FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

B.Tech. COMPUTER SCIENCE & ENGINEERING

(SEMESTER: I-VI)
(Under Credit Based Continuous Evaluation Grading System)

(Old System)
(SEMESTER: VII & VIII)

Examinations: 2012-13

GURU NANAK DEV UNIVERSITY AMRITSAR

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER SYSTEM
(Under Credit Based Continuous Evaluation Grading System)

Scheme:

S. NO.	Course Code	Course	CREDITS		
		Semester – I	L	T	P
1	ECL117	Manufacturing Process	2	1	1
2	ARL196	Engineering Graphics & Drafting	3	1	0
3	ENL114	Communicative English–I	2	0	0
4	MTL101	Mathematics–I	3	1	0
5	PHL193	Physics–I	2	1	1
6	ECL115	Electrical Engineering	2	1	1
7	PHL195	Material Science & Engineering	3	1	0
8		Elective–I	2	0	0
		Sub Total:	19	6	3
		Grand Total:	28		
		List of Electives–I			
1	PBL191	Punjabi Compulsory–I OR	2	0	0
	PBL191	Basic Punjabi (Mudhli Punjabi)	2	0	0

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		Semester – II			
1	CSL125	Fundamentals of I.T. & Computer Programming	2	1	1
2	CYL195	General Chemistry	2	1	1
3	ECL196	Electronics & Instruments	2	1	1
4	ENL196	Communicative English–II	2	0	0
5	MTL102	Mathematics–II	3	1	0
6	PHL199	Mechanics	3	1	0
7	PHL198	Physics – II	3	1	0
8		Elective–II	2	0	0
		Sub Total:	19	6	3
		Grand Total:	28		
		List of Electives–II			
1	PBL196	Punjabi Compulsory–I OR	2	0	0
2	PBL196	Basic Punjabi (Mudhli Punjabi)	2	0	0

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S. NO.	Course Code	Course	CREDITS		
		Semester – III			
1	CSL230	Computer Architecture	3	1	0
2	CSL231	Data Structures & Programming Methodology	2	1	1
3	CSL232	Programming Languages	2	1	1
4	ESL220*	Environmental Studies (Compulsory)	3	0	0
5	ECL291	Digital Circuits & Logic Design	2	1	1
6	ENL291	Written & Oral Technical Communication	2	1	1
7	MTL201	Mathematics–III	3	1	0
		Sub Total:	17	6	4
		Grand Total:	27		

*Note: Credits will not be included.

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		Semester – IV	L	T	P
1.	CSL240	Operating System	2	1	1
2.	CSL241	Data Communication	3	1	0
3.	CSL242	Microprocessors & Assembly Language Programming	2	1	1
4.	CSL243	System Programming	2	1	1
5.	ECL296	Control & Instrumentation	3	1	0
6.	MTL202	Discrete Structures	3	1	0
		Sub Total:	15	6	3
		Grand Total:	24		

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S. NO.	Course Code	Course	CREDITS		
		Semester – V			
1.	CSL330	System Analysis Design	3	1	0
2.	CSL331	Network Operating Systems	3	1	0
3.	CSL332	Relational Database Management Systems	3	1	0
4.	CSL333	Design & Analysis of Algorithm	3	1	0
5.	CSL334	Computer Graphics	3	1	0
6.	CSP335	Programming Lab–I(RDBMS & Computer N/W)	0	0	2
7.	CSP336	Programming Lab–II(Algorithm & Graphics)	0	0	2
8.		Interdisciplinary Course–I	4	0	0
		Sub Total:	19	5	4
		Grand Total:	28		
		Semester – VI	L	T	P
1.	CSL342	Object Oriented Analysis & Design	3	1	0
2.	CSL343	Software Engineering	3	1	0
3.	CSL344	Object Oriented Programming using JAVA	3	1	0
4.		Elective–I (for code see Dept. Elective–I list)	3	1	0
5.	CSP340	Programming Lab – VI	0	0	4
6.		Interdisciplinary Course–II	4	0	0
7.		Interdisciplinary Course–III	4	0	0
		Sub Total:	20	4	4
		Grand Total:	28		
		Electives–I			
1.	CSL345	Natural Language Processing	3	1	0
2.	CSL346	System Hardware Design	3	1	0
3.	CSL347	Real Time Systems	3	1	0
4.	CSL348	Operation Research	3	1	0
5.	CSL349	Language Processor	3	1	0

Seventh Semester:

S.No.	Course Code	Course Title	Internal Assessment	External Assessment	Total
1	CS-402	Symbolic Logic & Logic Programming	40	60	100
2	CS-404	Formal Languages & Automata Theory	40	60	100
3	CS-406	Principal of Engineering Economics & Management Techniques	40	60	100
4	CS-408	Overview of I.T. Material	40	60	100
5	CS-410	Software Lab VII (SI & LP)	25	25	50
6	for code see Elective-1 list	Departemental Elective - II	40	60	100
7	for code see Elective-1 list	Departemental Elective - III	40	60	100
8	for code see Elective-1 list	Lab (DE - III)	25	25	50

Semester Total : 700

Eighth Semester:

Industrial Attachment & Project Work in the same industry for total period of 28 weeks. (Six Months) to be continued during the seventh, semester also.

			Weeks	**Marks**		
S.No.	**Course Code**	**Course Title**		**Int. Asses.**	**Ext. Asses.**	**Total**
1	CS-401	Industrial Training Cum Projects	28 Weeks	300	325	625

Departmental Elective - II

S.No.	Course Code	Course Title	Hours/Week			Credits
			L	T	P	
1.	CS-412	INTERNET PROTOCOLS	3	1	-	4
2.	CS-414	CONGNITIVE PSYCHOLOGY	3	1	-	4
3.	CS-416	ORGANISATIONAL STRUCTURES	3	1	-	4
4.	CS-418	INDUSTRIAL MANAGEMENT	3	1	-	4
5.	CS-420	INDUSTRIAL ECONOMICS	3	1	-	4
6.	CS-422	TRANSACTIONAL ANALYSIS (BEHAVIOURAL SCIENCE)	3	1	-	4

Departmental Elective - III

S.No.	Course Code	Course Title	Hours/Week			Credits
			L	T	P	
1.	CS 424	ADVANCED MICROPROCESSORS	3	-	-	3
2.	CS-426	ADVANCED MICROPROCESSORS	-	-	4	2
3.	CS-428	FORMAL SPECIFICATION & VERIFICATION	3	-	-	3
4.	CS-430	FORMAL SPECIFICATION & VERIFICATION	-	-	4	2
5.	CS-432	EXPERT SYSTEMS	3	-	-	3
6.	CS-434	EXPERT SYSTEMS	-	-	4	2
7.	CS-436	ROBOTICS	3	-	-	3
8.	CS-438	ROBOTICS	-	-	4	2
9.	CS-440	IMAGE PROCESSING & PATTERN RECOGNITION	3	-	-	3
10.	CS-442	IMAGE PROCESSING & PATTERN RECOGNITION	-	-	4	2
11.	CS-444	EMERGING TECHNOLOGIES & CURRENT IT TRENDS	3	-	-	3
12.	CS-446	EMERGING TECHNOLOGIES & CURRENT IT TRENDS	-	-	4	2
13.	CS-448	SYSTEM SIMULATION & MODELING	3	-	-	3
14.	CS-450	SYSTEM SIMULATION & MODELING	-	-	4	2
15.	CS-452	OBJECT ORIENTED PROGRAMMING	3	-	-	3
16.	CS-454	OBJECT ORIENTED PROGRAMMING	-	-	4	2

Open Electives:

S.No.	Course Code	Course Title	Hours/Week			Credits
			L	T	P	
1.	CS-352	MICRO PROCESSORS AND ITS APPLICATIONS	3	1	-	4
2.	CS-354	MICRO PROCESSORS AND ITS APPLICATIONS (Lab).	-	-	2	1
3.	CS-356	INTERACTIVE COMPUTER GRAPHICS	3	1	-	4
4.	CS-358	INTERACTIVE COMPUTER GRAPHICS (Lab).	-	-	2	1
5.	CS-360	INFORMATION TECHNOLOGY TOOLS FOR ENGINEERS	3	1	-	4
6.	CS-362	INFORMATION TECHNOLOGY TOOLS FOR ENGINEERS (Lab).	-	-	2	1
7.	CS-364	DISTRIBUTED DATABASE MANAGEMENT SYSTEMS (Lab).	3	1	-	4
8.	CS-366	DISTRIBUTED DATABASE MANAGEMENT SYSTEMS (Lab).	-	-	2	1
9.	CS-368	APPLICATION PROGRAMMING FOR ENGINEERS	3	1	-	4
10.	CS-370	APPLICATION PROGRAMMING FOR ENGINEERS (Lab).	-	-	2	1
11.	CS-372	INSIDE WINDOWS NT SERVER	3	1	-	4
12.	CS-374	INSIDE WINDOWS NT SERVER	-	-	2	1
13.	CS-376	INSIDE NOVELL NETWARE SERVER	3	1	-	4
14.	CS-378	INSIDE NOVELL NETWARE SERVER	-	-	2	1
15.	CS-380	ROBOTICS & ARTIFICIAL INTELLIGENCE	3	1	-	4
16.	CS-382	ROBOTICS & ARTIFICIAL INTELLIGENCE	-	-	2	1

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ECL–117: MANUFACTURING PROCESS

CREDITS		
L	**T**	**P**
2	1	1

UNIT–I

Theory:

1. **Plastics and their Processing:** Introduction, Types of Plastics, Thermo–plastics, Thermosetting plastics, Materials for processing plastics, Moulding processes compression moulding, Transfer Moulding, Injection moulding, Extrusion, Calendering, Thermo forming, Blow moulding, Casting, Laminating & Reinforcing, foamed plastics, Fastening & matching plastics.
2. **Ferrous Metal & Alloys:** Introduction, Pig iron, cast iron, wrought iron, carbon steel, alloy steel, blast furnace, modern development, electric furnace process, classification of steel, unalloyed steels and alloy steels.
3. **Non–ferrous Metals & Alloy:** Introduction, Aluminum & its alloys, copper and its alloys, lead and its alloys, phosphorous Bronze gun metal.
4. **Mechanical Working of Metals (Metal forming):** Introduction, hot working, rolling, forgoing, piercing, Drawing, Spinning, extruding, cold working, metallurgical advantages of hot working over cold working processes.

UNIT–II

5. **Joint Processes :** Introduction, weldability, types of welding, welding processes, use of electricity in welding, formation & characteristics of electric Arc, Four positions of Arc, welding, types of joints and types of applicable welds, Arc. Welding machine. TIG welding MIG welding, submerged welding, laser welding, spot welding etc. gas welding, Oxyacetylene welding, types of gas flame welding equipments, relative merits of AC & DC welding, welding defects, soldering and Brazing.
6. **Carpentry :** Introduction, structure of wood, grain in wood, seasoning of wood, classification of wood, common varieties of Indian timber, carpentry tools, marking and measuring tools, cutting tools, boring tools, striking tools, holding tools, miscellaneous tools, carpentry processes marking, sawing, planning, chiselling, boring, grooving, rebating, moulding, carpentry joints, wood working lathe, circular saw, band saw, wood planer, joint, mortiser.
7. **Foundry :** Introduction, pattern materials, types of pattern, solid pattern, split pattern, match palatel pattern, three piece split pattern etc. Pattern making allowances moulding tools and equipments. Moulding sand, types of moulding sand and casting defects.

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UNIT–III

8. **Machine Process :** Introduction, function of the lathe, types of lathe, speed lathe, engine lathe, bench lathe, tool room lathe, capstan and turret lathe, special purpose lathe, automatic lathe, lathe list of lathe operations.
9. **Drilling Machine :** Introduction, types of drilling machine, work holding devices, list of drilling machine operation, twist drill nomenclature.
10. **Shaper and Planning Machines:** Introduction, types of shaper and planner, list of shaper and planer operations, Planner Vs shaper machine.
11. **Grinding Machines:** Introduction, kinds of grinding, types of grinding machines, rough grinding and precision grinding, potable and flexible shaft grinders, swing frame grinders, surface grinders etc. size and capacities of the grinder.

Texts:

1. Workshop technology by Hazra Chaudhary Latest Edition Volumes I,II.
2. Workshop Technology by Chapman.

Practical:

Aim of this lab course is to make the students familiar with machine shop, Welding shop and Carpentry shop.

