



**B.E COMPUTER SCIENCE AND ENGINEERING
 (FOUR YEAR FULL TIME)**

CURRICULUM 2008

SEMESTER I

Code no.	Course title	L	T	P	C
THEORY					
XCS101	Technical English	3	1	0	4
XCS102	Mathematics- I	3	1	0	4
XCS103	Applied Physics	3	1	0	4
XCS104	Applied Chemistry	3	1	0	4
XCS105	Engineering Graphics	2	0	3	4
XCS106	Electric Circuits and Electronic Devices	3	1	0	4
PRACTICAL					
XCS107	Applied Physics Lab	0	0	3	2
XCS108	Applied Chemistry Lab	0	0	3	2
XCS109	Basic Workshop Practices	0	0	3	2

Total Hours: 34

Total Credits: 30

SEMESTER II

Code no.	Course title	L	T	P	C
THEORY					
XCS201	Mathematics - II	3	1	0	4
XCS202	Computer Architecture	3	1	0	4
XCS203	Computer Programming	4	0	0	4
XCS204	Digital principles and system design	3	0	0	3
XCS205	Fundamentals of Computer Science	3	0	0	3
XCS206	Problem Solving Techniques	3	1	0	4
PRACTICAL					
XCS207	Computer Programming Lab	0	0	3	2
XCS208	Communication Skills Enhancement	0	0	3	2
XCS209	Digital Systems Lab	0	0	3	2

Total Hours: 31

Total Credits: 28

SEMESTER III

Code no.	Course title	L	T	P	C
THEORY					
XCS301	Discrete Mathematics	4	0	0	4
XCS302	Professional Ethics and Human Values (CSE)	3	0	0	3
XCS303	Microprocessors and Micro Controllers	3	1	0	4
XCS304	Signals and Systems	3	1	0	4
XCS305	System Software	3	0	0	3
XCS306	Data Structures	3	0	0	3
PRACTICAL					
XCS307	Microprocessors and Micro Controllers Lab	0	0	3	2
XCS308	Data Structures Lab	0	0	3	2

Total Hours : 27

Total Credits: 25

SEMESTER IV

Code no.	Course title	L	T	P	C
THEORY					
XCS401	Probability and Queuing Theory	3	1	0	4
XCS402	Environmental Science and Engineering	3	0	0	3
XCS403	Analog and Digital Communication	3	0	0	3
XCS404	Operating System	3	0	0	3
XCS405	Design and Analysis of Algorithm	3	1	0	4
XCS406	Object Oriented Programming	3	0	0	3
PRACTICAL					
XCS407	Object Oriented Programming Lab	0	0	3	2
XCS408	Operating System and System software Lab	0	0	3	2

Total Hours : 26

Total Credits: 24

SEMESTER V

Code no.	Course title	L	T	P	C
THEORY					
XCS501	Numerical methods	3	1	0	4
XCS502	Software Engineering	3	0	0	3
XCS503	Digital Signal Processing	3	1	0	4
XCS504	Computer Networks	3	0	0	3
XCS505	Theory of Computation	3	1	0	4
XCS506	Database Management System	3	1	0	4
PRACTICAL					
XCS507	Network Programming Lab	0	0	3	2
XCS508	Database Management System Lab	0	0	3	2

Total Hours:28

Total Credits: 26

SEMESTER VI

Code no.	Course title	L	T	P	C
THEORY					
XCS601	Distributed Computing	3	1	0	4
XCS602	Web Technology	3	0	0	3
XCS603	Principles of Compiler Design	3	1	0	4
XCS604	Information System Design	3	0	0	3
XCS605	Total Quality Management	3	0	0	3
XCS6E**	Elective-I	3	0	0	3
PRACTICAL					
XCS607	Web Technology Lab	0	0	3	2
XCS608	Compiler Design Lab	0	0	3	2

Total Hours : 26

Total Credits: 24

SEMESTER VII

Code no.	Course title	L	T	P	C
THEORY					
XCS701	Artificial Intelligence and Neural Networks	4	0	0	4
XCS702	Object Oriented Analysis and Design	3	0	0	3
XCS703	Graphics and Multimedia	3	0	0	3
XCS704	Social Engineering	3	0	0	3
XCS7E**	Elective – II	3	0	0	3
XCS7E**	Elective – III	3	0	0	3
PRACTICAL					
XCS707	CASE Tools Lab	0	0	3	2
XCS708	Graphics and Multimedia Lab	0	0	3	2
XCS709	Mini Project	0	0	8	4

Total Hours : 33

Total Credits: 27

SEMESTER VIII

Code no.	Course title	L	T	P	C
THEORY					
XCS801	Entrepreneurial Development Management	3	0	0	3
XCS8E**	Elective – IV	3	0	0	3
XCS8E**	Elective – V	3	0	0	3
PRACTICALS					
XCS803	Project Work	0	0	24	12

Total Hours:33

Total Credits: 21

Over all Credits: 205

LIST OF ELECTIVES

** Elective Code No	Course Title	L	T	P	C
51	Software Testing	3	0	0	3
52	Embedded Systems	3	0	0	3
53	Data Warehousing and Mining	3	0	0	3
54	Advanced Databases	3	0	0	3
55	Real Time Systems	3	0	0	3
56	TCP/IP Design and Implementation	3	0	0	3
57	System Modelling & Simulation	3	0	0	3
58	High Performance Computing	3	0	0	3
59	C# and .NET Framework	3	0	0	3
60	Natural Language Processing	3	0	0	3
61	Advanced Computer Architecture	3	0	0	3
62	Cryptography and Network Security	3	0	0	3
63	Soft Computing	3	0	0	3
64	Digital Image Processing	3	0	0	3
65	Robotics	3	0	0	3
66	Software Quality Management	3	0	0	3
67	Grid Computing	3	0	0	3
68	Bio Informatics	3	0	0	3
69	Component Based Technology	3	0	0	3
70	Mobile Computing	3	0	0	3

UNIT – I FOCUS ON LANGUAGE**15**

Word formation with prefixes and suffixes - synonyms and antonyms - nominal compounds , prepositions, homonyms, homophones and hyponyms, Part of speech, use of words as nouns and verbs, phrasal verbs, connectives, sentences patterns.

Suggested Activities

- Using prefixes and suffixes to change the grammatical functions of words – giving synonyms and antonyms, using the same words and its derivatives of different forms
- Expansion of noun + noun phrases - correction of errors in the given sentences.
- Using comparative forms of adjectives in sentences giving a pair of purpose and function statements to be linked with expressions like to in order to so as to (Eg: He used the ignition key. He started the engine. He used the ignition key in order to start the engine)
- Identification of content words in the given text.
- Learning multi functional words that can serve both nouns and verbs
- Analyzing sentences into S,V,O, C and A.

Note: All examples pertaining to this unit should preferably be related to science and technology.

