



ANNA UNIVERSITY
Chennai-25.
Syllabus for

B.E.(Full Time) Computer Science and Engineering

CM131 Chemistry I **2 1 2 4**

1. CHEMICAL THERMODYNAMICS **9**

Definition of free energy and spontaneity-Maxwell relations-Gibbs - Helmholtz equation - Van't Hoff equations-Stoichiometry and energy balances in Chemical reactions.

2. DYNAMICS OF CHEMICAL PROCESSES **10**

Basic concepts - composite reactions (opposing, parallel and consecutive reactions) - Collision theory - Thermodynamic formulation of reaction rates - unimolecular reactions - Chain reactions (Stationary and non-stationary) - Enzyme Kinetics - Michaelis-Menten Equation.

3. ELECTRODICS **8**

Types of electrodes and cells-Nernst Equation-EMF measurement and its applications-Principles of chemical and electrochemical corrosion-corrosion control (Sacrificial anode and impressed current methods).

4. WATER **8**

Water quality parameters-Definition and expressions-Estimation of hardness (EDTA method) - Alkalinity (Titrimetry)-Water softening (zeolite)-Demineralisation (Ion exchangers) and desalination (RO) - Domestic water treatment.

5. POLYMERS **10**

Monomer-Functionality-Degree of polymerisation - Classification based on source and applications-Addition, Condensation and copolymerisation-Mechanism of free-radical polymerisation - Thermoplastics and thermosetting plastics - Processing of plastics - Injection moulding, blow moulding and extrusion processes.

6. PRACTICALS **30**

I. Water Analysis : Determination of hardness, alkalinity, DO, Fe(spectrophotometry) and Na and K (Flame photometry).

II. Electrochemistry and corrosion experiments.

III. Polymer experiments.

Total No of periods: 75

Text Books:

1. *Alkins P.W. "Physical Chemistry", ELBS, IV Edition, 1998 London*

References:

1. *Balasubramanian M.R., Krishnamoorthy S. and Murugesan V., "Engineering Chemistry", Allied Publisher Limited., Chennai 1993.*
2. *Karunanidhi M., Ayyaswamy N., Ramachandran T and Venkatraman H., "Applied Chemistry", Anuradha Agencies, Kumbakonam 1994.*
3. *Sadasivam V., "Modern Engineering Chemistry - A Simplified Approach", Kamakya Publications, Chennai 1999.*
4. *Kuriakose J.C. and Rajaram J., "Chemistry in Engineering and Technology", Vol. I and II, Tata McGraw-Hill Publications Co.Ltd, New Delhi 1996.*
5. *P.C.Jain and Monica Jain, Engineering Chemistry, Dhanpat Rai Publications Co.,(P) Ltd., New Delhi,1998.*

1. BASICS 5

Introduction-Units and Dimensions-Laws of Mechanics-Vectors - Vectorial representation of forces and moments-Vector operations.

2. STATICS OF PARTICLES 8

Coplanar Forces-Resolution and Composition of forces- Equilibrium of a particle-Forces in space-Equilibrium of a particle in space-Equivalent systems of forces-Principle of transmissibility-single equivalent force

3. EQUILIBRIUM OF RIGID BODIES 7

Free body diagram-Types of supports and their reactions-requirements of stable equilibrium-Equilibrium of Rigid bodies in two dimensions-Equilibrium of rigid bodies in three dimensions.

4. PROPERTIES OF SURFACES AND SOLIDS 11

Determination of Areas and Volumes-First moment of area and the centroid-second and product moments of plane area-Parallel axis theorems and perpendicular axis theorems-Polar moment of inertia-Principal moments of inertia of plane areas- Principal axes of inertia-Mass moment of inertia-relation to area moments of inertia.

5. FRICTION 4

Frictional Force-Laws of Coloumb friction-Simple Contact friction - Rolling Resistance-Belt Friction.

6. DYNAMICS OF PARTICLES 16

Displacment, Velocity and acceleration their relationship-Relative motion-Curvilinear motion-Newton's Law-Work Energy Equation of particles-Impulse and Momentum-Impact of elastic bodies.

7. ELEMENTS OF RIGID BODY DYNAMICS 8

Translation of Rotation of Rigid Bodies-Velocity and acceleration-General Plane motion-Moment of Momentum Equations-Rotation of rigid Body-Work energy equation

Total No of periods: 59

Text Books:

1. *Beer and Johnson, "Vector Mechanics for Engineers, Vol.1 Statics and Vol.2 Dynamics" McGraw Hill International Edition, 1995.*
2. *Meriam, "Engineering Mechanics", Vol.1 Statics and Vol.2, Dynamics 2/e, Wiley International, 1988.*

References:

1. *Rajasekaran.S. and Sankara Subramanian,G. "Engineering Mechanics - Statics and Dynamics".*
2. *Irving H.Shames, "Engineering Mechanics - Statics and Dynamics", Thrid Edition, Prentice-Hall of India Pvt.Ltd., 1993.*
3. *Mokoshi, V.S., "Engineering Mechanics Vol.1 Statics and Vol.2 Dynamics", Tata McGraw Hill Books, 1996.*
4. *Timoshanko and Young "Engineering Mechanics" 4/e, McGraw Hill, 1995.*
5. *McLean "Engineering Mechancis ", 3/e SCHAUM Series 1995.*