In the Machine shop the students are required to understand the working of Lathe machine, Drilling Machine, Shaper machine and Grinding Machines. Students will be given a job to make using these machines.

In the welding shop the students are required to be familiar with arc welding and gas welding. Different types of joints. The students will have hand on practice on the gas and arc welding and will be required to make some job as instructed by the instructor.

In the carpentry shop the students will be made familiar with different types of tools used in carpentry and also some simple jobs will be given to the students to have a hand on practice in this shop.

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ARL–196: ENGINEERING GRAPHICS AND DRAFTING

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Drawing Techniques: Various types of lines, principles of dimensioning, size and location of dimensions, symbols, conventions scales (plane and diagonal) and lettering as per IS Code SP–46 of practice for general engineering drawings.

Practice of drawing various types of lines and dimensioning exercises.

Drawing exercises pertaining to symbols, conventions.

Exercise on lettering techniques: Free hand printing and numerals in 3,5,8 and 12 mm sizes vertical and inclined at 75 ; instrumental lettering in single stroke.

Projection of Points, Lines and Planes: First angle and third angle projections, concept of horizontal and vertical planes, Projection of points and lines, True length, Horizontal and vertical traces, Projection of Planes, Traces of Planes, Auxiliary planes.

Practice exercises on projection of points, lines and planes.

Projection and Sectioning of Solids: Projection of solids such as Prisms, Pyramids, Cylinders, Cones, Spheres, Auxiliary View.

Principles of sectioning, types of sectioning, section lines, cutting plane lines.

Practice on sectioning of solids.

UNIT–II

Isometric Projection: Exercises on isometric views.

Orthographic Projections: Orthographic views, Missing views.

Exercises on identification of missing views.

Practice on orthographic projections.

Practice of free hand sketching of different types of objects.

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UNIT–III

Intersection and Development of Surfaces: Intersection of cylinders, cones and Prisms, Axis of solids being vertical or horizontal. Development of surfaces of truncated cylinders, cones and prisms.

Exercises on intersection of solids – cylinder and cylinder, cylinder and cone, prism and prism, prism and cone, sphere with cylinder.

Exercises involving development of surfaces (Y–Piece, Hopper, Tray and truncated pieces).

Fasteners: Introduction to temporary and permanent fasteners, rivetted and welded joints, types of screw threads, conventional symbols for internal and external threads.

Exercises involving drawing of bolts, nuts, studs and locking devices.

Symbols and Conventions: Symbols and conventions pertaining to relevant engineering disciplines.

Practice in using AatoCAD or similar graphic package for preparing simple drawings.

Recommended Books:

1. Engineering Drawing by PS Gill, SK Kataria and Sons, Ludhiana.
2. Engineering Drawing by NK Bhatt.
3. Engineering and Teaching Drawing by Earl D. Black.
4. Text Book of Engineering Drawing by RK Dhawan, S. Chand and Company Ltd.

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ENL–114: COMMUNICATIVE ENGLISH–I

CREDITS		
L	T	P
2	0	0

Objectives: To introduce students in a graded manner to the communication skills of Reading and Writing in English. At the end of semester–I, the students should be able to demonstrate adequate competence in comprehending the prescribed text and performing the given writing tasks.

Reading:

a) **Developing habits of independent and fast reading:**
Students will be required to read a prescribed prose anthology titled selections from Modern English Prose (Ed. Haladhar Panda published by University Press, Hyderabad). The essays in the anthology will be read by students at home with the help of glossary given in the book. Progressing from one lesson to another, they should learn to read fast. Students are supposed to keep a record of their reading in the form of notes, difficulties, summaries, outlines and reading time for each essay. Class teacher may use this record for award of internal assessment (if any).

b) **Developing Comprehension Skills:**
Teacher will provide guided comprehension of the prescribe texts in the class and help students in answering the questions given at the end of each lesson. Teacher can construct more questions of factual and inferential nature to enhance the comprehension skills of the students. The teacher shall also guide students to do the vocabulary and grammar exercises given at the end of each lesson.

Writing:

a) **Developing skills in personal writing:**
Students will be required to learn short personal write oups involving skills of description and narration. The types of composition task may include personal letter writing, telegram writing, notice writing, diary writing etc. Teacher shall instruct the students about the appropriate format and usual conventions followed in such writing. The teacher may also prescribe any composition / writing book if so required.

b) **Developing writing skills based on guided composition:**
The students will be required to write a longish composition on a question from the essays of Selections from Modern English Prose. The composition will require presentation of ideas beyond the prescribed essays. Sample composition topics are given at the end of each lesson.

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Question Paper: The following format is suggested for a 3–hour test
(Appropriate choices may be given where possible)

1. Short answer comprehension question (at least 5) based on the lesson included in Selection from Modern English Prose) **App. Weighting : 30%**
2. Questions on grammar and vocabulary (words, phrases, proverbs)
App. Weighting : 20%
3. Two short writing tasks of app. 150 words. One a personal letter involving narration of a personal experience or description of objects, persons, places or events. The second may be a telegram or public notice or a diary entry about a personal or family achievement loss or celebration **App. Weighting : 30%**
4. One long composition of about 300 words on one of the topics discussed in Selections from Modern English Prose. Due consideration be given to the organization of details and coherence in writing. **App. Weighting : 20%**

Internal Assessment: The teacher may consider the following for award of internal assessment, if any.

1. Evidence of independent reading as given above. Teacher may suggest some special tasks to suit the needs of their students.
2. Students may be asked to keep diary of their daily or specific routines.
3. Students may be asked to write a certain number of compositions on selected topics during the semester.

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MTL–101: MATHEMATICS–I

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Calculus: Mean value theorems for real functions, Partial derivatives, Euler's theorem on homogeneous functions, Maclaurin's and Taylor's expansions of single and two variables, Maxima and minima of functions of several variables, Lagrangian method of multipliers; Multiple integrals and their use in obtaining surface areas and volumes of solids. (**10 Lectures)**

UNIT–II

Matrices: Unitary, Hermitian matrices, Canonical form of matrix, Bilinear and quadratic forms **(05 Lectures)**

Differential equations: Exact differential Equation, Higher order linear Differential equations, Simultaneous linear ODE's with constant coefficients. Applications of Differential equations **(10 Lectures)**

Solid Geometry: Sphere, Cone, Cylinder, Surface of revolution. **(08 Lectures)**

UNIT–III

Vector calculus: Scalar and Vector point functions, Differentiation of vectors, The vector differential operator applied to the products involving scalar and vector fields, Gradient of a scalar field, Divergence and Curl of a vector field and their physical interpretations, Line integral of a vector field, Surface integral of a vector field, Volume integral of a scalar field, Normal flux, Solenoidal and irrational vector fields, Stokes theorem, Gauss divergence theorem, Green's theorem from Stokes theorem and Gauss divergence theorem, Applications of these theorems in Electromagnetism and Fluid mechanics. **(12 Lectures)**

Books Recommended:

1. Louis A. Pipes: Applied Mathematics for Engineers and Physicists, McGraw Hill Book Company.
2. Kreyszig: Engineering Mathematics, Wiley Eastern Ltd.
3. B.S. Grewal: Higher Engineering Mathematics, Khanna Publisher, New Delhi.

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PHL–193: PHYSICS–I

CREDITS		
L	**T**	**P**
2	1	1

UNIT–I

THEORY

Gauss law and its applications in electrostatics in vector form, electric polarization, permittivity, energy density in an electric field, Ampere's law, Charged particle motion in E and B fields, magnetization,

UNIT–II

Faraday's law of electromagnetics induction; Equation of continuity, generalized Ampere's law, Maxwell's equations, wave equation, plane wave solutions, electromagnetic wave propagation in different media.

UNIT–III

Origin of quantum hypothesis, de Broglie's hypothesis of matter waves, Uncertainty principle, wave function, Schroedinger equation, Expectation value, one–dimensional solution: zero potential, step potential, potential barrier and potential well.

Books Recommended:–

1. Introduction to Electrodynamics, David J. Griffiths, Prentice Hall.
2. Electrodynamics, JD Kraus, McGraw Hill, New York(1991)
3. The Feyman Lectures on Physics Vol. I, II, III, RP Feyman, RB Llleighton, M Sands, Narosa Publushing House, New Delhi, 1995.
4. Concepts of Modern Physics, Arthur Besier, Tata McGraw Hill, 2007.

B. Practicals:

1. To find the capacitance of a capacitor using flashing and quenching of neon lamp.
2. To determine the capacitance of a capacitor by discharging it through a voltmeter.
3. To measure the low resistance using Carey– Foster's bridge.
4. To find the frequency of AC supply using an Electrical vibrator.
5. To find the impedance of an AC Circuit containing R, L and C in series.
6. To study the resonance in series LCR circuit for different R–values and calculate Qvalue.
7. To study the phase relationships using impedance triangle for LCR circuit and calculate impedance.

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ECL–115: ELECTRICAL ENGINEERING

CREDITS		
L	**T**	**P**
2	1	1

UNIT–I

A. THEORY

1. **Electricity :** A brief review of various applications of electricity, difference between AC and DC, units of voltage, current and resistance, concept of electromagnetic induction and production of alternating e.m.f. – single phase and poly phase, concept of 3 phase system star and delta connection, voltage and current relations (formula only)
2. **Power Supply System:** A brief review of special features of the power supply system – power station, transmission, distribution lines, service main, domestic and industrial wiring installation.
3. **Circuit Analysis :** A brief review of DC single phase AC circuits. Three phase AC circuits, phasor representation, star –delta transformation, concept of balanced and unbalanced three phase circuits, measurement of power and power factor in three phase balanced circuits, AC circuits (L.R.C.) solution.
4. **Electrical Machinery:** Transformers: Principle of working, types of transformer and their applications, performance losses, efficiency and voltage regulation, open circuit and short circuit tests on a transformer, auto transformer.

UNIT–II

5. **DC Motors:** Force and EMF production, methods of excitation in DC machines, various types, characteristic and application of DC shunt and series motors.
6. **3 Phase Induction Motor:** Construction and type of 3 phase induction motors; equivalent circuits, application of different types of induction motors, starters and protective devices used for motors.
7. **3 Phase Synchronous Machines:** Principle of working and construction of alternators and synchronous motors.
8. **Single Phase Induction Motors:** Types and construction, their working principle, starting of single phase motor, application of single phase motor.
9. **Special Purpose Motor:** Working principle and application of stepper motor, Servomotor.

UNIT–III

10. **Control and Protection:** Control mechanism, principle and application of servomotors, protection devices for wiring installation and motors – fuses, MCB, LCB, relays.
11. **Battery:** Types and application, care and maintenance of lead acid battery; charging of lead acid battery.

12. **Cables:** Types of cables, construction of LT and HT cables; laying of cables; selection of cables.
13. **Earthing and Grounding:** Need, types, Indian Electricity Rules, use of meggar and earth tester for measurement of earth resistance.
14. **Lighting and Illumination:** Good illumination lighting devices and application, planning for good lighting for various situations.

B. Practicals:

1. To find voltage, current relationship and power factor of given R–L series circuit.
2. To measure the power and power factor of 3 phase balanced circuit by two watt meter method.
3. To find out the line voltage and phase voltage relationship, line current and phase current relationship in case of star connected, and delta connected, 3 phase balanced load.
4. To perform open circuit and short circuit test on a transformer and determine the following:
   a) the transformation ratio.
   b) the transformer efficiency at 25%, 50%, 75%, 100%, 150% load at p.f. of 0.8 lagging and to plot the characteristic curve.
5. To study the speed control of a DC shunt motor. To draw the speed variation with respect to
   a) Change of field current (field control)
   b) Change of resistance in armature circuit (armature control).
6. To connect, start and reverse the direction of a 3 phase induction motor.
7. To trouble shoot fault in a three phase motor.
8. To test the condition of a given battery and to recharge a discharged battery.
9. To connect and take reading of a single phase energy meter.
10. Trouble shooting of domestic wiring system.
11. Study of a distribution board.
12. Use if meggar, test lamp and neon tester.
13. Measurement of earth resistance.