UNIT – II FUNCTIONAL GRAMMAR**15**

Tense forms and voice forms, concord, degrees of comparison, conditional clause, definition of technical terms, Sentences expressing, (purpose and function,) comparison and contrast, cause and effect constructions, imperatives, reported speeches, Modal verbs, infinitives, gerund, participles

Suggested Activities

Giving pairs of cause and effect statements to be linked with expressions like *as / since / because*. Rewriting imperative sentences using assertive form '*should*' (Store energy and tap it when required energy should be and tapped when it is required)

- Rewriting infinitive forms as gerunds (eg: To modernize the administrative office with computers is expensive, Modernizing the administrative office with computers is expensive) Fill in the blanks with appropriate prepositions.
- Choosing sentences in a given text that use different tense forms
- Subject-verb agreement of the sentences given practical
- Providing a context for the use of the tense forms - rewriting the sentences in the impersonal passive form
- Rewriting the sentences in the reported speeches

UNIT III READING

10

Techniques of Reading – Technical articles on invention and discoveries, Reading comprehension on biographies of eminent scientists, engineers and successful entrepreneurs, Practicing -skimming and scanning, Rhetorical functions (narrative, descriptive and argumentative) sequencing of sentences. Connective adverbs. Idioms and phrases, phrasal verbs and cloze test.

Suggested Activities

- Taking a quick glance at the text to predict the content – reading to identify the main theme.
- Identifying the topic sentence in a paragraph – providing suitable titles for paragraphs – matching the titles with the paragraphs.
- Guessing the contextual meaning of words – comprehending a passage and answering questions of varied kinds.
- Transferring of information from a text to graphical representations like tree diagram / flow chart / bar chart / pie chart/ tables.
- Filling the gaps with appropriate missing words from the given list.
- Making notes based on a passage in the format given.
- Using an appropriate format to make notes from a given passage.
- Providing a suitable title after reading the passage.
- Identifying main and supporting ideas by scanning.
- Sequencing of jumbled sentences using linguistic clues (e.g.: reference words).

Framing questions and answering, (“Wh” type and “Yes or No”) type note making, (guided and open) making lists, stating problems and proposing solutions, recommendations, instructions, check lists, technical report writing, decoding from graphical representation (flow chart, pie chart, tree diagram) numerical expressions.

Suggested Activities

- Identifying the phrases used for making recommendations in given texts and employing them in making recommendations.
- Writing checklists in the appropriate format.
- Writing instructions for performing tasks at home or at work (use of imperatives).
- Summarizing the discussions and other oral practice activities like role play in the prescribed textbooks.
- Essay writing based on discussion of scientific and technical topics given in the prescribed textbooks.

Paragraph writing, essay writing, technical report writing, letter writing, (personal, business, letter of application, letter to the editor) resume writing, drafting e-mails, minutes of meeting, memorandum, creative writing.

Suggested Activities

- Using appropriate expressions to define a concept / describe an object / device / process.
- Writing paragraphs on different scientific discourse patterns like classification, comparison and problem / solution – identifying the topic sentence.
- Using unity, cohesion and coherence in paragraph writing.
- Writing formal and business letters using the appropriate format.
- Note – making (guided and open).
- Summarizing and writing paragraphs based on listening tasks in the prescribed textbooks.
- Making recommendations by using modal auxiliary verbs like *should*, *must*, *ought to* etc.

L : 45; T: 15; Total: 60

TEXT BOOK:

1. Department of Humanities and Social Sciences, Anna University, English for Engineers and Technologists, Vols. I & II (Combined Edition), Orient Longman Pvt. Ltd., 2006.

REFERENCES:

1. V.R. Narayanaswami, Strengthen Your Writing, 3rd Edition, Orient Longman, 2005.
2. Andrea J. Rutherford, Basic Communication Skills for Technology, 1st Edition, Pearson Education Asia (Singapore) Pvt. Ltd., Bangalore, 2001.
3. Nell Ann Pickett, Ann A. Laster, Katherine E. Staples, Technical English (Writing, Reading and Speaking), 8th Edition, Pearson Education, USA, Addison Wesley Longman Inc., 2001.
4. “ Power words in Pairs”. Emerald publishers - Chennai

UNIT I MATRICES 9

Eigen values and Eigenvectors of a real matrix – Characteristic equation
 Properties of Eigen values and Eigen vectors - Cayley - Hamilton theorem
 (excluding proof) - Similarity transformation (Concept only) – Orthogonal matrix -
 Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of
 quadratic form to Canonical form by Orthogonal transformation.

UNIT II THREE DIMENSIONAL ANALYTICAL GEOMETRY 9

Direction Cosine and Ratios – Angle between two lines – Equation of plane –
 Equation of Straight line – Coplanar lines – shortest distance between skew lines –
 Sphere – Tangent plane – Plane section of a sphere

UNIT III GEOMETRICAL APPLICATIONS OF DIFFERENTIAL CALCULUS 9

Curvature – Cartesian and polar co – ordinates – Centre and radius of curvature –
 Circle of curvature – Involutives and evolutes – Envelopes – Properties of envelopes
 and evolutes .

UNIT IV FUNCTION OF SEVERAL VARIABLES 9

Functions of two variables – Partial derivatives – Total differential – Taylor's
 expansion – Maxima and Minima – Constrained maxima and minima – Lagrange's
 Multiplier method – Jacobians .

UNIT V ORDINARY DIFFERENTIAL EQUATIONS (ODE) AND APPLICATIONS 9

Simultaneous first order linear equations with constant coefficients – Linear
 equations of second order with constant and variable coefficients – Method of
 variation of parameters.

L: 45; T:15; Total :60

TEXT BOOK:

1. Grewal .B.S., “Higher Engineering Mathematics”, 38th Edition- Khanna Publication –Delhi, 2004.
2. Kreyszi.E., “Advance Engineering Mathematics”, 8th Edition-John Wiley & Son (Asia) Ltd, Singapore,. 2001.

REFERENCES:

1. Bali. N.P., Narayana Iyengar, and Chand.N., “Engineering Mathematics” Laxmi Publication Pvt. Ltd-New Delhi, 2003.
2. Veerarajan.T., “Engineering Mathematics (For First Year)”, 4th Edition , John Wiley & Son -Hill Publishing company Ltd, New Delhi, 2005.
3. Kandasamy. P., Thilagavathy. K, and Gunavathy. K., “Engineering Mathematics”-Volume I &II, S. Chand & Co, New Delhi, 2005.
4. Venkataraman. M. K., “Engineering Mathematics”-Volume I &II, Revised enlarged 4th Edition, The National Publishing Company-Chennai, 2004.

