, problem graphs – matching Heuristic functions – weak methods – measure of performance and analysis of search algorithm.
Game Playing :- Min max search procedure – Alpha – Beta cut offs.

Module 2

Knowledge Representation :- Representation using predicate logic, introduction to predicate calculus – Resolution – Resolution in propositional and predicate logic – uniform algorithm – Question – Answering. Natural deduction. Knowledge representation using other logic. Structure representation of knowledge.
Planning :- Natural language understanding – perception learning – Introduction to AI languages.

Module 3

An overview of expert systems. Type of expert systems, their components and architecture. Knowledge acquisition, inter knowledge – Heuristics – Knowledge representation – production based system, frame based system.
Inference :- backward chaining, forward chaining, rule value approach, Fuzzy reasoning – certainty factors – Constructing an expert system – Languages and tools – Typical expert system examples.

Text books:

1. Elaene Rich – Artificial Intelligence – Mc Graw Hill.

References:

Note :

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.806 2. GRAPH THEORY (ELECTIVE V) (R) 3 – 1 – 0

Module 1

What is graph – Application of graphs – finite and infinite graphs – Incidence and Degree – Isolated vertex, pendent vertex, Null graph.
Paths and circuits – Isomorphism, sub graphs, walks, paths and circuits, Connected graphs, disconnect graphs, Euler graphs Hamiltonian paths and circuits – Traveling salesman problem.
Trees – properties, pendent vertex, Distance and centres Rooted and binary tree, counting trees, spanning trees.

Module 2

Combinatorial versus geometric graphs, Planar graphs, Different representation of planar graphs, geometric dual, combinatorial dual, vector spaces of graph, ban2 vectors of a graph, orthogonal vectors and spaces Directed graphs – types of digraphs, Digraphs and binary relation, Euler graphs, trees with directed edges.

Module 3

Graphs theoretic algorithms and computer programming
Algorithms computer representation of a graph, algorithm for connectedness and components, spanning tree, directed circuits, shortest path, searching the graphs, Isomorphism.
Graphs in switching and cording theory – contact networks, Analysis of contact Networks, synthesis of contact networks, sequential switching networks, unit cube and its graph, graphs in coding theory.

Text books:

Graph theory – Narasingh Deo, PHI.

References:

1. Graphs theory applications – L.R. Foulds, Narosa.
2. Graph theory – Hararay, Narosa.
   A first look at graph theory – John clark and Derek Allan Hotton, Allied.

Note :

Question papers consist of two parts.
Part A (40 marks) Compulsory ten short questions (10 x 4)
Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.806.3 VLSI SYSTEM DESIGN (ELECTIVE V) (R) 3 – 1 – 0

Module 1

Introduction to MOS technology- IC technology- MOS and VLSI- NMOS and CMOS fabrication- thermal aspects- MOS circuits tub ties and latch up – wire parasitic- design rules and layouts- multiplayer CMOS process- layout diagrams- stick diagrams- hierarchical stick diagrams- layout design analysis tools

Module 2

Logic gates- review of combinational logic circuits- basic gate layouts- delay- power consumption- speed power product- wires and delay- combinational logic networks- layout design methods- network delay- cross talk- power optimization- switch logic networks- sequential machines –latches and flip flops- sequential system design- subsystem design- pipelining- data paths- ALU,ROM, RAM, PLA- multipliers

Module 3

Floor planning methods- floor plan of a 4 bit processor- off chip connections- architecture design- register transfer design- architecture for loe power- architecture testing- CAD systems and algorithms- VHDL-simulation- layout synthesis

Text Book:

Modern VLSI design – Wayne Wolf, Pearson education

References:

1. Basic VLSI design:– systems and circuits- Puck Nell D A and Eshraghm K
2. Introduction to VLSI design – Mead C, Conway L – Addison Wesley

Note :

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.806.4 WIRELESS NETWORKS (ELECTIVE V) (R) 3 – 1 – 0

Module 1

Introduction: Wireless Networks, Transmission Fundamentals: Analog And Digital Data Transmission, Channel Capacity, Media & Multiplexing.

Communication networks: LANS, MANS & WANS. Switching techniques, ATM.

Protocol Architecture**:** TCP / IP and OSI, internetworking.

Telecommunication Systems: GSM - Mobile services, System Architecture, protocol.

Module 2

Wireless communication Technology: Antenna & Propagation, Signal Encoding Criteria: Digital & Analog Data, Spread Spectrum: Frequency Hoping & Direct Sequence.

Coding & error control: Error Detection & Correction Methods.

Wireless Networking: Satellite Communication: Capacity Allocation – Frequency Division & Time Division..

Cellular Wireless Networks: Principles, TDMA, CDMA, Cordless Systems, WLL, Mobile IP, WAP.

Module 3

Wireless LANS: Wireless LAN Technology – Introduction. Infra Red Transmission Radio Transmission, Ad-Hoc Network.

Wireless LAN Standards – IEEE 802 Protocol Architecture, IEEE 802.11 System Architecture, Protocol Architecture & Services, MAC Layer & Management. Wireless ATM.

HIPERLAN: Requirements & Architecture. BLUETOOTH: Architecture & Protocol Stack.

Text book.

1. Wireless Communication And Networks – William Stallings- Pearson Education

References:

1. Principles Of Wireless Networks – Kaveh Pahlavan & Prashant Krishnamurthy, Pearson Education.
2. Mobile Communication – Jochen Schiller, Pearson Education
3. Wireless and Mobile Network Architecture. – John Wiley & Sons.
4. Wireless LANS – Implementing Interoperable Network – Lin & Chlamtac.

Note :

Question papers consist of two parts.

Part A (40 marks) Compulsory ten short questions (10 x 4)

Part B (60 marks) Three modules. Students must answer one out of two from each module.

03.807 OPERATING SYSTEMS AND NETWORKING LAB (R) 0 – 0 – 4

Implementation of dining philosophers problem by multiprogramming using threads, semaphores and shared memory

Program to generate disk usage status report for a given Unix/Dos formatted floppy disk giving details like free space availability etc.

Implementation of bankers algorithm

Inter-process communication using mail boxes and pipes

Lab1: Implementation of PC to PC file transfer using serial port and MODEM

Software simulation of Medium Access Control protocols

1. Go Back N. 2. Selective Repeat and 3. Sliding Window

Implementation of a sub set of simple mail transfer protocol using UDP

Implementation of a sub set of a file transfer protocol using TCP/IP

Implementation of finger utility using remote procedure call (RPC)

Generation and processing of HTML forms using CGI

03.808 PROJECT WORK AND VIVA – VOCE (R) 0 – 0 – 4

At the time of viva-voce the candidate's project has to be evaluated in addition to assessing the students overall ability and the knowledge in the specified field of engineering. He/she is expected to present his/her academic records including project report, seminar report, etc. at the time of viva-voce examination.