Recommended Books:

1. Principles of Electrical Engineering by Gupta BR; S. Chand and company, New Delhi
2. Electrical Technology by Hughes Edward; The English Language Book Society and Longmans Group Limited, London.
3. Electrical Machines by Bhattacharya SK; Tata McGraw Hill, Delhi.
4. Experiments in Basic Electrical Engineering by Bhattacharya SK and Rastogi KM; New Age International, New Delhi.
5. Experiments in Electrical Engineering by Bhatnagar US; Asia Publishing House, Bombay.
6. Advanced Electrical Technology by Cotton H; Isaac Pitmans and Sons Limited, London
7. Electrical Engineering – Basic Technology by Hubschar; Deutsche Gesllschaft Fur Technische Zusammenabelt (GTZ) GMBH.

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PHL–195: MATERIAL SCIENCE AND ENGINEERING

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Classification of Materials on the basis of their physical properties and applications, Structure–property relationship, structure of materials, crystal system, close packing, crystal planes and directions, Miller indices, Determination of crystal structure using X–Ray diffraction.

UNIT–II

General properties and applications, Phase diagram, Unary and binary, Lever rule, solid solutions, effect of doping and alloying, steel types, non–ferrous materials and alloys.

Crystal imperfections, 0, 1, 2 and 3 dimensional defects, deformation in single and polycrystalline materials

UNIT–III

Plastic and Plastic deformation, Effect of temperature, impurity and grain size.

Conductors, Ferro–electric, dielectric, piezeoelectric and pyro–electric materials and their applications, Electrode, Electrical contact, photo–conducting materials and their applications.

RECOMMENDED BOOKS

1. Materials Science and Engineering by WD Callister Jr. (John Wiley).
2. Elements of Materials Engineering by LH Van Vleck (Addison Wesley).
3. Principles of Materials Science and Engineering by W Smith (Tata McGraw Hill).
4. Introduction to solids by LV Azaroff (TMH).
5. Materials Science and Engineering by V Raghvan (Prentice Hall).
6. Structure and Properties of Materials Vol.1 to 4 by WD Mofflet, GW Pearsall and John Walff (Wiley Eastern).

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – I (ELECTIVES)
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PBL–191: PUNJABI–I

ਪਾਠ–ਕ੍ਰਮ ਅਤੇ ਪਾਠ–ਪੁਸਤਕਾਂ

CREDITS		
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(I) 1. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ

(ੳ) ਗੁਰਮੁਖ ਸਿੰਘ ਮੁਸਾਫਿਰ : **ਗਟਾਰ**
(ਅ) ਸੁਜਾ ਸਿੰਘ : **ਪਠਾਣ ਦੀ ਧੀ**
(ਇ) ਕਰਤਾਰ ਸਿੰਘ ਦੁਗਲ : **ਉੱਚੀ ਅੱਡੀ ਵਾਲੀ ਗੁਰਗਾਬੀ**
(ਕਹਾਣੀ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਹਾਣੀ–ਕਲਾ, ਕਹਾਣੀਕਾਰ)

2. ਗੁਰਮੁਖੀ ਔਰਥੋਗਰਾਫੀ ਦੀ ਜੁਗਤ, (ਪੈਂਤੀ; ਮੁਹਾਰਨੀ; ਬਿੰਦੀ, ਟਿੱਪੀ ਤੇ ਅੱਧਕ); ਵਿਰਾਮ ਚਿੰਨ੍ਹ, ਸ਼ਬਦ ਜੋੜ (ਸ਼ੁਧ–ਅਸ਼ੁਧ)

(II) 1. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ

(ੳ) ਸੰਤੋਖ ਸਿੰਘ ਧੀਰ : **ਸਾਂਝੀ ਕੰਧ**
(ਅ) ਕੁਲਵੰਤ ਸਿੰਘ ਵਿਰਕ : **ਉਜਾੜ**
(ਇ) ਮਹਿੰਦਰ ਸਿੰਘ ਸਰਨਾ : **ਜਥੇਦਾਰ ਮੁਕੰਦ ਸਿੰਘ**
(ਕਹਾਣੀ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਹਾਣੀ–ਕਲਾ, ਕਹਾਣੀਕਾਰ)

2. ਲੇਖ ਰਚਨਾ (ਜੀਵਨੀ–ਪਰਕ, ਸਮਾਜਕ ਅਤੇ ਚਲੰਤ ਵਿਸ਼ਿਆਂ ਉਤੇ):
10 ਲੇਖ ਲਿਖਵਾਉਣੇ (ਕਲਾਸ ਵਿਚ ਅਤੇ ਘਰ ਲਈ ਅਭਿਆਸ)

(III) 1. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਹਾਣੀਕਾਰ

(ੳ) ਪ੍ਰੇਮ ਪ੍ਰਕਾਸ਼ : **ਮਾੜਾ ਬੰਦਾ**
(ਅ) ਗੁਲਜ਼ਾਰ ਸਿੰਘ ਸੰਧੂ : **ਕੁਲੱਛਣੇ**
(ਇ) ਮੋਹਨ ਭੰਡਾਰੀ : **ਘੋਟਣਾ**
(ਸ) ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ : **ਦਲਦਲ**
(ਕਹਾਣੀ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਹਾਣੀ–ਕਲਾ, ਕਹਾਣੀਕਾਰ)

2. ਪੈਰਾ ਪੜ੍ਹ ਕੇ ਪ੍ਰਸ਼ਨਾਂ ਦੇ ਉੱਤਰ ਦੇਣਾ
(**ਆਤਮ ਅਨਾਤਮ** ਪੁਸਤਕ ਦੇ ਕਹਾਣੀ ਭਾਗ ਵਿੱਚੋਂ 15 ਪੈਰ੍ਹਿਆਂ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ)

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PBL–191: ਮੁੱਢਲੀ ਪੰਜਾਬੀ

(In lieu of Punjabi Compulsory)

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ਪਾਠ–ਕ੍ਰਮ

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ,
   ਗੁਰਮੁਖੀ ਲਿਪੀ
   ਗੁਰਮੁਖੀ ਲਿਪੀ : ਬਣਤਰ ਅਤੇ ਤਰਤੀਬ

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ
   ਸੂਰ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ
   ਵਿਅੰਜਨ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ

3. ਪੰਜਾਬੀ ਸ਼ਬਦ–ਬਣਤਰ
   ਸਾਧਾਰਨ ਸ਼ਬਦ
   ਇਕ ਉਚਾਰਖੰਡੀ ਸ਼ਬਦ

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1. ਪੰਜਾਬੀ ਭਾਸ਼ਾ : ਨਾਮਕਰਣ ਅਤੇ ਸੰਖੇਪ ਜਾਣ ਪਛਾਣ, ਗੁਰਮੁਖੀ ਲਿਪੀ : ਨਾਮਕਰਣ, ਗੁਰਮੁਖੀ ਵਰਣਮਾਲਾ; ਪੈਂਤੀ ਅੱਖਰੀ, ਅੱਖਰ ਕ੍ਰਮ, ਸੂਰ ਵਾਹਕ (ੳ ਅ ੲ), ਲਗਾਂ ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ।

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ ਅਤੇ ਉਚਾਰਨ; ਸੂਰਾਂ ਦੀ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ (ਲਘੂ–ਦੀਰਘ ਸੂਰ); ਸੂਰ ਅਤੇ ਲਗਾਂ ਮਾਤਰਾਂ; ਵਿਅੰਜਨਾਂ ਦੀ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ; ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣਾਂ (ਹ, ਰ, ਵ) ਦਾ ਉਚਾਰਨ ; ਲ ਅਤੇ ਲ਼ ਦਾ ਉਚਾਰਨ; ਭ, ਧ, ਢ, ਝ, ਘ ਦਾ ਉਚਾਰਨ; ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣਾਂ ਦਾ ਉਚਾਰਨ।

3. ਪੰਜਾਬੀ ਸ਼ਬਦ–ਬਣਤਰ : ਸਾਧਾਰਨ ਸ਼ਬਦ; ਇਕੱਲਾ ਸੂਰ (ਜਿਵੇਂ ਆ); ਸੂਰ ਅਤੇ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਆਰ); ਵਿਅੰਜਨ ਅਤੇ ਸੂਰ (ਜਿਵੇਂ ਪਾ); ਵਿਅੰਜਨ ਸੂਰ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਪਾਰ); ਕੋਸ਼ਗਤ ਸ਼ਬਦ (ਜਿਵੇਂ ਘਰ, ਪੀ); ਵਿਆਕਰਣਕ ਸ਼ਬਦ (ਜਿਵੇਂ ਨੂੰ, ਨੇ); ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ–1; ਲਿੰਗ–ਪੁਲਿੰਗ, ਇਕ ਵਚਨ–ਬਹੁ ਵਚਨ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ–1: ਖਾਣ–ਪੀਣ, ਸਾਕਾਦਾਰੀ, ਰੁੱਤਾਂ, ਮਹੀਨਿਆਂ, ਗਿਣਤੀ, ਮੌਸਮ ਆਦਿ ਨਾਲ ਸੰਬੰਧਿਤ।

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(Under Credit Based Continuous Evaluation Grading System)

CSL–125: FUNDAMENTALS OF INFORMATION TECHNOLOGY AND COMPUTER PROGRAMMING

CREDITS		
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UNIT – I

Theory:

Block diagram of Computer, Associated peripherals, Memories – RAM, ROM, Secondary Storage Devices, Classification of Computers, Languages, Operating Systems, Program Compilers, Interpreter, Assemblers, Linker and Loader (only definition)

UNIT – II

Introduction of various operating system with their file system, FAT and MBR, features of DOS, Basic Internal and External commands of DOS.

Introduction to Windows and its features.

UNIT – III

C Language:

Program, Algorithm and Flowchart, Data Types, Operators, expressions, Input and Output statements, control and conditional statements.

String Handling, Functions, Arrays and Structures, Pointers, Files.

Introduction to Information technology and its potential.

Practicals:

I a) Looking for directories and files under DOS.
Changing drives, searching for files, looking at files extensions and size of files.
Deleting and saving files, protecting and unprotecting file.
Formatting floppy disks.
Familiarising with windows, closing, maximising, shifting icons, ordering icons, changing the size of windows, moving windows.

File manager to view the files, transfer files from directories/devices to other placings.
Exercises (at least five) involving assignment, looping, functions, arrays, pointers and files in C.
Simple programs (at least three) to demonstrate object oriented concepts in C++.
Familiarisation and hands on experience with MS Word Software under Windows.

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Recommended Books:

1. Computers Today by Sanders.
2. Fundamentals of Computers TTTI Publication.
3. DOS 5 A to Z by Gary Masters.
4. DOS Instant Reference by Harvey and Nelson.
5. Fundamentals of Computers and IT, Dr. Gurvinder Singh, Rachhpal Singh and K.K. Saluja, Kalyani Publishers.
6. Mastering Word 6 for Windows – Ron Manfield.
7. Object Oriented Programming in C++ L Naljyoti Barkakati.
8. Mastering Turbo C by Brottle Stan Kelly.

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CYL–195: GENERAL CHEMISTRY

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The course has been divided into three nearly equally distributed sections. Unit–I to be completed before Minor–I; Unit–II before Minor–II and Unit–III should be completed before the final exams. Final exam will be from all the three units.

Unit – I

1. Chemical Bonding: (08 hours)

Qualitative treatment of bonding by molecular orbital theory of homonuclear diatomic (H_2^+, H_2, O_2) and heteronuclear diatomic molecules (CO, NO, HF) . Introduction to hybridization and molecular structure of H_2O, NH_3, CH_4 and ethylene. Valence bobnd approach (qualitative) of bonding of H_2^+, H_2 and benzene, Bond model of solids, Dipole moment and polarizability, Intermolecular forces–dipole–dipole interactions, dipole–induced dipole, induced dipole–induced dipole, Intermolecular forces in ionic lattices, magnetic moment.

Bonding in metals and transition metal complexes. (covalent, coordinate and back bonding) (02 hours)

2. Chemical Equilibrium: (05 hours)

Conditions for Chemical Equilibrium, Free enthalpy and equilibrium in reactions of ideal gases, Temperature dependence of equilibrium constant. Equilibrium in non ideal gases, Use of fugacity in equilibrium calculations, standard states for components in solution, equilibrium constant in solution.

Unit–II

3. Electrochemistry: (05 hours)

Faraday's laws, conductance, Arhenius theory of ionization, molar conductance, transport numbers, electric potential difference for a galvanic cell, types of half cells, standard electrode potential, concentration cells.