APPLIED PHYSICS
(Common to B.E. / B.Tech all Branches)

XCS103

APPLIED PHYSICS

3 1 0 4

UNIT-I Acoustics and Ultrasonics 9

Acoustics: Classification of sound – Characteristics of musical sound – Loudness – Weber-Fechner law – Decibel – Absorption Coefficient – Reverberation – Reverberation time – Sabine's Formula (growth & decay) – Factors affecting acoustics of buildings (reverberation time, loudness, focusing, echo, echelon effect, resonance and noise) and their remedies.

Ultrasonics: Production: Magnetostriction and Piezo electric methods –Applications

UNIT-II Wave Optics, Lasers and Fibre Optics 9

Wave Optics: Photo elasticity: Birefringence – Stress-optic law - Effect of a stressed model in a plane polariscope – Isoclinic and Isochromatic fringes (definitions) – Photoelastic bench.

Laser: Nd – YAG laser, CO₂ laser, semiconductor laser (homojunction) – Uses of lasers – Holography.

Fibre Optics: Principle and propagation of light in optical fibres – Numerical Aperture and Acceptance angle – Types of optical fibres (material, refractive index, mode) – Applications: Fibre optics communication system (block diagram only).

UNIT-III Crystal Physics and NDT 9

Crystal Physics: Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – 'd' spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures.

NDT: Liquid penetrant method – Ultrasonic flaw detection – Ultrasonic flaw detector (block diagram)– X-ray Radiography: displacement method – X-Ray Fluoroscopy– Merits and Demerits of each method

UNIT- IV Conducting Materials 9

Conductors: Wiedermann Franz law - Lorentz number –Fermi distribution function – Density of energy states – carrier concentration - effect of temperature on fermi energy level

Semiconductors: Semiconductor-properties- types of semiconductor, Hall effect – Determination of Hall co-efficient.

Superconductors: Super conducting phenomena – Properties of superconductors – Meissner effect , Isotope effect – Type I and Type II superconductors– Applications – Magnetic levitation and SQUID

UNIT–V Dielectrics and New Engineering Materials 9

Dielectrics: Electrical susceptibility - Dielectric constant – Electronic, ionic, orientational and space charge polarization – Frequency and temperature dependence of polarization – Internal field – Claussius-Mosotti relation (derivation) - Dielectric loss – Dielectric breakdown – Uses of dielectric materials (Capacitor and Transformer).

Introduction to New Materials: Metallic glasses – Nano materials – Shape memory alloys – Bio-materials.

L:45; T:15; Total:60

TEXT BOOKS:

1. Avadhanulu M.N. and Kshirsagar P.G., “A Text Book of Engineering Physics”, S.Chand & Company Ltd., 7th Enlarged Revised Ed., 2005.
2. Gaur R. K. and Gupta S. L., “Engineering Physics”, Dhanpat Rai Publishers, New Delhi, 2001.

REFERENCES:

1. Pillai S. O., “Solid State Physics”, New Age International Publication, New Delhi, Fifth Edition, 2003.
2. Rajendran V. and Marikani A., “Materials Science”, Tata McGraw Hill Publishing Company Ltd, New Delhi, 2004.

UNIT I WATER TECHNOLOGY 9

Source and types of water – water quality parameters – definition and expression – hard water – estimation of hardness (EDTA method) and alkalinity – boiler feed water – requirements – disadvantages of using hard water in boilers – internal conditioning (phosphate, calgon and carbonate conditioning methods) – external conditioning – demineralization process – desalination (RO method) – domestic water treatment.

UNIT II ELECTROCHEMISTRY 9

Electrode potentials – difference between electrolytic cells and electrochemical cells – Standard electrodes (H_2 and calomel electrodes) – Determination of pH using glass electrodes – Nernst equation – problems – electrochemical series – emf – measurements and its applications – Galvanic cells – Concentration cell – problems – reversible and irreversible cells – conductometric titrations.

UNIT III CORROSION AND ITS INHIBITION 9

Corrosion – principles of chemical corrosion – Pilling – Bedworth rule – principles of electrochemical corrosion – difference between chemical and electrochemical corrosion – types of corrosion – factors influencing corrosion – corrosion control methods – pre-treatment of metal surface – electroplating and electroless plating.

UNIT IV NUCLEAR ENERGY AND ENERGY STORAGE DEVICES 9

Nuclear fission process – definition, mechanism and characteristics – chain reactions – nuclear energy and its calculations – types of nuclear fission reaction – atom bomb – light water nuclear power plant – breeder reactor – batteries – introduction – types of batteries – primary and secondary batteries – dry cell – lead acid, Ni-Cd and Li batteries – alkaline batteries – principles and applications of solar cells.

UNIT V POLYMERS 9

Monomers and polymers – types of polymerization reaction – mechanism of polymerization (free radical) – engineering plastics – PVC, teflon, polycarbonate, polyurethane and thermocole – properties – applications – compounding of plastics, moulding methods – injection, compression moulding and blow moulding – polymer blends and alloys.

L:45; T:15; Total:60

TEXT BOOKS:

1. P.C. Jain and Monicka Jain, Engineering Chemistry, Dhanpat Raj Publishing Company (P) Ltd, New Delhi – 2002.
2. S.S. Dara. A Text book of Engineering Chemistry, S. Chand & Company Ltd, New Delhi – 2003.

REFERENCES:

1. B.K. Sharma, Engineering Chemistry, Krishna Prakasam Media (P) Ltd., Meerut, 2001.
2. Mars G. Fontana, Corrosion Engineering, Tata McGraw Hill Publishing Co., New Delhi, 2005.

Lettering & Free hand sketching

Representation of Three Dimensional objects – Need for and importance of multiple views and their placement – Developing visualization skills through free hand sketching of multiple views from pictorial views of objects.

UNIT I PLANE CURVES AND FREE HAND SKETCHING 6

Curves -Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid –Epi and hypo cycloids- construction of involutes of square, Hexagon and circle - Drawing of tangents and normal to the above curves.
Spirals

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES 6

General principles of orthographic projection – Layout of views – Projection of points, straight lines – Determination of true lengths and true inclinations and location of traces – Projection of polygonal surface and circular lamina inclined to any one plane.

UNIT III PROJECTION OF SOLIDS AND SECTION OF SOLIDS 6

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to both the reference plane - Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane - Obtaining true shape of section.

UNIT IV DEVELOPMENT OF SURFACES AND INTERSECTION OF SOLIDS 6

Development of lateral surfaces of simple and truncated solids – prisms, pyramids, cylinders and cones -Development of lateral surfaces of two Intersecting solids – prism & cylinder, cylinder & cylinder – Axis at right angles with no offset.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS 6

Principles of isometric projection – isometric scale – isometric projections of simple solids, truncated prisms, pyramids, cylinders and cones.

Perspective projection of regular solids -by visual ray and vanishing point methods.