(Revised Syllabus For B.E. / B.Tech. Programmes - Effective From June 2002)

1. MATRICES	9
Characteristic equation - Eigenvalues and eigenvectors of a real matrix - Properties of eigenvalues - Cayley-Hamilton theorem - Orthogonal reduction of a symmetric matrix to diagonal form - Orthogonal matrices - Reduction of quadratic form to canonical form by orthogonal transformation.	
2. THREE DIMENSIONAL ANALYTICAL GEOMETRY	9
Direction cosines and ratios - Angle between two lines - Equation of a plane - Equation of a straight line - Coplaner lines - Shortest distance between skew lines - Sphere - Tangent plane - Plane section of a sphere - orthogonal spheres.	
3. GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS	9
Curvature - cartesian and polar coordinates - Circle of curvature - Involutives and Evolutes - Envelopes - properties of envelopes - Evolute as envelope of normals.	
4. FUNCTIONS OF SEVERAL VARIABLES	9
Functions of two variables - Partial derivatives - Total differential - Differentiation of implicit functions - Taylor's expansion - Maxima and Minima - Constrained Maxima and Minima by Lagrangean Multiplier method - Jacobians - differentiation under integral sign.	
5. ORDINARY DIFFERENTIAL EQUATIONS	9
Simultaneous first order linear equations with constant coefficients - Linear equations of second order with constant and variable coefficients - Homogeneous equation of Euler type - equations reducible to homogeneous form - Method of reduction of order - Method of variation of parameters.	
6. TUTORIAL	15

Total No of periods: 60

Text Books:

1. Kreyszig, E., "Advanced Engineering Mathematics" (8th Edition), John Wiley and Sons (Asia) Pte Ltd., Singapore, 2001
2. Veerarajan, T., "Engineering Mathematics", Tata McGraw Hill Publishing Co., NewDelhi, 1999.

References:

1. Grewal, B.S., "Higher Engineering Mathematics" (35th Edition), Khanna Publishers, Delhi , 2000.
2. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics", Volume I (4th Revised Edition), S. Chand & Co., New Delhi, 2000.
3. Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiah, G., "Advanced Mathematics for Engineering Students", Volume I (2nd Edition), S. Viswanathan (Printers & Publishers), 1992.
4. Venkataraman, M.K. "Engineering Mathematics - First year " National Publishing Company, Chennai (2nd Edition), 2000.

1. PROPERTIES OF MATTER 9

Elasticity-stress-strain diagram-factors affecting elasticity - Twisting couple on a wire-Shafts-Torsion pendulum-Depression of a cantilever- Young's modulus by cantilever-Uniform and Non Uniform bending-I shape girders-Production and measurement of high vacuum-Rotary pump-Diffusion pump-Pirani Gauge-Penning gauge-Viscosity-Oswald Viscometer-Comparision of viscosities.

2. ACOUSTICS 9

Acoustics of buildings-Absorption coefficient-Intensity-Loudness-Reverberation time-Sabine's formula-Noise pollution-Noise control in a machine-Ultrasonics-production-Magnetostriction and Piezoelectric methods-Applications of ultrasonics in Engineering and Medicine.

3. HEAT AND THERMODYNAMICS 9

Thermal conductivity-Forbe's and Lee's Disc methods-Radial flow of heat-Thermal conductivity of rubber and glass-Thermal insulation in buildings-Laws of thermodynamics-Carnot's cycle as heat engine and refrigerator-Carnot's theorem-Ideal Otto and Diesel engines-Concept of entropy-Entropy Temperature diagram of carnot's cycle.

4. OPTICS 9

Photometry-Lummer Brodhum photometer-Flicker Photometer-Antireflection coating-Air wedge-Testing of flat surfaces-Michelson's Interferometer and its applications-Photoelasticity and its applications-Sextant-Metallurgical microscope-Scanning electron microscope.

5. LASER AND FIBRE OPTICS 9

Principle and lasers-laser characteristics-Ruby-NdYAG, He-Ne, CO₂ and semiconductor lasers-propagation of light through optical fibers-types of optical fibre-Applications of optical fibres as optical waveguides and sensors.

6. PRACTICALS 30

1. Young's modulus by nonuniform bending
2. Rigidity modulus and moment of inertia using Torsion Pendulum
3. Viscosity of a liquid by Poiseuille's method
4. Wavelength determination using grating by Spectrometer
5. Particle size determination by Laser
6. Thermal conductivity by Lee's disc.
7. Thickness of wire by Air wedge
8. Thermo emf measurement by potentiometer

Total No of periods: 75

Text Books:

Arumugam.M. "Engineering Physics," Anuradha Publications, 1998.