4. Chemical Kinetics: (05 hours)

Rate, order, molecularity, first, second and third order rate equations, Temperature dependence of reactions explosion reaction and photochemical reaction.

5. Polymers: (05 hours)

Chemistry of polymers, addition, condensation and copolymerization, molecular weight distribution, types of polymers – plastic, elastomers and fibers, biopolymers.

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Unit–III

6. Molecular Spectroscopy: (15 hours)

General features of spectroscopy – experimental techniques, intensities and linewidths, Rotational spectroscopy – molecular rotation and determination of length by rotational spectra, Vibrational spectroscopy – normal modes of vibrations, selection rules for IR and raman determination of force constant and identification of common functional groups UV and visible spectroscopy Beer Lamberts' law, electronic transitions and their significance, photo electron spectroscopy, nuclear magnetic Resonance spectroscopy – principles of magnetic resonance, NMR of simple molecules and their significance to magnetic and electric properties of materials.

Books:

1. Physical Chemistry by P.W. Atkins.
2. Physical Chemistry by Maron and Prutton
3. Molecular Spectroscopy – Wiliams and Fleming
4. Polymers by Billmeyer

Practical:

1. Find the strength of $KMnO_4$ solution.
2. Determine number of water molecules in Mohr salt by titration method.
3. Determine percentage of sodium carbonate in given sample of washing soda.
4. Determine percentage of sodium carbonate and sodium hydroxide in given sample of caustic soda.
5. Determination of total Hardness of Water.
6. Determine percentage of Ca^{2+} and Mg^{2+} in the given sample of water.
7. To determine the molecular weight of a compound of Rast's micro method.
8. Determination of coefficient of viscosity of a given liquid by viscometer.
9. To determine the unknown composition of a given mixture of two liquids by viscosity method.
10. To find the mol. Wt. of high polymer of using viscosity measurements.
11. Determination of surface tension of a given liquid by drop number method by stalagmometer.
12. To determine the critical micelle concentration of a soap (sodium laurate) by surface tension measurements.
13. To determine the distribution coefficient of I_2 between CCI_4 and water.
14. To determine refractive index of a liquid by Abbe's refractometer and hence the specific and molar refraction.
15. Determination of Chlorine in bleaching powder.

Books Recommended:

1. Findlay's Practical Physical Chemistry.
2. Advanced Practical Physical Chemistry by J.B. Jadav.
3. Quantitative Organic Analysis by Vogel.

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ECL–196: ELECTRONICS AND INSTRUMENTS

CREDITS		
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UNIT–I

Electrical Sources : Voltage and current sources and their characteristics. (1)
Signals : Analog signals, digitization and its advantages, Sampling Rate, Digital Signals. (2)
Semiconductor Devices : Review of semiconductor diodes, bi–polar transistor, JFET and MOSFET, SCR, Photo diode and photo–transistor. Analog switch, transmission gate and analog multiplexer. (6)
Amplifiers : Concept of an amplifier, its characteristics and frequency response. Features of power amplifier; Distortion, efficiency, power output, heat dissipation and heat sinking. (4)
Operational Amplifier : The ideal operational amplifier, its features and various applications as inverting and non–inverting amplifier, summing amplifier, difference amplifier, integrator, differentiator, buffer and sample and hold switch. (4)

UNIT–II

Feedback and Oscillators : Concept of feedback, effect of positive and negative feedback on amplifier gain. Advantages of negative feedback. Criterion for oscillations, RC Oscillators using op–amp. (3)
Power Supplies : Reviews of rectifiers and filters used in power supplies, regulation, Regulator ICs (78 xx and 79 xx) specifications and applications. (3)
Digital Electronics : Logic levels and variables; definition, symbol and truth–table of basic gates; concept of universal gate. (2)
Flip–flop and latch – Different types and truth–table. Main characteristics of TTL and CMOS logic families and their specifications. Concept of – encoder/decoder. Mux/demux, tristate devices and adder/subtractor. (4)
Shift registers and their types, universal shift register. Counters, their type and applications. (2)
ADC/DAC – weighted register type DAC, counter type ADC. (3)

UNIT–III

Displays : 7 segment LED/LCD displays and their working. (2)
Semiconductor memories : Concept of RAM, ROM, EPROM, and their applications. (2)
Need for microprocessor based systems, block diagram and working of a microprocessor based system. (2)
Elements of Communication System: Need for modulation, modulation process, types and advantages. (2)
Instrumentation : Elements of instrumentation systems, transducers, sensors and bridge. Characteristics of instrumentation amplifier, op–amp based instrumentation amplifiers, transducers; LVDT, Strain gauge, Piezo–electric, capacitive, thermister, photo–transistor. Moving coil velocity transducer, Acceleration transducers. Noise and its elimination. (7)
Working Principles of the following instruments: CRO, Elctronic multimeter, digital multimeter, signal generator, Block diagram of data acquisition system. (2)

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Practicals:

1. **Familiarization with various controls of the following instruments:**
   (a) CRO
   (b) Multimeters (Analog and Digital)
   (c) Function Generator
   (d) Power Supply and to observe/measure the outputs of (c) and (d) on a and (b).
2. **Study of OP–AMP as**
   (a) Non–inverting amplifier.
   (b) Inverting amplifier.
   (c) Summing amplifier.
   (d) Difference Amplifier.
3. **Study of OP–AMP as**
   (a) Differentiator
   (b) Integrator
4. To study the characteristics of an instrumentation amplifier using Op–amps.
5. To observe the output waveform and variation of frequency using Wein Bridge Oscillator using OP–Amp.
6. To assemble and test 5V/–9V power supply using three–terminal voltage regulator ICs, i.e. 78xx,79xx, LM317.
7. a) Verification of truth table of the following gates: AND, OR, NAND, NOR, XOR, and Tristate.
   b) To realise AND, OR, XOR gates using, NAND gates and verify their truth table.
8. Verification of truth tables of D and JK Flip–Flops.
9. Verification of truth tables of MUX and DEMUX.
10. Use of 7490 as a decade counter.
11. Construct a 4–bit shift register using JK FF's.
12. Use of ADC and DAC chips for data conversion.
13. Interfacing lathe machine with PC.
14. To draw temperature vs resistance characteristics of a thermistor.
15. Study the characteristics of various transducers like strain gauge, LVDT, Photo–transistor etc.

Recommended Books:

1. Microelectronics by Millman and Grabel (Mc. Hill).
2. Digital Principles by RLK Tokheim (Mc. Hill).
3. Electronics Instrumentation and Measurements by Cooper and Heyrick (Phi).
4. Microprocessors Architect, Programming and Applications with 8085/8080A by RS Gaonkar, Wiley Eastern.

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ENL–196: COMMUNICATIVE ENGLISH–II

CREDITS		
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Objectives: To introduced students in a graded manner to the communication skills of Reading and Writing in English. At the end of semester II, the students should be able to demonstrate adequate competence in comprehending an unseen passage and performing the prescribed communication/writing tasks.

Reading:

a) ***Developing Comprehension Skills***

Students will be required to read sample comprehension passage as given in Chapter *Critical Reading and Comprehension* of the prescribed book. The teacher will help students in handling text and answering questions given at the end of each passage. Teacher can bring in more texts and construct questions of factual and inferential nature to enhance the comprehension skills of the students.

b) ***Developing habits of additional reading***

The students will be required to show evidence of additional independent reading. They will maintain a scrapbook consisting of such readings as clippings from newspapers and magazines, short articles, stories etc. The minimum quantum of such additional reading will be decided by the class teacher, who will also test students individually on their additional reading (and appropriately award internal assessment, if required).

Prescribed Reading:

Vandana R.Singh. *The Written Word*, Oxford University Press, New Delhi (Selected Chapters)

Writing:

a) Developing vocabularly and using it in the right context

Students will be required to pay special attention to build up their vocabularly. They should master the contents of the chapter on *Vocabularly* in the prescribed book. Teacher will help the students learn the correct and appropriate use of the given set of words/phrases/expressions.

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b) Developing skills in formal writing

Students will be required to do write–ups involving skills of making formal complaints, rquests, orders etc., reporting, note taking, summarising and transcoding. The types of composition task may include business and public interest letters, news/features writing, speeches, minutes, instructions, summary reports etc. Teacher shall instruct the students about the appropriate formal and usual conventions followed in such writings. The following chapters in the prescribed book may be consulted for exercise materials on these task:

- Paragraph and essay writing
- Report Writing
- Letter Writig
- Note Making and Summerising
- Transcoding

Question paper: The following format is suggested for a 3–hour test.

(Appropriate choices may be given where possible)

1. One unseen passage of app. 300 words with at least five questions for testing comprehension (at least three of them may be multiple choice) App. weighting 20%
2. Vocabulary and other expressions App. weighting 20%
3. Two writing tasks pertaining to formal letter writing, reporting, note taking, summary writing etc. App. weighting 40%
4. One task involving transcoding from dialogue to prose or prose to dialogue App. weighting 20%

Internal Assessment: The teacher may consider the following for award of internal assessment, if any.

1) Evidence of independent and additionl reading as given above. Teacher may suggest some special reading list to suit the needs of their students.
2) Classroom tests on vocabularly and suggested writing tasks.
3) Project writing involving the communication skills referred in writing tasks.

Prescribed Book:

A Course in Grammar and Composition by Geeta Nagraj, Foundation Books, 2006.

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MTL–102: MATHEMATICS–II

CREDITS		
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UNIT – I

Infinite Series: Sequences and sub sequences and their convergence, Cauchy sequence, Infinite series and their convergence, Standard tests for convergence including p–test, Ratio test, Comparison test, Raabe's test, Cauchy Integral test, Cauchy root test, Gauss's test, Absolute convergence, Alternating series and its convergence, Power series. **(10 Lectures)**

UNIT–II

Complex Analysis: De Moivre's theorem, Circular and hyperbolic functions of complex variables, Inverse functions and their real and imaginary parts, Summation of Trigonometric series, Analytical functions, Cauchy–Riemann equations, Laplace equation, Cauchy's integral theorem, Cauchy's integral formula, Taylor series and Laurent series, Residues and their application in evaluating real improper integrals, Conformal mapping, linear fractional transformations. **(15 Lectures)**

UNIT–III

Laplace Transforms: Existence of Laplace transform, Unit impulse function, Unit step function, Delayed step function, Dirac delta function and their Laplace transforms, Properties of Laplace transforms: Linearity, First shifting property, Change of scale property; Laplace transform of derivatives and differentiation theorem, Integration theorem, Laplace transform of Integrals, Inverse Laplace transform, Formulas for obtaining inverse Laplace transforms, Convolution theorem, The second shifting property, Solution of initial value problems arising in ODE's. **(10 Lectures)**

Fourier Series and Fourier Transform: Fourier series expansion, Fourier series for even and odd functions, half range series, harmonic functions, existence of Fourier transform, Modulation theorem, shifting properties, convolution theorems, sine and cosine transforms, Fourier transform of derivatives and integrals, inverse Fourier transform, applications to PDE's. **(10 Lectures)**

Books Recommended:

1. Louis A. Pipes: Applied Mathematics for Engineers and Physicists, McGraw Hill Book Company.
2. Kreyszig: Engineering Mathematics, Wiley Eastern Ltd.
3. B.S. Grewal: Higher Engineering Mathematics, Khanna Publisher, New Delhi.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – II
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PHL–199: MECHANICS

CREDITS		
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UNIT–I

Internal forces and momentum conservation. Centre of mass. Elastic collisions in laboratory and center of mass systems; velocities, angles, energies in these systems and their relationships. Conservation of angular momentum and examples–shape of the galaxy, angular momentum of solar system. Torques due to internal forces, angular momentum about center of mass. Cross–section, elastic scattering and impact parameter, Rutherford scattering.

UNIT–II

Equation of motion of a rigid body, rotational motion of a rigid body in general and that of plane lamina. Rotation of angular momentum vector about a fixed axis. Angular momentum and kinetic energy of a rigid body about principal axis, Euler's equations. Precession and elementary gyroscope, Spinning top.

UNIT–III

Frames of reference, Galilean transformation, Galilean invariance, The Michelson–Morley experiment. Special theory of relativity, the Lorentz transformation, Relativity of length and time, relativistic velocity addition, mass variation formula, mass–energy equivalence.