L: 30; P:60; Total : 90

TEXT BOOKS:

1. K.Venugopal “Engineering Graphics”, New Age International (P) Limited, 2002.
2. K.V. Natarajan “A text book of Engineering Graphics”, Dhanalakshmi Publishers, Chennai, 2006.

REFERENCES:

1. N.D. Bhatt “Engineering Drawing” Charotar publishing House 46th Edition, 2003.
2. K.R. Gopalakrishnana. “Engineering Drawing” (Vol. I & II) Subhas Publications – 1998.
3. Luzadder and Duff, “Fundamentals of Engineering Drawing” Prentice Hall of India Pvt Ltd, XI Edition - 2001.

STANDARDS

1. IS10711 – 2001 Technical products Documentation – Size and Layout of Drawing sheets.
2. IS9609 (Parts 0 & 1) – 2001 Technical product Documentation – Lettering.
3. IS11669 – 1986 Dimensioning on Technical Drawings.
4. IS15021 (Parts 1-4) – 2001 Technical Drawings – Projection Methods.

NOTE

1. Five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.

UNIT I BASIC CIRCUIT CONCEPTS**9**

Lumped circuits – Kirchhoff's Laws – V-I-relationships of R, L and C – independent sources – dependent sources – simple resistive circuits – network reduction – voltage division – current division – source transformation. Phasor – sinusoidal steady state response – concepts of impedance and admittance- analysis of simple circuits – power and power factor – series resonance and parallel resonance – bandwidth and Q factor

UNIT II MESH-CURRENT AND NODE-VOLTAGE METHODS**9**

Formation of matrix equations and analysis of complex circuits using mesh-current and nodal-voltage methods – mutual inductance – coefficient of coupling – ideal transformer. Superposition theorem – reciprocity theorem – compensation theorem – substitution theorem – maximum power transfer theorems – Thevenin's theorem – Norton's theorem and Millman's theorem with applications.

UNIT III SEMICONDUCTOR DIODE**9**

Theory of p-n junction – p-n junction as diode – p-n diode currents – Volt-amp characteristics – Diode resistance – Temperature effect of p-n junction – Transition and diffusion capacitance of p-n diode – Diode switching times.

UNIT IV BI-POLAR TRANSISTOR**9**

Junction transistor – Transistor construction – Detailed study of currents in transistor – Input and output characteristics of CE, CB and CC configurations – Transistor hybrid model for CE configuration – Analytical expressions for transistor characteristics – Transistor switching times – Voltage rating – Power transistors.

UNIT V FIELD EFFECT TRANSISTORS**9**

Junction field effect transistor – Pinch off voltage – JFET volt-ampere characteristics – JFET small signal model – MOSFETS and their characteristics – FET as a variable resistor – Unijunction transistor

Total: 45**REFERENCES:**

1. Paranjothi S.R., 'Electric Circuit Analysis', New Age International Ltd., Delhi, 2nd Edition, 2000.
2. Sudhakar, A. and Shyam Mohan S.P., 'Circuits and Network Analysis and Synthesis', Tata McGraw-Hill Publishing C.Ltd., New Delhi, 1994.
3. Jacob. Millman, Christos C.Halkias, 'Electronic Devices and Circuits', Tata McGraw Hill Publishing Limited, New Delhi, 2003.
4. David A.Bell, 'Electronic Devices and Circuits', Prentice Hall of India Private Limited, New Delhi, 2003.

PHYSICS LABORATORY
(Common to all branches of B.E. / B.Tech)
Semester I

XCS107

APPLIED PHYSICS LAB

0 0 3 2

LIST OF EXPERIMENTS

1. Torsional Pendulum – Determination of moment of inertia of disc and rigidity modulus of the material of a wire.
2. Non -Uniform Bending – Determination of Young’s Modulus.
3. Viscosity – Determination of Co-efficient of Viscosity of a liquid by Poiseuille’s flow.
4. Spectrometer – Dispersive power of a prism.
5. Air wedge - Determination of thickness of thin wire.
6. Lee’s Disc – Determination of thermal conductivity of a bad conductor.
7. Spectrometer – Determination of wavelength of Hg source using Grating.
8. Band gap determination of a semiconductor.
9. Spectrometer – id curve.
10. Semiconductor laser –
 - i. Determination of wavelength of Laser using grating.
 - ii. Particle size determination.
 - iii. Determination of numerical aperture and acceptance angle of an optical fibre.

LIST OF EXPERIMENTS (Any 10 Experiments)

- 1) Determination of total hardness, temporary & permanent hardness of water by EDTA method.
- 2) Determination of alkalinity of water sample.
- 3) Determination of chloride content of water sample by argentometric method.
- 4) Determination of DO content by Winkler's method.
- 5) Estimation of copper in brass.
- 6) Determination of strength of Hydrochloric acid by pH metric method.
- 7) Conductometric titration between strong acid and strong base.
- 8) Conductometric titration of mixture of acids.
- 9) Conductometric precipitation titration using barium chloride and sodium sulphate.
- 10) Determination of strength of iron by potentiometric method using dichromate.
- 11) Estimation of iron (1,10 – phenanthroline / thiocyanate method) or Ni (DMG) in the given solution by spectrometric method
- 12) Determination of sodium and potassium ions in water sample by flame photometric method.
- 13) Determination of molecular weight of a polymer by viscometry method.
- 14) Determination of percentage of calcium in limestone by EDTA method.

P :45

References for Chemistry Laboratory

- (1) J. Mendham, R.C. Denney, J.D. Barnes and N.J.K. Thomas, Vogel's Textbook of Quantitative Chemical Analysis, 6th Edition, Pearson Education, 2004.
- (2) D.P. Shoemaker and C.W. Garland, Experiments in Physical Chemistry, McGraw Hill, London.

Chemistry Laboratory classes will be conducted on alternate weeks with 3 periods duration.

List of Equipments needed for Chemistry Laboratory
(for a batch of 30 students)

1. Electronic balance	-	1 No
2. pH meter	-	4 Nos
3. Conductivity bridge	-	4 Nos
4. Potentiometer	-	4 Nos
5. Platinum electrodes	-	4 Nos
6. Calomel electrodes	-	4 Nos
7. Spectrophotometer	-	1 No
8. Flame photometer	-	1 No
9. Oswald viscometer	-	10 Nos

Glassware for a batch of 30 students

- A) **WOOD WORK** : Sawing, Planing and making common joints like TEE, Half lap and dovetail (any two)
- B) **PLUMBING** : Basic pipe connection using valves, taps, couplings, unions, reducers, elbows in household fitting - Practice in mixed pipe connections: Metal, plastic and flexible pipes used in household appliances Preparation of line sketches for (i) water supply lines (ii) sewage lines.
- C) **DEMONSTRATION (CIVIL ENGINEERING)** : Study of pipe connections on the suction and delivery pipe layouts.
Study of joints in door panels, wooden furniture.
Bar bending -Straightening of rods and cutting- 90°, 130° bend formation - 45°, 30° crank formation-Stirrups fabrication-Binding and placing of steel reinforcement
- D) **FITTING** : Square, dovetail and hemisphere fitting of metal plate of 3mm
- E) **WELDING** : (i) Preparation of arc welding of butt joints, lap joints and tee joints.
(ii) Gas welding practice.