References:

- 1. Resnik.R. and Halliday.D., " Physics," Wiley Eastern, 1986.*
- 2. Nelkon.M., and Parker.P., "Advanced Level Physics", Arnold-Heinemann, 1986.*
- 3. Vasudeva A.S., "Modern Engineering Physics", S. Chand and Co., 1998..*
- 4. Gaur,R.K., and Gupta,S.L."Engineering Physics," Dhanpat Raj and Sons,1988.*
- 5. Mathur, D.S," Elements, of properties of Matter", S.Chand & Co., 1989.*

1. FUNDAMENTALS OF COMPUTERS AND OPERATING SYSTEMS	4
Evolution of Computers-Organization of Modern Digital Computers-Single user Operating System-Multitasking OS-GUI	
2. OFFICE AUTOMATION	11
a) Word Processing	
b) Data Base Management System	
c) Spread Sheet Package	
d) Presentation Software	
3. PRACTICALS	45
Total No of periods:	60

Text Books:

1. *"Computers and Computation - A Beginner's Guide", Ghosh Dastidar, Chattopadhyay and Sarkar, Prentice Hall of India, 1999.*

References:

1. *Microsoft Office 97, Nelson, Tata McGraw Hill, 1999.*
2. *"PC Software for Windows Made Simple", Taxali, Tata McGraw Hill, 1999.*

GE133 Workshop Practice

0 0 4 2

1. SHEET METAL 10

Tools and Equipments - Fabrication of tray, cone, etc., with sheet metal

2. WELDING 10

Tools and Equipments - Arc Welding of butt joint, Tap Joint, Tee fillet etc., Demonstration of gas welding.

3. FITTING 10

Tools and Equipments- Practice in Chipping, Filing, Drilling - making Vee joints, square and dove tail joints.

4. CARPENTRY 10

Tools and Equipments-Planning Practice-making halving joint and dove tail joint models.

5. FOUNDRY 10

Tools and Equipments Preparation of moulds of simple objects like flange, gear V- grooved pulley etc.,

6. SMITHY 10

Tools and Equipments - Demonstration for making simple parts like keys, bolts etc.

Total No of periods: 60

References:

1. *V.S.Venkatachalapathy, First Year Engineering Workshop Practice, Raamalinga Publications, Madurai, 1999.*
2. *P. Kanaiah and K.C. Narayana, Manual on Workshop Practice Scitech Publications, Chennai, 1999.*

1. PROGRAM DEVELOPMENT 5

Top-down approach-Bottom-up approach-Stepwise refinement-Modularity_Pseudo code-Sequence-Selection-Iteration-Recursion-Structured Programming Methodologies.

2. C LANGUAGE 10

Primitive Data Types-Control-Function-Aggregate data types-Input/Output-Preprocessor.

3. LINEAR DATA STRUCTURES 12

Lists-Stacks-Queues-Representation using arrays-Singly linked lists-doubly linked lists-application.

4. NONLINEAR DATA STRUCTURES 10

Trees-Binary trees-Representation-Traversals-Binary search trees-Tables-Representation-Hashing techniques.

5. SEARCHING, SORTING AND FILES 8

Linear search-Binary search-Insertion sort-Bubble sort-Files-Sequential-Random.

6. TUTORIAL 15

Total No of periods: 60

Text Books:

1. *Kruse R.L., Tondo C.L. and Leung B.P, "Data Structures and Program Design in C", Prentice Hall, 1997.*
2. *Tenenbaum A.M and Augenstein M.J, "Data Structures using C", Prentice Hall of India, 1997.*

References:

1. *Alkelly and Iro Pohl, "A Book on C ", Addison Wesley, 1998.*
2. *Horowitz, Sahni, Mehta, "Fundamentals of Data Structures in C", Galgotia Publication, 1997.*
3. *Brian W.Kernigham and Pike R., "The Practice of Programming", Addison Wesley, 1999.*
4. *Yuksel Uckan, "Problem Solving Using C", McGraw Hill, 1999.*
5. *Brian W.Kernigham and Dennis Ritchie, "C Programming Language", Prentice Hall of India. 1990.*

1. LOGIC	9
Statements-Truth Tables-connectives-Normal forms-Predicate Calculus-Inference theory for statement calculus and Predicate Calculus.	
2. COMBINATORICS	9
Review of Permutation and combination-Mathematical Induction-Pigeon hole principle-Principle of inclusion and exclusion-Generating function-Recurrence relations.	
3. GROUPS	9
Semi groups-Monoids-groups-permutation group-Consets-Lagranges theorem-Group homomorphism-Kernal-Rings and Fields (definitions and Examples only).	
4. LATTICES	9
Partial ordering- Posets-Hasse diagram-Lattices-Properties of Lattices-Sub Lattices-Special Lattices-Boolean Algebra.	
5. GRAPHS	9
Introduction to Graphs-Graph terminology-Representation of Graphs-Graph Isomorphism-Connectivity-Euler and Hamilton Paths.	
6. TUTORIAL	15

Total No of periods: 60

Text Books:

1. *"Discrete Mathematical Structures with Applications to Computer Science"*, by Tremblay J.P, and Manohar R., McGraw Hill Book Company, 1975, International Edition, 1987. Sections: 1-2.1 to 1-2.4; 1-2.6 to 1-2,14; 1-3.1 to 1-3.5; 1-4. 1 to 1-4.3; 1-5.1 to 1-5.5; 1-6.4 and 1-6.5 for Logic. Sections: 3-1.1 to 3-2.3; 3-5.1 to 3-5.5 for Groups Rings and Fields. Sections: 2-3.8 and 2-39; 4-1.1 to 4.2.2 for Lattices.
2. *"Discrete and Combinatorial mathematics"*, Ralph P., Grimaldi, Addison-Wesley Publishing Company, Reprinted in 1985. Sections : 1.1. to 1.3; 4.1 and 4.2.; 5.5; 8.1 to 8.3; 9.1 to 9.5; 10.1, 10.2 and 10.4 for Combinatorics.
3. *"Discrete Mathematics and its Applications"*, Kenneth H.Rosen, McGraw Hill Book Company, 1999. Sections: 7.1 to 7.5.

Internet References:

The following URL (Universal Resource Locator) can also be contacted for Lecture Notes on Discrete Mathematics.

- (a) <http://www.mhhe.com/math/advmath/rosen/index.mhtml#aboutau>.
- (b) <http://www.cs.stedwards.edu/~phil/Math24/Lectures/index.htm>.
- (c) <http://www.ms.uky.edu/~jlee/DiscreteMath.html> (you may need a java enabled browser to view this)

(Revised Syllabus For B.E. / B.Tech. Programmes - Effective From June 2002)

- 1. MULTIPLE INTEGRALS 9**
 Double integration in Cartesian and polar coordinates - Change of order of integration - Area as a double integral - Triple integration in Cartesian coordinates - Change of variables - Gamma and Beta functions.
- 2. VECTOR CALCULUS 9**
 Curvilinear coordinates - Gradient, Divergence, Curl - Line, surface & volume integrals - Statements of Green's, Gauss divergence and Stokes' theorems - Verification and applications.
- 3. ANALYTIC FUNCTIONS 9**
 Cauchy Riemann equations - Properties of analytic functions - Determination of harmonic conjugate - Milne-Thomson's method - Conformal mappings : Mappings $w = z + a$, az , $1/z$, z^2 and bilinear transformation.
- 4. COMPLEX INTEGRATION 9**
 Cauchy's theorem - Statement and application of Cauchy's integral formulae - Taylor's and Laurent's expansions - Singularities - Classification - Residues - Cauchy's residue theorem - Contour integration - Circular and semi Circular contours (excluding poles on real axis).
- 5. STATISTICS 9**
 Moments - Coefficient of correlation - Lines of regression - Tests based on Normal and t distributions, for means and difference of means - Chi Square test for goodness of fit.

Total No of periods: 45

Text Books:

1. Kreyszig, E., "Advanced Engineering Mathematics" (8th Edition), John Wiley and Sons, (Asia) Pte Ltd., Singapore, 2000.
2. Grewal, B.S., "Higher Engineering Mathematics" (36th Edition), Khanna Publishers, Delhi 2001

References:

1. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics", Volumes I & II (4th Revised Edition), S. Chand & Co., New Delhi, 2001.
2. Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiyah, G., "Advanced Mathematics for Engineering Students", Volumes I & II (2nd Edition), S. Viswanathan (Printers & Publishers, Pvt, Ltd.), 1992.
3. Venkataraman, M.K. "Engineering Mathematics III - A", National Publishing Company, Chennai, (13th Edition), 1998.

1. SEMICONDUCTING MATERIALS 9

Structure and bonding Schrodinger's equation-Partical in a box Density of states-Intrinsic conductivity-Extrinsic semiconductors-PN junction theory LED-Materials used in computers and communication system-PIN photo diodes- Frequency response of silicon photo diodes-High speed and long wavelength photo diodes.

2. MODERN ENGINEERING MATERIALS 9

Super conducting materials-High Tc super conductors-Applications= Liquid crystals-Liquid crystal display systems-Merits and demerits-Metallic glasses and their applications-Shape memory alloys and applications-IC packaging materials.

3. OPTOELECTRONIC SWITCHIGN DEVICES 9

Analog and digital modulators-Franz keldysh and strak effect modulators-Quantum well-Electro absorption modulators-Electro optics modulators-Optical switching and logic devices.

4. FIBER OPTICAL COMMUNICATIONS 9

Principles of ligh transmission through fiber-fiber index profiles-Modes of propagation-Losses in fibers-Dispersion-Ligh sources for fiber optics-Fiber optic communication link-Modulators and detectors-Fiber optic communication link-Modulators and detectors-Fiber amplifiers-Soliton based coherent optical fiber communication.

5. MAGNETIC/OPTICAL DATA STORAGE MATERIALS 9

Magnetic material parameters-Bubble materials-rare earth garnets-Disk memories-Flexible disk storage systems-Floppy disks-Tapes and drives-Charge coupled devices(CCD)-Optical data storage-Disk data storage-Recording and read out of information-CD ROM-Magneto-optical recording and read out-Different storage and retrieval techniques-Holographic optical data storage.