Reference Books:

1. Mechanics–Berkeley Physics Course, Vol–I (second edition):C. Kittel, W. D. Knight, M. A. Ruderman, C. A. Helmholtz and R. J. Moyer–Tata Mc Graw Hill Publishing Company Ltd., New Delhi.

2. Analytical Mechanics: Satish K. Gupta–Modern Publishers.

3. Fundamentals of Physics: D. Halliday, R. Resnick and J. Walker (sixth edition)–Wiley India Pvt. Ltd., New Delhi.

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PHL–198: PHYSICS–II

CREDITS		
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Unit–I

Classical and quantum statistics, Statistics of discrete energy levels, Black body spectral density, Bose condensation, Free electrons, density of states, Kronig–Penney model, Effective mass, band structure.

Unit–II

Tunneling of particles and Examples, Tunneling through multiple barriers and superconductor junction: Nanostructures, concept of electron in low dimensional confinement

Unit–III

Quantum wells & Superlattices leading to new devices concepts.
Einstein coefficients, population inversion, Light amplification, Optical resonators,
Characteristics of lasers, He–Ne, Ruby and semiconductor lasers.

Books Recommended:

1. Concepts of Modern Physics, Arthur Besier, Tata McGraw Hill, 2007.
2. Introduction of Solid State Physics 6th ed. PC Kittle, Wiley Eastern Ltd., New Delhi, 1976.
3. The Physics of Low–dimensional semiconductors: An Introduction John H. Davies, Cambridge University Press (1998).
4. Laser Theory and Applications, K Thyagrajan and AK Ghatak, Mac Millan Indian Ltd., New Delhi.
5. Laser and Optical Engineering, P.Dass, Narosa Pub. House, New Delhi, 1991.

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PBL–196: PUNJABI–II

ਪਾਠ–ਕ੍ਰਮ ਅਤੇ ਪਾਠ ਪੁਸਤਕਾਂ

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(I) 1. ਆਤਮ ਅਨਾਤਮ **(ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠਾਂ ਲਿਖੇ ਕਵੀ**

(ੳ) ਭਾਈ ਵੀਰ ਸਿੰਘ
(ਅ) ਪ੍ਰੋ: ਪੂਰਨ ਸਿੰਘ
(ੲ) ਪ੍ਰੋ: ਮੋਹਨ ਸਿੰਘ
(ਕਵਿਤਾ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਾਵਿ–ਕਲਾ, ਕਵੀ)

2. ਪੰਜਾਬੀ ਸ਼ਬਦ ਬਣਤਰ : ਧਾਤੂ/ਮੂਲ, ਵਧੇਤਰ (ਅਗੇਤਰ, ਪਿਛੇਤਰ, ਵਿਉਂਤਪਤ ਅਤੇ ਰੁਪਾਂਤਰੀ), ਸਮਾਸ ।

(II) 1. **ਆਤਮ ਅਨਾਤਮ (**ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿੱਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ

(ੳ) ਅੰਮ੍ਰਿਤਾ ਪ੍ਰੀਤਮ
(ਅ) ਡਾ. ਹਰਭਜਨ ਸਿੰਘ
(ੲ) ਸ਼ਿਵ ਕੁਮਾਰ ਬਟਾਲਵੀ
(ਕਵਿਤਾ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਾਵਿ–ਕਲਾ, ਕਵੀ)

2. **ਪੈਰ੍ਹ ਰਚਨਾ :** ਕਲੱਸ ਵਿੱਚ 10 ਵਿਸ਼ਿਆਂ (ਸਭਿਆਚਾਰਕ, ਧਾਰਮਿਕ ਅਤੇ ਰਾਜਨੀਤਕ) ਤੇ ਪੈਰ੍ਹ ਰਚਨਾ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ ।

(III) 1. **ਆਤਮ ਅਨਾਤਮ** (ਸੰਪ. ਵਰਿਆਮ ਸਿੰਘ ਸੰਧੂ ਅਤੇ ਡਾ. ਸੁਹਿੰਦਰਬੀਰ ਸਿੰਘ, ਗੁਰੂ ਨਾਨਕ ਦੇਵ ਯੂਨੀਵਰਸਿਟੀ, ਅੰਮ੍ਰਿਤਸਰ) ਵਿਚੋਂ ਹੇਠ ਲਿਖੇ ਕਵੀ

(ੳ) ਡਾ. ਜਸਵੰਤ ਸਿੰਘ ਨੇਕੀ
(ਅ) ਡਾ. ਜਗਤਾਰ
(ੲ) ਡਾ. ਸੁਰਜੀਤ ਪਾਤਰ
(ਸ) ਪਾਸ਼
(ਕਵਿਤਾ–ਸਾਰ, ਵਿਸ਼ਾ–ਵਸਤੂ, ਕਾਵਿ–ਕਲਾ, ਕਵੀ)

2. ਮੁਹਾਵਰੇ ਤੇ ਅਖਾਣ (ਅਖਾਣ ਤੇ ਮੁਹਾਵਰਾ ਕੋਸ਼ ਵਿੱਚ) 200 ਮੁਹਾਵਰਿਆਂ ਅਤੇ 100 ਅਖਾਣਾਂ ਨੂੰ ਵਾਕਾਂ ਵਿੱਚ ਵਰਤਣ ਦੇ ਅਭਿਆਸ ਕਰਵਾਉਣੇ (ਕਲਾਸ ਵਿਚ ਤੇ ਘਰ ਲਈ) ।

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PBL–196: ਮੁੱਢਲੀ ਪੰਜਾਬੀ

(In lieu of Punjabi Compulsory)

2–0–0

ਪਾਠ–ਕ੍ਰਮ

1. ਪੰਜਾਬੀ ਸ਼ਬਦ–ਬਣਤਰ
   ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਸ਼ਬਦ
   ਬਹੁ–ਉਚਾਰਖੰਡੀ ਸ਼ਬਦ

2. ਪੰਜਾਬੀ ਵਾਕ–ਬਣਤਰ
   ਸਾਧਾਰਨ–ਵਾਕ : ਕਿਸਮਾਂ
   ਸੰਯੁਕਤ–ਵਾਕ : ਕਿਸਮਾਂ
   ਮਿਸ਼ਰਤ–ਵਾਕ : ਕਿਸਮਾਂ

3. ਪ੍ਰਕਾਰਜੀ ਪੰਜਾਬੀ
   ਚਿੱਠੀ ਪੱਤਰ
   ਪੈਰ੍ਹਾ ਰਚਨਾ
   ਸੰਖੇਪ ਰਚਨਾ
   ਅਖਾਣ ਅਤੇ ਮੁਹਾਵਰੇ

ਯੂਨਿਟ ਅਤੇ ਥੀਮ

1. ਪੰਜਾਬੀ ਸ਼ਬਦ–ਬਣਤਰ : ਸੰਯੁਕਤ ਸ਼ਬਦ; ਸਮਾਸੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਲੋਕ ਸਭਾ); ਦੋਜਾਤੀ ਸ਼ਬਦ (ਜਿਵੇਂ ਕਾਲਾ ਸਿਆਹ); ਦੋਹਰੇ ਸ਼ਬਦ/ਦੁਹਰਰੁਕਤੀ (ਜਿਵੇਂ ਧੂੜ੍ਹ ਧਾੜ੍ਹ/ਭਰ ਭਰ), ਮਿਸ਼ਰਤ ਸ਼ਬਦਾਂ ਦੀ ਬਣਤਰ/ਸਿਰਜਨਾ; ਅਗੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਉਪ ਭਾਸ਼ਾ), ਪਿਛੇਤਰਾਂ ਰਾਹੀਂ (ਜਿਵੇਂ ਰੰਗਲਾ), ਪੰਜਾਬੀ ਸ਼ਬਦ ਰਚਨਾ–2: ਪੜਨਾਵੀਂ ਰੂਪ, ਕਿਰਿਆ/ਸਹਾਇਕ ਕਿਰਿਆ ਦੇ ਰੂਪ; ਨਿੱਤ ਵਰਤੋਂ ਦੀ ਪੰਜਾਬੀ ਸ਼ਬਦਾਵਲੀ–2: ਮਾਰਕੀਟ/ਬਾਜ਼ਾਰ, ਵਪਾਰ, ਧੰਦਿਆਂ ਨਾਲ ਸੰਬੰਧਿਤ।

2. ਪੰਜਾਬੀ ਵਾਕ–ਬਣਤਰ : ਕਰਤਾ ਕਰਮ ਕਿਰਿਆ; ਸਾਧਾਰਨ ਵਾਕ, ਬਿਆਨੀਆ, ਪ੍ਰਸ਼ਨਵਾਚਕ, ਆਗਿਆਵਾਚਕ, ਸੰਯੁਕਤ ਅਤੇ ਮਿਸ਼ਰਤ ਵਾਕਾਂ ਦੀਆਂ ਕਿਸਮਾਂ; ਸੁਤੰਤਰ ਅਤੇ ਅਧੀਨ ਉਪਵਾਕ; ਸਮਾਨ (ਤੇ/ਅਤੇ) ਅਤੇ ਅਧੀਨ (ਜੋ/ਕਿ) ਯੋਜਕਾਂ ਦੀ ਵਰਤੋਂ; ਪੰਜਾਬੀ ਵਾਕਾਂ ਦੀ ਵਰਤੋਂ : ਵਿਭਿੰਨ ਸਮਾਜਕ/ਸਭਿਆਚਾਰਕ ਪ੍ਰਸਥਿਤੀਆਂ ਦੇ ਅੰਤਰਗਤ; ਘਰ ਵਿਚ, ਬਾਜ਼ਾਰ ਵਿਚ, ਮੇਲੇ ਵਿਚ, ਸ਼ੌਪਿੰਗ ਮਾਲ/ਸਿਨਮੇ ਵਿਚ, ਵਿਆਹ ਵਿਚ, ਧਾਰਮਿਕ ਸਥਾਨਾਂ ਵਿਚ, ਦੋਸਤਾਂ ਨਾਲ ਆਦਿ।

3. ਇਸ ਯੂਨਿਟ ਵਿਚ ਚਿੱਠੀ ਪੱਤਰ (ਨਿੱਜੀ/ਦਫ਼ਤਰੀ/ਵਪਾਰਕ), ਪੈਰਾ ਰਚਨਾਂ, ਸੰਖੇਪ ਰਚਨਾ ਅਤੇ ਅਖਾਣ ਮੁਹਾਵਰਿਆਂ ਦੀ ਵਰਤੋਂ ਰਾਹੀਂ ਵਿਦਿਆਰਥੀ ਦੀ ਭਾਸ਼ਾਈ ਯੋਗਤਾ ਨੂੰ ਪਰਖਿਆ ਜਾਵੇਗਾ।

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CSL–230: COMPUTER ARCHITECTURE

CREDITS		
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UNIT–I

Principles of computer design – software / hardware interaction, cost/benefit concept of layers in architecture design. [10%]

Basic Computer Organization taking 8085 as an example binary arithmetic – add, subtract, multiply – algorithms and implementations. Carry look ahead add fast adders. [15%]

CPU design – Choice of instruction set control structure hardwired and microprogrammed control – RISC vs. CISC, Pipelining in CPU design superscalar machines. [15%]

UNIT – II

Memory hierarchy design caches, main memory, interleave memory, virtual memory architectural aids in implementing these. [10%]

I/O Modes – Program interrupt, DMA, Channel, I/O Processor. [15%]

UNIT–III

I/O Performance measures – Buses connecting I/O devices to CPU/memory – interaction with operating system Serial/Parallel interfaces taking 8251 and 8255 as example. [15%]

Performance evaluation SPEC marks LINPACK Whetstone Dhrystone etc., Transaction processing benchmarks. [10%]

Multiprocessors – Parallel & distributed computers – SIMD SPMD and MIMD machines. [10%]

Texts References:

1. Patterson and Hennessy, Computer Architectures, Morgaon Kauffman, San Mateo, CA, USA, 1992.
2. P.Pal Chaudhary, Computer Organization and Design Prentice Hall of India Pvt, Ltd., New Delhi, 1994.
3. P.V.S. Rao, Perspectives in Computer Architecture, Prentice Hall of India Pvt, Ltd., New Delhi, 1994.
4. M.R. Bhujade, Digital Computer Design Principles, Pitamber Publishing Co., 3rd Edition, 1996.