P : 45

UNIT- I BASIC STRUCTURE OF COMPUTERS 10

Functional units - Basic operational concepts - Bus structures - Software performance – Memory locations and addresses – Memory operations – Instruction and instruction sequencing – Addressing modes – Assembly language – Basic I/O operations – Stacks and queues.

UNIT- II ARITHMETIC UNIT 8

Addition and subtraction of signed numbers – Design of fast adders – Multiplication of positive numbers - Signed operand multiplication and fast multiplication – Integer division – Floating point numbers and operations.

UNIT- III BASIC PROCESSING UNIT 9

Fundamental concepts – Execution of a complete instruction – Multiple bus organization – Hardwired control – Microprogrammed control - Pipelining – Basic concepts – Data hazards – Instruction hazards – Influence on Instruction sets – Data path and control consideration – Superscalar operation.

UNIT- IV MEMORY SYSTEM 9

Basic concepts – Semiconductor RAMs - ROMs – Speed - size and cost – Cache memories - Performance consideration – Virtual memory- Memory Management requirements – Secondary storage.

UNIT- V I/O ORGANIZATION 9

Accessing I/O devices – Interrupts – Direct Memory Access – Buses – Interface circuits – Standard I/O Interfaces (PCI, SCSI, USB).

L:45; T:15; TOTAL : 60

TEXT BOOKS:

1. Carl Hamacher, Zvonko Vranesic and Safwat Zaky, 5th Edition “Computer Organization”, McGraw-Hill, 2002.

REFERENCES:

1. William Stallings, “Computer Organization and Architecture – Designing for Performance”, 6th Edition, Pearson Education, 2003.
2. David A.Patterson and John L.Hennessy, “Computer Organization and Design: The hardware / software interface”, 2nd Edition, Morgan Kaufmann, 2002.
3. John P.Hayes, “Computer Architecture and Organization”, 3rd Edition, McGraw Hill, 1998.

UNIT I BASICS OF COMPUTER AND PROGRAMMING 12

Digital Computer Fundamentals –Block diagram of a computer–Component of a computer system–Hardware and Software–Categories of Software–Booting–Installing and uninstalling Software–Software piracy–Software terminologies–Applications of Computers–Algorithm – Design - Flow chart –History of Internet–Internet Services.

UNIT II BASIC ELEMENTS OF C 12

Introduction to C – Lexical elements of C – Operators and expressions – Operator precedence and associativity of operators – Input and Output Functions – Simple computational problems - Program Control Structures- Control statements – Branching, looping, nested control structures, switch, break, continue, goto statements – Problems using control structures.

UNIT III FUNCTIONS AND PROGRAM STRUCTURES 12

Prototypes and Functions–Declaring, defining and accessing functions–Parameter passing methods–Recursion–Storage classes–auto, extern, static and register–Library functions-Programs using functions.

Arrays:

Defining and processing arrays–Passing arrays to functions–Multi-dimensional arrays–Strings and basic operations on strings–Enumerated data types–Programs using simple sorting, searching and merging of arrays.

UNIT IV POINTERS 12

Pointer concept–Declaration–Accessing variable through pointer–Initializing pointer variable–Pointers and Functions–Pointers and Arrays–Pointers and Structures–Example programs using pointers with function, arrays and structures–Command line arguments – Dynamic memory allocation–Operations on pointers.

UNIT V STRUCTURES, UNIONS AND FILE HANDLING 12

Structures–User defined data types–Union–Nested structure, passing structures to functions - Self referential structures - File pointer–High level File operations–Opening and closing of file–Creating, Processing and Updation on files–Simple file handling programs.

L:60; Total:60

TEXT BOOKS:

1. Byron Gottfried, "Programming with C", II Edition, (Indian Adapted Edition), TMH publications, 2006.
2. Yeshwant Kanethker, "Let us C", BPB Publications, 2004

REFERENCES:

1. Brian W. Kernighan and Dennis M. Ritchie, "The C Programming Language", Pearson Education Inc. (2005).
2. Behrouz A. Forouzan and Richard. F. Gilberg, "A Structured Programming Approach Using C", II Edition, Brooks–Cole Thomson Learning Publications, 2001.
3. Johnsonbaugh R. and Kalin M., "Applications Programming in ANSI C", III Edition, Pearson Education India, 2003.

XCS204 DIGITAL PRINCIPLES AND SYSTEM DESIGN**3 0 0 3****UNIT- I BOOLEAN ALGEBRA AND LOGIC GATES****8**

Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems - Boolean functions – Simplifications of Boolean functions using Karnaugh map and tabulation methods – Logic gates

UNIT- II COMBINATIONAL LOGIC**9**

Combinational circuits – Analysis and design procedures - Circuits for arithmetic operations - Code conversion – Introduction to Hardware Description Language (HDL)

UNIT- III DESIGN WITH MSI DEVICES**8**

Decoders and encoders - Multiplexers and demultiplexers - Memory and programmable logic - HDL for combinational circuits

UNIT- IV SYNCHRONOUS SEQUENTIAL LOGIC**10**

Sequential circuits – Flip flops – Analysis and design procedures - State reduction and state assignment - Shift registers – Counters - HDL for sequential logic circuits, Shift registers and counters.

UNIT- V ASYNCHRONOUS SEQUENTIAL LOGIC**9**

Analysis and design of asynchronous sequential circuits - Reduction of state and flow tables – Race-free state assignment – Hazards.

L:45; TOTAL :45**TEXT BOOK**

M.Morris Mano, “Digital Design”, 3rd edition, Pearson Education, 2002.

REFERENCES

1. Charles H.Roth, Jr. “Fundamentals of Logic Design”, 4th Edition, Jaico Publishing House, 2000.
2. Donald D.Givone, “Digital Principles and Design”, Tata McGraw-Hill, 2003.

XCS205 FUNDAMENTALS OF COMPUTER SCIENCE 3 0 0 3

UNIT – I DIGITAL CONCEPTS 9
Digital Computer Fundamentals -Digital and Analog quantities – Binary digits – Logic Levels – Digital Waveforms – Basic Logic operations – Digital Integrated Circuits.

UNIT – II HARDWARE AND SOFTWARE 9
Processing Devices – Memory Devices – Input and Output Devices – Optical Input Devices – Audiovisual Input Devices – Monitors – Printing Devices - Storage Devices – Magnetic and Optical Storage Devices - System Software – Application Software – Graphics and Multimedia.