Total No of periods: 45

Text Books:

1. *John Allison, "Electronic Engineering Materials and Devices", Tata McGraw Hill, 1985.*

References:

1. *Arumugam M., "Material Science", Anuradha publishers, 1997.*
2. *Gerd Geiser, "Optical Fiber Communications", McGraw Hill, 1993.*
3. *Pallab Bhattacharya, "Semiconductors Optoelectronic Devices", Prentice Hall of India, 1995.*
4. *Thomas C. Bartee, "Computer Architecture and Logic Design", McGraw Hill, 1991.*

1. PRINCIPLES OF GRAPHICS 16

Two-dimensional geometrical construction-Conic sections, Involutives and Cycloids-Representation of three dimensional objects-Principles of Projections-Standard codes of principles.

2. ORTHOGRAPHIC PROJECTIONS 28

Projections of points, straight lines and planes - Auxiliary projections - Projection and sectioning of solids - Intersection of surfaces - Development of surfaces.

3. PICTORIAL PROJECTIONS 8

Isometric projections - Perspectives , Free hand Sketching.

4. COMPUTER GRAPHICS 8

Hardware - Display technology - Software - Introduction to drafting software.

Total No of periods: 60*Text Books:*

1. Narayanan K.L. and Kannaiyah P. 'Engineering Graphics', 1992.

References:

1. William M. Neumann and Robert F. Sproul, 'Principles of Computer Graphics', McGraw Hill, 1989.
2. Warren J. Luzadder and John M. Duff, 'Fundamentals of Engineering Drawing', Prentice Hall of India Private Ltd., Eastern Economy Edition, 1995.
3. Natarajan K.V., 'Text Books: of Engineering Drawing', Private Publication, Madras, 1990.
4. Mathur M.L. and Vaishwanar R.S., 'Engineering Drawing and Graphics', Jain Brothers, New Delhi, 1993.

CS231 Introduction to Analysis of Algorithms

3 1 0 4

1. ADVANCED DATA STRUCTURES 9

Heaps-Height Balanced Trees-Applications-Graphs-Representations-Traversal.

2. ALGORITHM ANALYSIS 12

Mathematical foundations-Big "oh" notation-Searching-Worst case - Tournament method-Finding the largest and second largest-lower bound-Time space requirements.

3. SORTING AND STRING MATCHING ALGORITHMS 9

Quick Sort-Heap Sort-Merge Sort-External Sort-String Matching-Knuth-Morris Pratt algorithm-Analysis.

4. GRAPH ALGORITHMS 6

Minimal spanning trees-Shortest paths-Cut vertices-Bi-connected Components-Analysis.

5. "HARD" PROBLEMS 9

Definition-Examples-Approximation Algorithms-Classical Problems-Solutions.

6. TUTORIAL 15

Total No of periods: 60

Text Books:

Sara Baase, "Computer Algorithms-Introduction to Design and Analysis", Addison-Wesley Publishing Company, 1991.

References:

- 1. Thomas H.Cormen, Charles E.Leiserson, Ronald L.Rivest, "Introduction to Algorithms", Prentice Hall of India Pvt.Ltd. 1998.*
- 2. Ellis Horowitz, Sartaj Sahni, Sanguthevar Rajasekaran, "Computer Algorithms", Galgotia Publications Pvt.Ltd, 1999.*
- 3. Donald E.Knuth, "The Art of Computer Programming", Volume 3, Second Edition, Addison_Wesley Publishing Company, 1999.*

1. NUMBER SYSTEMS AND BOOLEAN ALGEBRA	10
Binary number systems and conversion-Binary arithmetic-Binary codes-Boolean algebra-Basic operations-Basic Theorems-Boolean functions-Canonical forms-Simplification of Boolean functions-Karnaugh maps-Tabulation method-Digital logic gates-Integrated circuits.	
2. COMBINATIONAL LOGIC	12
Multilevel gate networks-NAND and NOR gates-Multiple output network-Multiplexers-Decoders-Network for arithmetic operations-Iterative networks-Combinational network design-Read only memories-Programmable logic devices.	
3. SEQUENTIAL LOGIC	12
Gate delays and timing diagrams-Flip flops-Analysis of clocked sequential networks-State reduction-Sequential network design-Registers-Counters-Shift registers.	
4. ALGORITHMIC STATE MACHINES(ASM)	11
ASM Charts-Timing considerations-Derivation of ASM charts-Realization of ASM charts-Control implementations-Design examples-Analysis and Design of asynchronous sequential networks-State assignment and races-Flow table reduction-Hazards.	
5. TUTORIAL	15
Total No of periods: 60	

Text Books:

1. Charles H.Roth Jr., "Fundametnals of Logic Design", IV edition, Jaico publishing house, Mumbai 1999.

References:

1. Ronald J.Tocci, "Digital System: Principles and Applications", 6th Edition, PHI, 1997.
2. M.Morris Mano, "Digital Design", II Edition, Prentice Hall, 1996.
3. Thomas C.Bartee, "Computer Architecture and Logic Design", Tata McGraw Hill Publishing, 1997.
4. James E.Palmer, David E.Perlman, "Introduction to Digital Systems", Tata McGraw Hill Publishing Co., Ltd., 1996.