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CSL–231: DATA STRUCTURES & PROGRAMMING METHODOLOGY

CREDITS		
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Theory:

UNIT – I

Introduction	[8%]
Linear Data Structures I : Arrays & Records	[5%]
Linear Data Structures II : Linked Lists	[10%]
Linear Data Structures III: Stacks & Queues	[5%]

UNIT–II

Linear Data Structures IV: Strings	[5%]
Recursion	[10%]
Non Linear Data Structures I: Trees	[8%]
Non Linear Data Structures II	[10%]

UNIT–III

Hashing	[10%]
Sets	[12%]
Graphs	[12%]
Files	[5%]

Practicals:

Algorithm development in all areas of data structures covered in the course. Emphasis should be given on the following matters. Development of recursive as well as non recursive a algorithms involving linked list trees and graphs. Use of pointers for dynamic allocations of storage. Development of classes for some of the data structures using the concept of the abstract data types.

Texts / References:

1. Aho A. V. J. E. Hopcroft, J.D. Ullman; Data Structures and Algorithms, Addison–Wesley, 1983.
2. Baase, S Computer Algorithms; Introduction to Design and Analysis, Addison – Wesley, 1978.
3. Berztiss, A.T.: Data Structures, Theory and practice: 2nd ed., Academic Press, 1977.
4. Collins, W.J. Data Structures, An Object–Oriented Approach, Addison – Wesley, 1992.
5. Goodman, S.E., S.T.Hedetniemi: Introduction to the Design and Analysis of Algorithms, McGraw Hill, 1977.
6. Horowitz, E.S. Sahni: Algorithms: Design and Analysis, Computer Science Press, 1977.
7. Horowitz, E.S. Sahni: Fundamentals of Data Structures in PASCAL, Computer Science Press, 1984.
8. Kunth, D.E. The Art of Computer Programming. Vols. 1–3, Addison – Wesley, 1973.
9. Kurse, R.L. Data Structures and Program Design, 2nd Ed., Prentice Hall, 1987.
10. Lorin, H.: Sorting and Sort Systems, Addison – Wesley, 1975.
11. Standish, T.A.: Data Structure Techniques, Addison – Wesley, 1980.
12. Tremblay, J.P., P.G. Soreson: An Introduction to Data Structures with Applications, McGraw Hill, 1976.
13. Wirth, N.: Algorithms + Data Structures = Programs, Prentice Hall, 1976.

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CSL–232: PROGRAMMING LANGUAGES

CREDITS		
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Theory:

UNIT–I

Introduction:
C and C++ programming, difference between C and C++, adding an user interface to C and C++ program, standard C and C++ data types, storage classes, operators, Standard C and C++ libraries, writing & using functions, arrays pointer, I/O in C, Structures unions, macro's Advanced preprocessor statements, dynamic memory allocation.

UNIT–II

Object Oriented Programming:
Object oriented terminology, C++ classes I/O M C++, the cost team class list combining C & C++ code, designing Unique manipulators, Object oriented stack and linked list in C++.

UNIT–III

Windows Programming Foundations:
Windows concepts windows programming concept, visual C++ Windows tools, procedure – oriented windows Application Microsoft foundation Class library concepts. Windows Applications with MFC.

Wizards:
Application and class Wizards, introduction to OLE, active X controls with the MFC library.

Practical:
Students should be asked to write programs in C & C++ using different statements, Libraries and Functions, Designing Unique Manipulators etc.

Books:

1. The complete Reference Visual C++ 5.
2. Chris H. Pappas & William H. Murray, III.
3. The Visual C++ handbook.
4. Chris H. Pappas & William Murray Osborne.

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ESL 220: Environmental Studies (Compulsory)

Credit 3-0-0

1. **The multidisciplinary nature of environmental studies:** Definition, scope & its importance, Need for public awareness.

2. **Natural resources**: Natural resources and associated problems.

   a) **Forest resources**: Use of over exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people.

   b) **Water resources**: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams-benefits and problems.

   c) **Mineral resources**: Use and exploitation, environmental effects of extracting and using mineral resources, case studies.

   d) **Food resources**: World food problems, change caused by agriculture and overgrazing, effects or modern agriculture, fertilizer-pesticide problem, salinity, case studies.

   e) **Energy resources**: Growing of energy needs, renewable and non-renewable energy resources, use of alternate energy sources, case studies.

   f) **Land recourses**: Land as a resource, land degradation, soil erosion and desertification.

   g) Role of an individual in conservation of natural resources, Equitable use of resources for sustainable lifestyles.

3. **Ecosystem:**
   Concept of an ecosystem, Structure and function of an ecosystem, Producers, consumers and decomposers, Energy flow in the ecosystem, Ecological succession, Food chains, food webs and ecological pyramids.
   Introduction, types, characteristic features, structure and function of the following ecosystems:
   a. Forest ecosystem
   b. Grassland ecosystem
   c. Desert ecosystem
   d. Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries).

4. Biodiversity and its Conservation:

Definition: Genetic, species and ecosystem diversity, Biogeographical classification of India.
Value of Biodiversity: Consumptive use; productive use, social, ethical, aesthetic and option values.
Biodiversity of global, National and local levels, India as mega-diversity nation "Hot-spots of biodiversity.
Threats to Biodiversity: Habitat loss, poaching of wild life, man wildlife conflicts
Endangered and endemic species of India.
Conservation of Biodiversity: In situ and Ex-situ conservation of biodiversity.

5. Environmental Pollution:

Definition, Causes, effects and control measures of:
a) Air Pollution
b) Water Pollution
c) Soil Pollution
d) Marine Pollution
e) Noise Pollution
f) Thermal Pollution
g) Nuclear Hazards

Solid Waste Management: Causes, effects and control measures of urban and industrial wastes.
Role of an individual in prevention of pollution.
Pollution case studies Disaster Management: Floods, Earthquake, Cyclone and Landslides

6. Social Issues and Environment:

* From unsustainable to sustainable development
* Urban problems related to energy
* Water conservation, rain water harvesting, watershed management
* Resettlement and rehabilitation of people; its problems and concerns. Case studies
* Environmental ethics: Issues and possible solutions.
* Climate change, global warning, acid rain, ozone layer depletion, nuclear accidents and holocause. Case studies.
* Wasteland reclamation
* Consumerism and waste products
* Environmental Protection Act
* Air (prevention and Control of Pollution) Act
* Water (prevention and Control of Pollution) Act
* Wildlife Protection Act
* Forest Conservation Act
* Issues involved in enforcement o£. environmental legislation
* Public awareness

7. Human population and the environment

* Population growth, variation among nations
* Population explosion-Family welfare programme
* Environment and human health
* Human rights
* Value education
* HIV / AIDS
* Women and child welfare
* Role of information technology in environment :and human health
* Case studies

*** Road Safety Rules & Regulations:** Use of Safety Devices while Driving, Do's and Don'ts while Driving, Role of Citizens or Public Participation, Responsibilities of Public under Motor Vehicle Act, 1988, General Traffic Signs

*** Accident & First Aid:** First Aid to Road Accident Victims, Calling Patrolling Police & Ambulance

8. Field Work: Visit to a local area to document environmental assets–river / forest / grassland / hill / mountain. Visit to a local polluted site–Urban / Rural / Industrial / Agricultural. Study of common plants, insects, birds. Study of simple ecosystems–pond, river, hill slopes, etc. (Field work equal to 5 lecture hours)

References:

1. Agarwal, K. C. 2001. Environmental Biology, Nidhi Publications Ltd. Bikaner.
2. Bharucha, E. 2005. Textbook of Environmental Studies, Universities Press, Hyderabad.
3. Bharucha, E. 2004. The Biodiversity of India, Mapin Publishing Pvt. Ltd. Ahmedabad.
4. Brunner, R. C. 1989. Hazardous Waste Incineration, McGraw Hill Inc. New York.
5. Clark, R. S. 2000. Marine Pollution, Clanderson Press Oxford.
6. Cunningham, W. P., Cooper, T. H., Gorhani, E. & Hepworth, M. T. 2001. Environmental Encyclopedia, Jaico Publications House, Mumbai.
7. De, A. K. 1989. Environmental Chemistry, Wiley Eastern Ltd.
8. Down to Earth, Centre for Science and Environment, New Delhi.
9. Hawkins, R. E. 2000. Encyclopedia of Indian Natural History, Bombay Natural History Society.

10. Heywood, V. H & Waston, R. T. 1995. Global Biodiversity Assessment, Cambridge House, Delhi.
11. Jadhav, H. & Bhosale, V. M. 1995. Environmental Protection and Laws. Himalaya Pub.
12. Joseph, K. and Nagendran, R. 2004. Essentials of Environmental Studies, Pearson Education (Singapore) Pte. Ltd., Delhi.
13. Kaushik, A. & Kaushik, C. P. 2004. Perspective in Environmental Studies, New Age International (P) Ltd, New Delhi.
14. Miller, T. G. Jr. 2000. Environmental Science, Wadsworth Publishing Co.
15. Odum, E. P. 1971. Fundamentals of Ecology. W.B. Saunders Co. USA.
16. Rajagopalan, R. 2005. Environmental Studies from Crisis to Cure. Oxford University Press, New Delhi.
17. Sharma, B. K. 2001. Environmental Chemistry. Geol Publishing House, Meerut.
18. Sharma, J. P. 2004. Comprehensive Environmental Studies, Laxmi Publications (P) Ltd, New Delhi.
19. Sharma, P. D. 2005. Ecology and Environment, Rastogi Publications, Meerut.
20. Subramanian, V. 2002. A Text Book in Environmental Sciences, Narosa Publishing House, New Delhi.
21. Survey of the Environment. 2005. The Hindu.
22. Tiwari, S. C. 2003. Concepts of Modern Ecology, Bishen Singh Mahendra Pal Singh, Dehra Dun.
23. Townsend, C., Harper, J. and Michael, B. 2001. Essentials of Ecology, Blackwell Science.
24. Booklet on Safe Driving. Sukhmani Society (Suvidha Centre), District Court Complex, Amritsar.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – III
(Under Credit Based Continuous Evaluation Grading System)

ECL–291: DIGITAL CIRCUITS AND LOGIC DESIGN

CREDITS		
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Theory:

UNIT–I

Data and number representation–binary–complement representation BCD–ASCII, ISCII. [15%]
Boolean algebra, logic gates, minimization, use of programs such as expresso in minimization. [05%]
Digital Circuit Technologies, RTL / DTL / DCTL / TTL / MOS / CMOS / ECL, analysis of basic circuits in these families, internal architecture of programmable logic devices. [10%]
Combinational design, design with Muxes. [05%]

UNIT–II

Sequential circuits, flip–flops, counters, shift registers, multivibrators, state diagram–sequential circuit design from state diagrams computer aids in synthesis. [15%]
Memory system – RAM, ROM, EPROM, EEPROM, PAL, PLDs, PGAs. [20%]

UNIT–III

Bus structures, transmission line effects, line termination. [10%]
A/D and D/A conversion techniques and selected case studies. [15%]
CAD tools, FPGA based design exercises. [15%]
Introduction to VLSI Design, Custom and semi–custom design. [05%]

Practicals:

Realization of selected circuits using TTL and MOS components.
Familiarization with CAD design tools.
Design exercises using EPLDs and FPGAs.
Compare two six bit numbers and display the larger number on seven segment display.
Design a mod – 7 counter. Generate a pulse for every 1 ms.
Use 2 to 1 Mux and implement 4 to 1 Mux.
Pattern recoginzer.
4 bit ALU.
Serial to parallel shifter and parallel to serial shifter.
Priority resolver.
Binary to gray code converter.
Traffic light controller.
Pattern Generator.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – III
(Under Credit Based Continuous Evaluation Grading System)

Texts / References:

1. Morris Mano, Digital Design– Prentice Hall of India Pvt. Ltd., New Delhi, 1992.
2. Jesse H.Jenkins, Designing with FPGAs and CPLDs, PTR Prentice Hall, Englewood Cliffs, New Jersy, 1994.
3. H.Taub & D. Schilling, Digital Integrated Electronics. McGraw Hill, 1977.
4. Douglas L. Perry, VHDL, McGraw Hill, Inc. 2nd Edition, 1993.
5. Mead and L. Conway, Introduction to VLSI Systems, Addition Wesley, 1979.
6. R. Vishwanathan, G.K. Meat and V. Rajaraman, "Electronics for Scientist and Engineers", Prantice Hall of India Pvt. Ltd., 1978.
7. Millman and Halkias, "Integrated Electronics, Analog and Digital Circuits and systems, Tata McGraw Hill, 1972.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – III
(Under Credit Based Continuous Evaluation Grading System)

ENL–291: WRITTEN & ORAL TECHNICAL COMMUNICATION
(Communication skills for Scientists and Engineers)

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Note taking from lectures and reference material	[10%]
Essay and precis writing	[30%]
Slide preparation and oral presentation principles	[10%]
Written presentation of technical material	[20%]
Preparation of Bibliography	[10%]
Basics of Official Correspondence	[15%]
Preparation of bio–data	[5%]

Students should be asked to prepare and present Seminars during the practice session.