UNIT – III NETWORKING FUNDAMENTALS 9
Data Communication with Standard Telephone Lines – Modems – Digital Data Connections – Broadband Connections – DSL Technologies – Cable Modem Connections – Computer Networking Basics – Common Types of Networks – Structuring of Networks – Network Media and Hardware.

UNIT – IV INTERNET CONCEPTS 9
Introduction – Evolution of Internet - Internet Applications – Electronic mail-Search engines-Languages of Internet-Internet and viruses, Network Components-Routers-Firewalls – Repeaters-Hubs- Switches- Bridges, HTTP, FTP, Telnet, WWW

UNIT – V OPERATING SYSTEM AND DATABASE FUNDAMENTALS 9
Evolution, Types, Functions of Operating system, , Modern operating system, Introduction to File and database system, Database system structure, Database Languages.

Total:45

TEXT BOOKS:

1. Thomas L.Floyd and R.P.Jain, “Digital Fundamentals”, 8th Edition, Pearson Education, 2007.
2. Peter Norton, “Introduction to Computers”, 6th Edition, Tata Mc Graw Hill, New Delhi, 2006.
3. ITL Education Solutions Limited, ”Introduction to Computer Science”, Pearson Education, 2004

REFERENCES:

1. Morris Mano, “Digital Design”, 3rd Edition, Pearson Education, 2006.
2. Rajkamal, “Digital Systems: Principles and Design”, 1st Edition, Pearson Education, 2007.
3. Albert Paul Malvino, Donald P. Leech, “Digital Principles and Applications”, 6th Edition, Mc Graw Hill Publishers, 2007.

1. INTRODUCTION 9

Problem solving aspect – Top –down design – Implementation of algorithms – Program verification – Efficiency –Analysis of Algorithms – Fundamental Algorithms – swapping – counting – Factorial Reversing the digits – Base conversion Algorithms.

2. FACTORING METHODS AND ARRAY TECHNIQUES 9

Finding Squart Root – LCM – GCD Generation of Prime Numbers – Random Numbers and Fibonacci Numbers – Array Techniques – Histogramming – Minimum and Maximum numbers – Duplication Removal – Partitioning – Kth smallest Element.

3. MERGING, SORTING AND SEARCHING 9

Two- way Merge Sort – Selection Sort – Exchange Sort – Insertion Sort – Diminishing Increment Sort – Partition Sort – Binary Search – Hash Search – Text Processing – Keyword Searching in text – Text Line Editing – Linear and Sub linear Pattern Search.

4. DYNAMIC DATA STRUCTURE ALGORITHMS 9

Stack Operations – Queue Operations – Linked List – Insertion Deletion and Search Operation – Binary Tree – Insertion, Deletion and Search.

5. RECURSIVE ALGORITHMS 9

Binary Tree Traversal – Recursive Quick Sort – Towers of Hanoi Problem.

L :45; T :15; Total:60

TEXT BOOKS:

1. Dromey R.G, “How to Solve it by Computer” Prentice Hall of India, Delhi, 1999.

REFERENCES:

1. Aho A.V. J.E. Hopcroft and J.D. Ullman, “The Design and Analysis of Computer Algorithms”, Pearson Education Delhi, 2001.
2. Sara Baase and Allen Van Gelder, “Computer Algorithms – Introduction to Design and Analysis” Pearson Education Delhi, 2002.

INTRODUCTION

Application Packages

1. Word
2. Spread sheet
3. Power point

C PROGRAMMING

1. Programs using Operators and Expressions
2. Programs using IO Formatting
3. Programs using Control Structures
4. Programs using Looping Structures
5. Programs using Arrays and String manipulations
6. Programs using Functions and Recursion
7. Programs using Structures and Unions
8. Programs using Pointers
9. Programs using Files
10. Programs using Command line arguments

Practical : 45

UNIT – I EXTENSIVE LISTENING**12**

Listening and typing –Listening and sequencing of information – Filling in the blanks – Listening and answering the question. Cloze Exercises- Vocabulary building – Dictionary habits a brief note on Thesaurus.

Listening to specific speeches, discussions, interviews, debates, lectures. (Instructional Aids: Audio cassettes, Tape recorders, Language Software.

Suggested Activities

- Gap filling activities while listening to a text
- Listening and identifying the missing words in a given text
- Listening to a brief conversation and answering questions orally
- Listening to commentaries on television or radio to improve listening skills
- Paying attention to speaker's appearance, expressions, body movements and posture that convey meaning to his/her words.

UNIT – II INTENSIVE LISTENING**12**

Listening for specific information – note taking-guided and open – listening comprehension- listening to specific speeches-interviews –debates lectures.

Suggested Activities

- Taking notes during lectures.
- Listening to a discourse and filling up gaps in a work sheet.
- Informational comprehension and literal comprehension tasks based on listening- post listening quiz.
- Listening to a passage preferably technical and answering questions choosing appropriate options (multiple choice)

Note : These listening activities can be done using a work sheet in a language laboratory or in the class room using a tape recorder.

UNIT III SPEAKING

12

Oral practice –developing confidence-introducing oneself-asking for or eliciting information-offering suggestions and recommendations.

Analysing problems and providing solutions- expressing opinions (agreement and disagreement) Role of idioms in Spoken Communication Pronunciation Practice-Stress intonation, accent, questions for oral discussions, describing objects, presenting information, Process description, narrating events, giving introduction, welcome speech and proposing a vote of thanks.

Suggested Activities

- Introducing oneself and others
- Role play activities based on real –life situations
- Discussing travel plan / industrial visit
- Giving oral instructions for performing tasks at home, at class-room and at work place
(use of imperatives)
- Participating in a short classroom-discussion on a controversial topic (eg. For and against reservation policy in educational institutions)
- Oral presentation on topics related to science and technology.

UNIT IV CONVERSATION

12

Face to Face conversation- Telephonic conversation- Role play activities (Students take on roles and engage in conversation) participating in an interview situational dialogues.

Suggested Activities

- Making either telephonic conversations or face to face conversation- making request- Asking questions-making recommendations using modal verbs-Giving instructions using imperatives – Expressing purpose and function-obligation and preference- Accepting and offering counseling .

UNIT V LABORATORY PRACTICE

12

Resume/ Report preparation / Letter writing

Structure the resume/ report letter writing/ E-mail communication samples

Presentation skills

Elements of an effective presentation – structure of presentation- presentation tools-voice modulation- audience analysis – body language- video samples.

Soft skills

The management- articulation – assertiveness – psychometrics- innovation and creative – stress management and poise- video samples

Group discussion

Why is GD part of selection process?- Structure of GD- moderator – led and other GDs – Strategies in GD- Team spirit- Body language(gestures)- Mock GD- Video samples.

Interview skills

Kinds of interviews- required key skills – corporate culture – mock interview- video samples.