1. INTRODUCTION	9
Basic concepts-Machine structure-Instruction formats-Addressing modes-Typical Architectures.	
2. ASSEMBLERS	9
Functions-Features-Machine dependent-Machine independent-Design options-One pass-Multipass-Implementation-Examples.	
3. LOADERS AND LINKERS	9
Functions-Features-Relocation-Program Linking-Linking loader implementation-Automatic library search-Loader option-Linkage editors-Dynamic linking-Bootstrap loaders-Examples.	
4. MACROPROCESSORS	9
Functions-Macro parameters-Using labels-Conditional macro expansion-Recursive macro expansion-General purpose macro processors-Examples.	
5. COMPILERS AND UTILITIES	9
Introduction to Compilers-Different phases of a compiler-Simple one pass compiler-Code optimization techniques-System Software tools-Implementation of editors-Debuggers.	
Total No of periods:	45

Text Books:

1. L.Beck, "System Software, An Introduction to System Programming", Addison Wesley, 1999.

References:

1. D.M.Dhamdhare, "Systems Programming and Operating Systems", Tata McGraw Hill Company, 1999.
2. A.V.Aho, Ravi Sethi and J.D.Ullman, "Compilers Principles, Techniques and Tools", Addison Wesley, 1988.

1. INTRODUCTION	5
Database Management Systems-Data views-Architecture-Data models-Data Dictionary-Relational Databases.	
2. RELATIONAL APPROACH	8
Relational Model-Relational Algebra-Query languages-SQL-Embedded SQL.	
3. DATABASE DESIGN	12
Relational database Design-Integrity Constraints-Pitfalls in Design-Functional Dependencies-Normalization-Introduction to ER model-Physical Database organization-Indexing and Hashing.	
4. IMPLEMENTATION TECHNIQUES	10
Query processing-Transaction Processing-Concurrency control-Recovery.	
5. CURRENT TRENDS	10
Commercial database Systems- Distributed Databases-Object Oriented Databases-Object Relational Databases-Data mining and Data Warehousing.	
Total No of periods:	45

Text Books:

1. Abraham Silberschatz, Henry F.Korth, S.Sudharshan, "Database System Concepts", III Edition, Tata McGraw, 1997.

References:

1. Ramez Elmasri, Shamkant B.Navathe, "Fundamentals of Database Systems", 3rd Edition, Addison Wesley-2000.
2. C.J.Date, "An Introduction to Database Systems", 7th edition, Addison Wesley, 1997.
3. Raghu Ramakrishnan, "Database Management Systems", WCB, McGraw Hill, 1998.

1. ELECTRICAL CIRCUITS 9

Dependent and independent sources-Kirchoff's laws-Theorems-Phasors-Sinusoidal steady state response of simple RLC circuits - Mesh current and Node Voltage methods-Coupled circuits-Q factor and resonance circuit.

2. ELECTRICAL MACHINES 15

Principles of operation of single phase transformers-Equivalent circuits-Efficiency D.C. motor-Principle of operation-Torque equation-Load ch.of D.C. shunt motor-Single phase induction motor-Double field revolving theory-Equivalent circuits-Starting methods-Shaded pole induction motor-Stepping motors-Variable reluctance and hybrid stepping motors-Applications (Quantitative Treatment only).

3. SOLID STATE SPEED CONTROL 6

Rectifier, chopper, inverter circuits, speed control of D.C. shunt motor- Controllers for stepper motors.

4. CONTROL SYSTEMS 4

Open loop and closed loop systems-Effects of Feed back-Multivariable systems-Block diagram reduction technique-signal flow graph-Introduction to non-linear systems.

5. STATE SPACE VARIABLE 4

State space-state models of physical systems using physical and phase variables.

6. TIME RESPONSE OF SECOND ORDER SYSTEMS 7

Time response specifications-Steady state error constants.

7. TUTORIAL 15**Total No of periods: 60**

Text Books:

1. *I.J.Nagrath, M.Gopal, "Control Systems Engineering",
New Age International(P) Ltd., Publishers, 1996.*

References:

1. *Joseph J Distefand, Allen R.Stuberud Lvan, J.Williams, Schaum's outline series, "
Theory and Problems of Feed back and Control Systems",
McGraw Hill Book Company, 1987.*
2. *Ogata K., "Modern Control Engineering", Prentice Hall of India Pvt.Ltd.,
New Delhi, 1982.*

(Revised Syllabus For B.E. / B.Tech. Programmes - Effective From June 2002)