Texts / References:

1. The Chicago Manual of Style, 13th Edition, Prentice Hall of India 1989.
2. Gowers Ernest, "The Complete Plan in Words" Penguin, 1973.
3. Menzel D.H., Jones H.M., Boyd, LG., "Writing a Technical Paper", McGraw Hill, 1961.
4. Strunk, W., & White E.B., "The Elements of Style:, 3rd Edition, McMillan, 1979.
5. Turbian K.L., "A Manual for Writers of Term Papers, Thesis and Dissertations" Univ. of Chicago Press, 1973.
6. IEEE Transactions on "Written and Oral Communication" has many papers.

Practical:
Students should be asked to prepare Technical Presentation on the emerging areas of Information Technology and present the same to the group of Students.

Texts / References:

1. The Chicago Manual of Style, 13th Edition, Prentice Hall of India 1989.
2. Gowers Ernest, "The Complete Plan in Words" Penguin, 1973.
3. Menzel D.H., Jones H.M., Boyd, LG., "Writing a Technical Paper", McGraw Hill, 1961.
4. Strunk, W., & White E.B., "The Elements of Style:, 3rd Edition, McMillan, 1979.
5. Turbian K.L., "A Manual for Writers of Term Papers, Thesis and dissertations" Univ. of Chicago Press, 1973.
6. IEEE Transactions on "Written and Oral Communication" has many papers.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – III
(Under Credit Based Continuous Evaluation Grading System)

MTL–201: MATHEMATICS–III

CREDITS		
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UNIT–I

Probability: Classical and axiomatic approach to the theory of probability, additive and multiplicative law of probability, conditional probability and Bayes theorem. **(07 Lectures)**

Random Variables: Random variable, probability mass function, probability density function, cumulative distribution function, function of random variable. Two and higher dimensional random variables, joint distribution, marginal and conditional distributions, Stochastic independence.

(05 Lectures)

UNIT–II

Expectation: Mathematical expectations and moments, moment generating function and its properties. **(05 Lectures)**

Probability Distributions: Binomial, Poisson, Uniform, Exponential, Gamma, Normal distribution, t–distribution, chi– square distribution, F–distribution **(15 Lectures)**

UNIT–III

Testing of Hypothesis: Testing of hypothesis, Applications of t–distribution and chi–square distribution and F– distribution in testing of hypothesis, Large sample tests, **(13 Lectures)**

Books Recommended:

1. Hogg, R.V., Mckean, J.W. and Craig, A.T.: Introduction to Mathematical Statistics.
2. Gupta, S. C. and Kapoor, V. K.: Fundamentals of Mathematical Statistics, Sultan Chand & Co.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – IV
(Under Credit Based Continuous Evaluation Grading System)

CSL–240: OPERATING SYSTEM

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UNIT–I

Introduction to Operating Systems, Main Functions and characteristics of Operating Systems, Types of Operating Systems.

Process Management: Process States, Process Control Block, Process Scheduling, Critical regions, Race Conditions, precedence graphs, semaphores, monitors, System Calls, Deadlocks.

UNIT–II

Memory Management: External fragmentation, Internal fragmentation, Compaction, Paging, Segmentation, Virtual memory, Demand paging.

Device Management: Dedicated devices, shared devices, virtual devices, channels, I/O traffic controller, I/O scheduler, I/o Device handlers.

UNIT–III

Disk Scheduling: FCFS, SSTF, SCAN, C–SCAN, N–Stop Scan
Introduction to Multiprocessor and Distributed Operating Systems.

Case Studies: DOS, Windows 9x/XP/2000, UNIX to be discussed briefly.

Practical:
Linux Shell Programming, C programming using System Calls use of Fork calls IEEE POSIX threads Library Package and its use in writing multithreaded programs. Example problems on some of the live problems like Disk access, shared memory and deadlocks. Implementation and use of semaphores and other constructs.

Text / References:

1. Madnick and Donovan: Operating System, McGraw Hill, 1973.
2. P.B. Henson: Operating System Principles, Prentice Hall, 1973.
3. P.B. Henson: Architecture of concurrent programs, Prentice Hall, 1977.
4. Peter B. Galvin, A. Silberchatz: Operating System Concepts, Addison Wesley, 6th Edi., 2003.
5. A.C. Shaw: Logic Design of operating System, Prentice Hall, 1974.
6. M.J. Bach: Design of UNIX Operating system, PHI, 1986.
7. A.S. Tenenbaum: Operating System: Design and Implementation PHI, 1989

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – IV
(Under Credit Based Continuous Evaluation Grading System)

CSL–241: DATA COMMUNICATION

CREDITS		
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UNIT–I

OSI Reference Model, Concepts of layer, protocols, layer interfaces; TCP/IP Model.

Network topologies, LAN, MAN, WAN.

Transmission Media: Twisted pair, coaxial cables, fibre–optics cables.
Wireless Transmission: Electromagnetic spectrum, Radio transmission, Microwave Transmission, Infrared, and Millimeter Waves, lightwave Transmission.

UNIT–II

Error Detection and correction, sliding window protocols, Multiple Access protocols.

LAN standards: Ethernet, Token ring, Token Bus

Repeaters, Hubs, Bridges, Switches, Routers, Gateways

UNIT–III

Virtual Circuits and datagrams, Routing Algorithms, Congestion Control Algorithms. Internetworking.

Fundamental of Data Compression Techniques and Cryptography.

Domain Name System, Electronic Mail, FTP, Worldwide web (WWW). IPv4, IPv6

Relevant Book:

1. Tannanbaum, A.S. : Computer Networks, Prentice Hall, 1992 2nd Ed.
2. Tannanbaum, A.S. : Computer Networks, Prentice Hall, 1992 3rd Ed.
3. Stallings, William : Local Networks : An introduction Macmillan Publishing Co.
4. Stallings, William : Data & Computer Communication Macmillan Publishing Co.
5. Black : Data Networks (PHI) 1988.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – IV
(Under Credit Based Continuous Evaluation Grading System)

CSL–242: MICROPROCESSORS AND ASSEMBLY LANGUAGE PROGRAMMING

CREDITS		
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UNIT–I

Introduction: Introduction to Microprocessor, Microcontroller and Microcomputer.

Architecture of a Microcomputer: General Architecture of a microcomputer system. Microprocessor unit, input unit, output unit, memory unit and auxiliary storage unit.

Architecture of 8086/ 8088 Microprocessor: Description of various pins, configuring the 8086/8088 microprocessor for minimum and maximum mode systems description of maximum system mode interfaces, internal architecture of the 8086 / 8088 microprocessor, system clock, Bus cycle, instruction execution sequence.

UNIT–II

Memory Interface of the 8086 / 8088 Microprocessor: Address space and Date organization, generating memory addresses, hardware organization of the memory address space, memory bus status codes, memory control signals, read/write bus cycles, the role of stack in intrrupts and subroutine cells; demultiplexing the address data bus, program and data storage memory, dynamic RAM system.

Input /Output Interface of the 8086 / 8088 Microprocessor: I/O Interface, I/O address space and data transfers, I/O instructions, I/O bus cycles, Output ports, 8255A programmable peripherals interface (PPI), memory– mapped, I/O, serial communication interface (USART and UART) – the RS–232 C interface, 8251A programmable communication interface, special purpose interface controllers.

UNIT–III

Interrupt Interface of 8086/8088 Microprocessor: What is interrupt? Types of interrupt, interrupt vector table (IVT)

8086/8088 Assembly Language Programming: General structure of an assembly language program, steps in the development of an assembly language program, Assembly language V/S machine language, addressing modes, Instruction set : data movement instructions, arithmetic instructions, logical instructions, shift and rotate instructions, jumping and looping instructions, string processing, interrupt instructions, stack operations, subroutines, handling instructions, defining and using macros.

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(Under Credit Based Continuous Evaluation Grading System)

**Programming exercises must be design to show how the input/output is performed. How decisions are made and how loops can be set in an assembly language programs.*

Practicals:
Familiarity with the Microprocessor and Microcontroller kits. Selected Exercises in Interfacing selected peripherals to these kits lab Project involving designs fabrication and testing if 8/16 bit Microprocessor based minimum configurations.
Development of Assembly Language Programs in Intel 8086/8088.

References:

1. Walter Triebel: The 8086 Microprocessor – Architecture, Software and Interfacing techniques, PHI, Delhi.
2. Walter Triebel: The 8088 Microprocessor – Architecture, Software and Interfacing techniques, PHI, Delhi.
3. Douglas V. Hall: Microprocessors and Interfacing – Programming and Hardware, Tata McGraw Hill Publishing Company Ltd., New Delhi.
4. Peter Abel: IBM PC Assembly Language and Programming, PHI, Delhi.

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CSL–243: SYSTEM PROGRAMMING

CREDITS		
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UNIT–I

Assemblers. [20%]
Macro Processors. [10%]

UNIT–II

LOADER & Linkers. [15%]
Introduction to Operating systems. [20%]

UNIT–III

Introduction to Compilers. [30%]
Editors & Debuggers. [5%]

Practicals:

Software Lab for Development of an integrated assembler macro processor – direct linking loader module for a subset of assembly language and macro instructions of a typical machine.
Software lab on I/O Programming, e.g. interfacing some device to a Intel 8085 microprocessor based systems through serial and parallel ports.
Software lab for development of some features of editors.

Texts / References:

1. Barron D.W., Assemblers and Loaders, 2/e New York, Elsevier, 1972.
2. Beck L.L., Systems Software: An Introduction to Systems Programming, Addison–Wesley, 1985.
3. Calingaret, P, Assemblers, Compilers and Program Translation Rockville, MD, Computer Science Press, 1979.
4. Donovan J.J., Systems Programming, New York, McGraw Hill, 1972.

5. Groslinc G.W., Assembly and Assemblers, The Motorola 68000 Family, Prentice Hall, Englewood Cliffs, 1988.
6. Ullman. J.D., Fundamental Concepts of Programming systems , Addison–Wesley 1976.
7. Dhamdhere, D.M., Introduction to Systems Software, Tata McGraw Hill, 1996.
8. Glingaret P., Assembles Loaders and Compilers, Prentice Hall.
9. Echouse, R.H. and Morris, L.R., Minicomputer Systems Prentice Hall, 1972.
10. Rochkind M.J., Advance C Programming for Displays, Prentice Hall 1988.
11. Biggerstaff, T.S. Systems Software Tools Prentice Hall 1986.
12. Finsett, C.A., The Craft of Text Editing Springer Verlag, 1991.
13. Shooman H.L., Software Engineering McGraw Hill 1983.
14. Aho A.V. and J.D. Ullman Principles of Compiler Design Addison Wesley/Narosa 1985.
15. Aho A.V. and Ullman J.D. The theory of Parsing, Translation and compiling, Vol. I Parsing. Prentice Hall Inc. 1972.
16. Aho A.V. and Ullman J.D. The theory of Parsing, Translation and compiling, Vol. II Compiling. Prentice Hall Inc. 1972.
17. Aho A.V., Sethi R. and Ullman J.D. Compiler, Principles, Techniques and Tools.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – IV
(Under Credit Based Continuous Evaluation Grading System)

ECL–296: CONTROL AND INSTRUMENTATION

CREDITS		
L	**T**	**P**
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UNIT–I

Generalized measurement system Zero order, first order and second order systems, modelling static and dynamic characteristics.
Sensors for measuring following quantities with characteristics, ranges and interfacing circuits.
Mechanical quantities – displacement, velocity, acceleration.
Temperature
Flow
Pressure [35%]

UNIT–II

Digital sensors, I.C. sensors and chemical sensors. [10%]
Feedback control systems – Open loop and closed loop control systems, block representation, effects of feedback on system parameters and dynamics.
Time domain analysis – Steady state analysis and transient responses error coefficients.
Frequency response analysis – Bode plots correlation between time and frequency responses. [25%]

UNIT–III

Stability analysis – Concepts of stability, conditions for stability, Routh stability criterion gain and phase imagines Design and compensation techniques – Lend lag, and lead lag compensation Transform methods. [30%]

Text / References:

1. E.O. Deobelin, Measurement systems – Engineering, Wiley Eastern Ltd., 1985.
2. Ogata Modern Control Engineering Prentice Hall 1974.
3. DIV.'S. Murthy Transducers and Instrumentation, Prentice Hall, 1995.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – IV
(Under Credit Based Continuous Evaluation Grading System)

MTL–202: DISCRETE STRUCTURES

CREDITS		
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UNIT–I

Groups and Rings: Groups, monoids, and Submonoids, Semigroup, Subgroups and Cosets. Congruence relations in semigroups. Morphisms. Normal subgroups. Cyclic groups, permutation groups, dihedral groups, Rings, subrings, morphism of rings, ideals and quotient rings.