L:30; P:30; Total : 60

TEXT BOOKS

1. Meenakshi Raman, Sangeetha Sharma: Technical Communication Principles and Practice, Oxford University Press.

REFERENCES

1. Jeremy Comfort, Pamela Rogerson, Trish Stott and Derek Utley: Speaking Effectively, Cambridge University Press.
2. Jayashree Balan; Spoken English, Vijay Nicole Imprints Private Ltd., Chennai.
3. Jean Naterop and Rod Revell (1988) Telephoning in English (Cambridge University Press David Martur (1994), Tough Talking, University Press, Hyderabad.

1. Verification of Boolean theorems using digital logic gates
2. Design and implementation of combinational circuits using basic gates for arbitrary functions, code converters, etc.
3. Design and implementation of 4-bit binary adder / subtractor using basic gates and MSI devices
4. Design and implementation of parity generator / checker using basic gates and MSI devices
5. Design and implementation of magnitude comparator
6. Design and implementation of application using multiplexers
7. Design and implementation of Shift registers
8. Design and implementation of Synchronous and Asynchronous counters
9. Coding combinational circuits using Hardware Description Language (HDL software required)
10. Coding sequential circuits using HDL (HDL software required)

UNIT -I PROPOSITIONAL CALCULUS 9

Propositions – Logical connectives – Compound propositions – Conditional and biconditional propositions – Truth tables – Tautologies and contradictions – Contrapositive – Logical equivalences and implications – DeMorgan's Laws - Normal forms – Principal conjunctive and disjunctive normal forms – Rules of inference – Arguments - Validity of arguments.

UNIT -II PREDICATE CALCULUS 9

Predicates – Statement function – Variables – Free and bound variables – Quantifiers – Universe of discourse – Logical equivalences and implications for quantified statements – Theory of inference – The rules of universal specification and generalization – Validity of arguments.

UNIT -III SET THEORY 9

Basic concepts – Notations – Subset – Algebra of sets – The power set – Ordered pairs and Cartesian product – Relations on sets –Types of relations and their properties – Relational matrix and the graph of a relation – Partitions – Equivalence relations – Partial ordering – Poset – Hasse diagram – Lattices and their properties – Sublattices – Boolean algebra – Homomorphism.

UNIT-IV FUNCTIONS 9

Definitions of functions – Classification of functions –Type of functions - Examples – Composition of functions – Inverse functions – Binary and n-ary operations – Characteristic function of a set – Hashing functions – Recursive functions – Permutation functions

UNIT-V GROUPS 9

Algebraic systems – Definitions – Examples – Properties – Semigroups – Monoids – Homomorphism – Sub semigroups and Submonoids - Cosets and Lagrange's theorem – Normal subgroups – Normal algebraic system with two binary operations - Codes and group codes – Basic notions of error correction - Error recovery in group codes.

L:45; T: 15;Total: 60

TEXT BOOKS:

1. Trembly J.P and Manohar R, “Discrete Mathematical Structures with Applications to Computer Science”, Tata McGraw–Hill Pub. Co. Ltd, New Delhi, 2003.
2. Ralph. P. Grimaldi, “Discrete and Combinatorial Mathematics: An Applied Introduction”, Fourth Edition, Pearson Education Asia, Delhi, 2002.

REFERENCES:

1. Bernard Kolman, Robert C. Busby, Sharan Cutler Ross, “Discrete Mathematical Structures”, Fourth Indian reprint, Pearson Education Pvt Ltd., New Delhi, 2003.
2. Kenneth H.Rosen, “Discrete Mathematics and its Applications”, Fifth Edition, Tata McGraw – Hill Pub. Co. Ltd., New Delhi, 2003.

UNIT – I HUMAN VALUES**10**

Morals, Values and Ethics – Integrity – Work Ethic – Service Learning – Civic Virtue – Respect for Others – Living Peacefully – caring – Sharing – Honesty – Courage – Valuing Time – Co-operation – Commitment – Empathy – Self-Confidence – Character – Spirituality

UNIT – II ENGINEERING ETHICS**9**

Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest - customs and religion - uses of ethical theories.

UNIT – III ENGINEERING AS SOCIAL EXPERIMENTATION**9**

Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

UNIT – IV SAFETY, RESPONSIBILITIES AND RIGHTS**9**

Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the three mile island and Chernobyl case studies.

Collegiality and loyalty - respect for authority - collective bargaining - confidentiality - conflicts of interest - occupational crime - professional rights - employee rights - Intellectual Property Rights (IPR) - discrimination.

UNIT – V GLOBAL ISSUES**8**

Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-sample code of Ethics like ASME, ASCE, IEEE, Institution of Engineers (India), Indian Institute of Materials Management, Institution of electronics and telecommunication engineers (IETE),India, etc.

Total : 45**TEXT BOOKS:**

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 1996.
2. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES:

1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New Jersey, 2004 (Indian Reprint)
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
3. John R Boatright, "Ethics and the Conduct of Business", Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, "Fundamentals of Ethics for Scientists and Engineers", Oxford University Press, Oxford, 2001.

XCS303 MICROPROCESSORS AND MICROCONTROLLERS 3 1 0 4

UNIT I THE 8085 MICROPROCESSOR 9

Introduction to 8085 – Microprocessor architecture – Instruction set – Programming the 8085 – Code conversion.

UNIT II I/O INTERFACING 9

Memory Interfacing and I/O interfacing - Parallel communication interface – Serial communication interface – Timer – Keyboard /display controller – Interrupt controller – DMA controller – Programming and applications.

UNIT III THE 8086 MICROPROCESSOR 9

Intel 8086 microprocessor – Architecture – Instruction set and assembler directives – Addressing modes – Assembly language programming – Procedures – Macros – Interrupts and interrupt service routines.

8086 signals and timing – MIN/MAX mode of operation – Addressing memory and I/O – Multiprocessor configurations – System design using 8086

UNIT IV 8051 MICROCONTROLLER 9

8051 Micro controller hardware- I/O pins, ports and circuits- External memory – Counters and Timers-Serial Data I/O- Interrupts-Interfacing to external memory and 8255.

UNIT V 8051 PROGRAMMING AND APPLICATIONS 9

8051 instruction set – Addressing modes – Assembly language programming – I/O port programming -Timer and counter programming – Serial Communication – Interrupt programming –8051 Interfacing: LCD, ADC, Sensors, Stepper Motors, Keyboard and DAC.

L:45; T:15; Total : 60

TEXT BOOKS:

1. Ramesh S.Gaonkar, “Microprocessor - Architecture, Programming and Applications with the 8085”, Penram International publishing private limited, fifth edition.
(UNIT-1: – Chapters 3,5,6 and programming examples from chapters 7-10)
2. A.K. Ray & K.M.Bhurchandi, “Advanced Microprocessors and peripherals- Architectures, Programming and Interfacing”, TMH, 2002 reprint.
(UNITS 2 to 5: – Chapters 1-6, 7.1-7.3, 8, 16)
3. Mohamed Ali Mazidi, Janice Gillispie Mazidi, “The 8051 microcontroller and embedded systems”, Pearson education, 2004.