- 1. PARTIAL DIFFERENTIAL EQUATIONS 9**
 Formation - Solutions of standard types of first order equations - Lagrange's equation - Linear partial differential equations of second and higher order with constant coefficients.
- 2. FOURIER SERIES 9**
 Dirichlet's conditions - General Fourier series - Half range Sine and Cosine series - Parseval's identity - Harmonic Analysis.
- 3. BOUNDARY VALUE PROBLEMS 9**
 Classification of second order linear partial differential equations - Solutions of one - dimensional wave equation, one-dimensional heat equation - Steady state solution of two-dimensional heat equation - Fourier series solutions in Cartesian coordinates.
- 4. LAPLACE TRANSFORMS 9**
 Transforms of simple functions - Basic operational properties - Transforms of derivatives and integrals - Initial and final value theorems - Inverse transforms - Convolution theorem - Periodic functions - Applications of Laplace transforms for solving linear ordinary differential equations upto second order with constant coefficients and simultaneous equations of first order with constant coefficients.
- 5. FOURIER TRANSFORMS 9**
 Statement of Fourier integral theorem - Fourier transform pairs- Fourier Sine and Cosine transforms - Properties - Transforms of simple functions - Convolution theorem - Parseval's identity.

Total No of periods: 45

Text Books:

1. Kreyszig, E., "Advanced Engineering Mathematics" (8th Edition), John Wiley and Sons, (Asia) Pte Ltd., Singapore, 2000.
2. Grewal, B.S., "Higher Engineering Mathematics" (35th Edition), Khanna Publishers, Delhi 2000.

References:

1. Kandasamy, P., Thilagavathy, K., and Gunavathy, K., "Engineering Mathematics", Volumes II & III (4th Revised Edition), S. Chand & Co., New Delhi, 2001.
2. Narayanan, S., Manicavachagom Pillay, T.K., Ramanaiah, G., "Advanced Mathematics for Engineering Students", Volumes II & III (2nd Edition), S. Viswanathan (Printers & Publishers, Pvt, Ltd.) 1992.
3. Venkataraman, M.K. "Engineering Mathematics" Volumes III - A & B, 13th Edition National Publishing Company, Chennai, 1998.
4. Shanmugam, T.N. : <http://www.annauniv.edu/shan/trans.htm>

1. INTRODUCTION	6
Programming methodologies-Comparison-Object Oriented concepts-Basics of C++ environment.	
2. CLASSES	9
Definition-Data members-Function members-Access specifiers-Constructors-Default constructors-Copy constructors-Destructors-Static members-This pointer-Constant members-Free store operators-Control statements.	
3. INHERITANCE AND POLYMORPHISM	9
Overloading operators-Functions-Friends-Class derivation-Virtual functions-Abstract base classes-Multiple inheritance.	
4. TEMPLATES	6
Class templates-Function templates-Exception handling-Streams.	
5. JAVA PROGRAMMING	15
Java environment-Classes-Definition-Fields-Methods-Object creation-Constructors-Overloading methods-Static members-This keyword-Nested classes-Extending classes-Inheritance-member accessibility-Overriding methods-Abstract classes-Interfaces.	
Total No of periods:	45

Text Books:

1. Stanley B.Lippman, "The C++ Primer" Addison Wesley, 1998.
2. H.M.Deitel and P.E.Deitel, "Java How to Program", Prentice Hall, 1998.

References:

1. Deitel and Deitel, "C++ How to Program" Prentice Hall, 1998.
2. N.Barkakati, "Object Oriented Programming in C++", Prentice Hall of India Pvt.Ltd, 1997.
3. Ken Arnold and James Gosling, "The Java Programming Language", Addison Wesley 1998.

1. INTRODUCTION	6
Basic structure of Computer Hardware-Von-Neumann Architecture-Functional units-Instruction formats and types-Addressing modes.	
2. ARITHMETIC AND LOGIC UNIT	9
Fixed point arithmetic operation-addition, subtraction, multiplication, division-Floating point arithmetic operation-Design of ALU-Bit-slice processors.	
3. PROCESSOR UNIT	12
Data path implementation-Control unit-hardwired control, microprogrammed control, nanoprogramming-Concepts of pipelining.	
4. MEMORY SYSTEM	9
Memory hierarchy-Internal organization of RAM, ROM, Interleaved memory-Cache and associative memories-Virtual memory.	
5. INPUT/OUTPUT AND PERIPHERALS	9
Basic concepts-programmed I/O-Interrupts and DMA-I/O processors-input devices-display devices-printers-magnetic disk drives-optical drives.	
6. TUTORIAL	15

Total No of periods: 60

Text Books:

1. *Carl Hamacher V., Zvonko G. Vranesic, Safwat G. Zaky, "Computer organization", Tata McGraw Hill, Latest Edition.*
2. *Heuring V.P., Jordan H.F., "Computer System Design and Architecture", Addison Wesley, 1999.*

References:

1. *Patterson and Hennessey, "Computer Organization and Design". The Hardware/Software interface, Harcourt Asia Morgan Kaufmann, 1999.*
2. *Hayes, "Computer Architecture and Organization", Tata McGraw Hill, 1998.*

1. INTRODUCTION 8

Input and Output devices-graphic adaptors-input methods-classification-Raster and Random scan-Line and circle drawing algorithms-Polygon filling.

2. CURVES, SURFACES AND SOLIDS 12

Clipping-Color table-Animation using Colour table-Anti aliasing methods-Representing curves, Surfaces and solids-B-splines-Bezier curves-Quadtree and octree-Geometric model-Fractals-Hierarchical model.

3. TRANSFORMATIONS 8

2D transformations-3D transformations-perspective viewing-Animation of wire frame models.

4. HIDDEN SURFACE ELIMINATION 8

Hidden line elimination-Hidden surface elimination-Painter's algorithm-Scan the algorithm-Octree method-Z-buffer-Ray tracing.

5. COLOR MODELS 9

Chromaticity diagram-RGB, CMY, HSV, HLS, CIE models-Realism in rendering, halving-Illumination and shading-Gouraud and Phong shading.

6. TUTORIAL 15**Total No of periods: 60**

Text Books:

1. *Hearn D and Baker M.P., "Computer Graphics", Second Edition, PHI, New Delhi 1995.*

References:

1. *Foley J.D., Van Dam A, Fiener S.K. and Hughes J.F., "Computer Graphics", 2nd Edition, Addison Wesley, 1993.*
2. *Newman W.M. and Sproull R.F., "Principles of Interactive Computer Graphics", Second Edition, Tata McGraw Hill Publishing Company Limited, New Delhi, 1997.*

1. INTRODUCTION	7
Definition of AI-Foundations-History-Intelligent Agents-Perception and Language Processing-Problem Solving-Searching-Heuristic Search-Game Playing.	
2. LOGIC AND REASONING	8
Agents that reason logically-First order logic-Inference in first order logic-Logical reasoning.	
3. KNOWLEDGE REPRESENTATION	10
Semantic Nets and Description matching-Frames-Inheritance and common sense Rules-Rule Chaining, Substrates and cognitive modeling.	
4. REASONING WITH INCOMPLETE AND UNCERTAIN KNOWLEDGE	10
Uncertainty-Probabilistic Reasoning Systems-Making simple and complex decisions-Nonmonotonic reasoning and Truth Maintenance.	
5. PLANNING AND LEARNING	10
Planning-Representation for planning-Partial order planning-Conditional planning-Replanning agent-Learning-Analysing differences-Explaining experience-Correcting mistakes-Recording cases-Version space method-Identification trees-Neural nets and Genetic algorithms.	
Total No of periods:	45

Text Books:

1. Stewart Russel and Peter Norvig. "Artificial Intelligence-A Modern Approach", Prentice Hall Internationa. 1995.
2. Patrick Henry Winston, "Artificial Intelligence", Third Edition, ISE reprint, Addison Wesley, 1999.

References:

1. Elaine Rich and Kevin Knight, "Artificial Intelligence", Tata McGraw Hill, Second Edition, 1993.
2. Eugene Charniak and Drew Mc Dermott, Addison Wesley, "Introduction to Artificial Intelligence", ISE Reprint 1998.
3. Nils J.Nilsson, "Artificial Intelligence - A New Synthesis", Harcourt Asia PTE Ltd, Morgan Kaufmann, 1988.

Text Books:

1. *Milman and Halkias, "integrated Electronics", McGraw Hill 1987.*
2. *Allen Mottershed, "Electronic Devices and Circuits", Prentice-Hall India, 1981.*

1. PROBABILITY AND RANDOM VARIABLES 9

Probability concepts, Random variables, moments, Moment Generating function, Binomial, Poisson, Geometric, Negative binomial, Exponential, Gamma, Weibull distributions, Functions of random variable, Chebychev inequality.

2. TWO-DIMENSIONAL RANDOM VARIABLES 9

Marginal and conditional distributions, Covariance, Correlation and regression, Transformation of random variables, Central limit theorem.

3. RANDOM PROCESSES 9

Classification, Stationary process, Markov process, Binomial process, Poisson process, Birth and death process, Renewal process

4. MARKOV CHAIN AND RELIABILITY 9

Markov chain, Transition probabilities, Limiting distributions, Concepts of reliability, Hazard function, Series and parallel systems, Reliability and Availability of Markovian systems, Maintainability, Preventive maintenance.

5. QUEUEING THEORY 9

Markovian queueing models, Little's formula, Multi-server queues, M/G/1 Queues, Pollaczek-Khintchine formula.

6. TUTORIAL 15**Total No of periods: 60**

Text Books:

1. *Trivedi K.S., "Probability and Statistics with reliability, Queuing and Computer Science Applications", Prentice-Hall of India, New Delhi, 1984.*
2. *Balagurusamy .E., "Reliability Engineering", Tata McGraw Hill Publishers, New Delhi, 1984.*
3. *Gross D, and Harris C.M, "Fundamentals of Queuing Theory", John Wiley & Sons, 1985.*

References:

1. *Allen, A.O., "Probability Statistics and Queuing Theory", Academic Press, 1981.*

I C++ PROGRAMMING

45

1. Simple C++ Program.
2. Function overloading.
3. Operator overloading.
4. Inheritance.
5. Virtual functions and Dynamic binding.
6. Templates.
7. File Handling.
8. Exception handling.

II JAVA PROGRAMMING

1. Simple Java programs.
2. Inheritance.
3. Event handling programs.

Total No of periods: 45