REFERENCES:

1. Douglas V.Hall, "Microprocessors and Interfacing: Programming and Hardware", TMH, Third edition
2. Yu-cheng Liu, Glenn A.Gibson, "Microcomputer systems: The 8086 / 8088 Family architecture, Programming and Design", PHI 2003
3. John Uffenbeck, The 80x86 Family, Design, Programming and Interfacing, Third Edition. Pearson Education, 2002
4. Kenneth J Ayala, The 8051 Microcontroller Architecture Programming and Application, 2nd Edition, Penram International Publishers (India), New Delhi, 1996.
5. Barry B.Brey, "The Intel Microprocessors – 8086/8088, 80186, 286, 386, 486, Pentium and Pentium Pro processor", Prentice Hall of India Pvt. Ltd., 1998.

XCS305 SYSTEM SOFTWARE 3 0 0 3

UNIT I INTRODUCTION 8

System software and machine architecture – The Simplified Instructional Computer (SIC) - Machine architecture - Data and instruction formats - addressing modes - instruction sets - I/O and programming.

UNIT II ASSEMBLERS 10

Basic assembler functions - A simple SIC assembler – Assembler algorithm and data structures - Machine dependent assembler features - Instruction formats and addressing modes – Program relocation - Machine independent assembler features - Literals – Symbol-defining statements – Expressions - One pass assemblers and Multi pass assemblers - Implementation example - MASM assembler.

UNIT III LOADERS AND LINKERS 9

Basic loader functions - Design of an Absolute Loader – A Simple Bootstrap Loader - Machine dependent loader features - Relocation – Program Linking – Algorithm and Data Structures for Linking Loader - Machine-independent loader features - Automatic Library Search – Loader Options - Loader design options - Linkage Editors – Dynamic Linking – Bootstrap Loaders - Implementation example - MSDOS linker.

UNIT IV MACRO PROCESSORS 9

Basic macro processor functions - Macro Definition and Expansion – Macro Processor Algorithm and data structures - Machine-independent macro processor features - Concatenation of Macro Parameters – Generation of Unique Labels – Conditional Macro Expansion – Keyword Macro Parameters-Macro within Macro-Implementation example - MASM Macro Processor – ANSI C Macro language.

UNIT V SYSTEM SOFTWARE TOOLS 9

Text editors - Overview of the Editing Process - User Interface – Editor Structure. - Interactive debugging systems - Debugging functions and capabilities – Relationship with other parts of the system – User-Interface Criteria.

Total : 45

TEXT BOOK:

1. Leland L. Beck, “System Software – An Introduction to Systems Programming”, 3rd Edition, Pearson Education Asia, 2000.

REFERENCES:

1. D. M. Dhamdhere, “Systems Programming and Operating Systems”, Second Revised Edition, Tata McGraw-Hill, 1999.
2. John J. Donovan “Systems Programming”, Tata McGraw-Hill Edition, 1972.

XCS306 DATA STRUCTURES 3 0 0 3

UNIT I PROBLEM SOLVING 9

Problem solving – Top-down Design – Implementation – Verification – Efficiency – Analysis – Sample algorithms.

UNIT II LISTS, STACKS AND QUEUES 8

Abstract Data Type (ADT) – The List ADT – The Stack ADT – The Queue ADT

UNIT III TREES 10

Preliminaries – Binary Trees – The Search Tree ADT – Binary Search Trees – AVL Trees – Tree Traversals – Hashing – General Idea – Hash Function – Separate Chaining – Open Addressing – Linear Probing – Priority Queues (Heaps) – Model – Simple implementations – Binary Heap

UNIT IV SORTING 9

Preliminaries – Insertion Sort – Shellsort – Heapsort – Mergesort – Quicksort – External Sorting

UNIT V GRAPHS 9

Definitions – Topological Sort – Shortest-Path Algorithms – Unweighted Shortest Paths – Dijkstra's Algorithm – Minimum Spanning Tree – Prim's Algorithm – Applications of Depth-First Search – Undirected Graphs – Biconnectivity – Introduction to NP-Completeness

Total : 45

TEXT BOOKS:

1. R. G. Dromey, "How to Solve it by Computer" (Chaps 1-2), Prentice-Hall of India, 2002.
2. M. A. Weiss, "Data Structures and Algorithm Analysis in C", 2nd ed, Pearson Education Asia, 2002. (chaps 3, 4.1-4.4 (except 4.3.6), 4.6, 5.1-5.4.1, 6.1-6.3.3, 7.1-7.7 (except 7.2.2, 7.4.1, 7.5.1, 7.6.1, 7.7.5, 7.7.6), 7.11, 9.1-9.3.2, 9.5-9.5.1, 9.6-9.6.2, 9.7)

REFERENCES:

1. Y. Langsam, M. J. Augenstein and A. M. Tenenbaum, "Data Structures using C", Pearson Education Asia, 2004
2. Richard F. Gilberg, Behrouz A. Forouzan, "Data Structures – A Pseudocode Approach with C", Thomson Brooks / COLE, 1998.
3. 3.Aho, J. E. Hopcroft and J. D. Ullman, "Data Structures and Algorithms", Pearson education Asia, 1983.

LIST OF EXPERIMENTS

1. Programs for 8/16 bit Arithmetic operations (Using 8085).
2. Programming with 8085-code conversion, decimal arithmetic, bit manipulations.
3. Programming with 8086 – String manipulation, search, find and replace, copy operations, sorting. (PC Required)
4. Using BIOS/DOS calls: Keyboard control, display, file manipulation. (PC Required)
5. Using BIOS/DOS calls: Disk operations. (PC Required)
6. Interfacing with 8085/8086 – 8255, 8253
7. Interfacing with 8085/8086 – 8279,8251
8. 8051 Microcontroller based experiments – Simple assembly language programs (cross assembler required).
9. 8051 Microcontroller based experiments – Simple control applications (cross assembler required).
10. Communication between 8051 Microcontroller kit and PC.

1. Queue implementation using arrays.
2. Stack implementation-using arrays.
3. Singly, doubly and circular linked list implementation and all possible operations on lists
4. Queue and Stack implementation using linked list.
5. Implement the application for checking 'Balanced Parenthesis' using array implementation of Stack ADT.
6. Implement the application for 'Evaluating Postfix Expressions' using array and linked list implementations of Stack ADT.
7. Binary search tree implementation using linked list and possible operations on binary search trees.
8. In-order, preorder and post order traversals.
9. Quick sort.
- 10.Heap Sort.
- 11.Binary Search implementation.
- 12.Depth first and Breadth first traversal in graphs.