(10 Lectures)

UNIT–II

Graph Theory: Graphs and Multigraphs, Subgraphs, Isomorphic and Homeomorphic Graphs, Paths, Connectivity, Bridges of Konigsberg, Transversable Multigraphs, Labeled and Weighted Graphs, Complete, regular and Bipartite Graphs, Tree graphs, Planar Graphs, Graph Colorings, Representing Graphs in Computer Memory. Directed Graphs: Sequential Representation of Directed Graphs, Warshall's Algorithm, Shortest Paths, Linked Representation of Directed Graphs, Rooted Trees, Graph Algorithms, Depth–first and Breadth–first searches, Directed Cycle–Free Graphs, Topological Sort, Pruning Algorithm for Shortest Path. Binary Trees: Complete and Extended trees, Representing trees in memory, Transversing trees, Search trees, Heaps, path Lengths, Huffman's Algorithm. **(15 Lectures)**

UNIT–III

Lattices and Boolean algebra: Partially ordered sets, lattices and its properties, lattices as algebraic systems, sub–lattices, direct products, Homomorphism, some special lattices (complete, complemented, distributive lattices). Boolean algebra as lattices, Boolean identities, sub–algebra, Boolean forms and their equivalence, sum of product, product of some canonical forms.

(10 Lectures)

Recurrence Relations and Generating Functions: Polynomial expressions, telescopic form, recursion theorem, closed form expression, generating function, solution of recurrence relation using generating function. **(10 Lectures)**

Books Recommended:

1. Trambley, J.P. and Manohar,R: Discrete Mathematical Structures with Applications to Computer Science.
2. Liu C.L.: Elements of Discrete Mathematics.
3. Alan Doerr and Kenneth Levasseur: Applied Discrete Structures for Computer Science
4. Narsingh Deo: Graph Theory.
5. Lipschutz, S. and Lipson, M.: Discrete Mathematics (Schaum's out lines series).

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – V
(Under Credit Based Continuous Evaluation Grading System)

CSL–330: SYSTEM ANALYSIS AND DESIGN

CREDITS		
L	**T**	**P**
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UNIT–I

System Planning and Analysis: Introduction to systems development and preliminary stage, Requirement analysis, Problem definition, Feasibility Study and its importance ,Identification and investigation of system, Information Gathering Tools, Cost Benefit Analysis, Role and Responsibilities of System Analyst.

UNIT–II

System Design: Input/Output Design , Modular and Structured Design , Tools for structured design and system design considerations.

System Implementation: System testing, Quality assurance, Documentation tools, Managing system implementation.

UNIT–III

System Security: Introduction, Threats to System, Control Measures, Disaster Recovery, Audit Trails.

Case study of the following systems.
Inventory Control.
University Management System.

References:

1. "Elements of System Analysis" – Marvin Gore and John W. Stubbe, 2003.
2. "System Analysis and Design" – Thapliyal M.P., 2002.
3. "Modern Systems Analysis & Design" – Hoffer, George and Valacich , 2001.
4. "SSAD: System Software Analysis and Design" – Mehta Subhash and Bangia Ramesh, 1998.
5. "Understanding Dynamic System : Approaches to Modelling, Analysis and Design" – Dorny C. Nelson, 1993.
6. "System Analysis and Design" – Perry Edwards, 1993.
7. "Systems Analysis and Design" – Elias M. Awad, 1993.
8. "Analysis and Design of Information Systems" – James A. Senn, 1989

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – V
(Under Credit Based Continuous Evaluation Grading System)

CSL–331: NETWORK OPERATING SYSTEMS

CREDITS		
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UNIT–I

Introduction of various Network Operating Systems: Windows 2000/2003/XP, Unix/Linux.

Overview of Network Operating System: Introduction, Architecture, Shell, Kernel, File System, Hardware requirements, Active Directory, Clustering & Load Balancing , Storage Management, Editors, Networking and Communication features, Licensing

UNIT–II

Disk Management: Terminology and Concepts, Managing Disks, Managing Basic and Dynamic Disks, Disk Quotas, Disk Fragmentation, Remote Storage, RAID and Mirroring.
Servers: Managing DHCP, IIS, WINS, DNS and Proxy servers.

User, Group and Computer Accounts: Creating and Managing user, Group and Computer Accounts, Managing Access Controls, Troubleshooting Accounts.

UNIT–III

Performance Monitoring and Security: Task Management, System Monitoring, Performance Logs and Alerts, Monitoring Memory, Network and Process Objects, Auditing Security Events, Audit Policy and Event Viewer.

Backup and Disaster Recovery: Backup & Recovery Concepts, Creating Backup Plan, Choosing and Managing Backup Media, Setting Backup Options, Scheduling Backup Jobs, Developing Disaster Recovery Plan, Assessing Threats, Incident Response Team, Restoring Data using Backups.

Special Topics: Introduction to E–Mail, Telnet and FTP, Distributed Systems.
Case and Comparative Studies of Windows 2003 server and Unix/Linux.

References:

1. MCSA/MCSE; Exam 70–291, Implementing , Managing and Maintaining a Windows Server 2003
2. Network Infrastructure by Shinder Deborah Littlejohn, Shroff Publishers, 7th Reprint, 2005..
3. Networking : The Complete Reference by Craig Zacker, Tata McGraw–Hill, Seventh Reprint, 2004.
4. Unix Concepts and Applications , Sumitabha Das,Third Edition, Tata McGraw Hill, First Reprint, 2003.
5. Unix and Shell Programming : A Text Book, Behrouz A. Forouzen, Second Reprint, PWS Publishers, 2005.
6. Linux: A Practical Approach, B.Mohamad Ibrahim, Second Reprint, Laxmi Publications, 2006.
7. Linux Security, Hontanon Ramon.J., BPB Publications, 2001.
8. The Internet: Douglas E. Comer, 3rd Edition, Prentice Hall, 2003.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – V
(Under Credit Based Continuous Evaluation Grading System)

CSL–332: RELATIONAL DATABASE MANAGEMENT SYSTEM

CREDITS		
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UNIT–I

Introductory Concepts: Database, Database Management System (DBMS), Advantages and Disadvantages of DBMS, Database System Structure, DBA and responsibilities of DBA.
Three level ANSI–SPARC Architecture Schemas, Mapping, instances and Database Independence, Entity–Relationship Model, Relational Data Model, Keys, Integrity Constraints, Relational Algebra, Relational Calculus.

SQL: Introduction, Data Definition Language (DDL), Data Manipulation Language (DML), Data Control Language (DCL) statements, Views, Sub–queries, Access Rights.

UNIT–II

PLSQL: Introduction, Comparison of SQL and PLSQL, Structure of PLSQL, Components of PLSQL, Variables and Constants, I/O Statements, Control Statements: Conditional, Iterative and Sequence, Cursor Management, Triggers and Exception Handling.

Normalization: Purpose of Normalization, 1NF, 2NF, 3NF, BCNF.

Query Optimization : Introduction of Query Processing, Heuristic Approach to Query Optimization, Cost Estimation, Pipelining.

UNIT–III

Transaction Management and Concurrency Control : Introduction to Transaction Processing, Properties of Transactions, Serializability and Recoverability, Need for Concurrency Control, , Locking Techniques, Time stamping Methods, Optimistic Techniques and Granularity of Data items.

Database Recovery of database: Introduction, Need for Recovery, Transactions and Recovery, Recovery Facilities, Recovery Techniques.

Database Security: Introduction, Threats, Counter Measures.

References:

1. S.K.Singh "Database Systems– Concepts, Design and Applications First Impression, 2006.
2. Ivan Bayross, "SQL/PLSQL: The Programming Language of Oracle, 3rd Revised Edition, 2006.
3. Prateek Bhatia & Gurvinder Singh, Simplified Approach to DBMS, 3rd Edition, 2006.
4. Elmarsi & Navathe, "Fundamentals of Database Systems" 4th Edition, 2004.
5. C.J.Date "Introduction to database system", 8th Edition, Galgotia Publications, 2004.
6. Connolly & Begg "Database Systems – A practical approach to design, Implementation and Management, 3rd Edition, Pearson Education India, 2003.
7. Silberschatz, Korth, Sudershan "Database System Concepts" 4th Edition, McGraw Hill Education, 2002.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – V
(Under Credit Based Continuous Evaluation Grading System)

CSL–333: DESIGN AND ANALYSIS OF ALGORITHMS

CREDITS		
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UNIT–I

Introduction: Concept of Algorithm, Algorithm Specification, Performance Analysis (Time and space complexities), Asymptotic Notations.
Elementary Data Structures: Stacks, Queues, Trees and Graphs.
Divide and conquer: General Method, Binary Search, Finding the Maximum and Minimum, Quick Sort, Selection.
Greedy Method: General Method, Knapsack Problem, Minimum Cost Spanning Trees (Prim's Algorithm, Kruskal's Algorithm) and Single–Source Shortest Path.

UNIT–II

Dynamic Programming: General Method, Multistage Graphs, All Pairs Shortest Paths, Single–Source Shortest Paths, Optimal Binary Search Tress, 0/1 Knapsack and Travelling Salesmn Problem.
Backtracking: General Method, 8–Queens Problem, Graph Coloring and Hamiltonian Cycles.
Search and Traversal Technique: Techniques for Binary Trees, Techniques for Graphs,

UNIT–III

Alegebric Algorithms: General Method, Evaluation and Interpolation, Fast Fourier Transformation, Modular Arithmatic.
Hard Problems: Basic Concepts, Nondeterministic Algorithms, Classes NP–Hard and NP–Complete , NP–Hard Graph Problems (CNDP, DHC, TSP and AOG).
Approximation Algorithms: Introduction, Absolute Approximation (Planner Graph Coloring and NP–Hard Absolute Approximations), ε–Approximations (Scheduling Independent Tasks and Bin Packing).

References:

1. Aho , Hopcroft and Ullman "The Design and Analysis of Computer Algorithms", 2003.
2. Horowitz, S. Sahni, Sanguthevar Rajasekaran "Fundamentals of Computer Algorithms" , 2003.
3. R.G.Droomy, "How to Solve it by Computer" , Third Printing, 1989.
4. K. Mehlhorn, "Data Structures and Algorithms", Vols. 1 and 2, Springer Verlag, 1984.
5. Purdom, Jr. and C. A. Brown, The Analysis of Algorithms, Holt Rinechart and Winston, 1985.
6. D. E. Kunth, The Art of Computer Programming, Vols.I and 3, 1968, 1975.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – V
(Under Credit Based Continuous Evaluation Grading System)

CSL–334: COMPUTER GRAPHICS

CREDITS		
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UNIT–I

Overview of Computer Graphics: Applications of Computer Graphics, Raster–Scan displays, Random–Scan displays, Color CRT Monitors, Flat–Panel Displays; Video Controller, Display Processor, Common Graphic Input and Output devices, Graphic File Formats.
Output Primitives: DDA, Bresenham Line Algorithm; Bresenham and Midpoint Circle drawing algorithms; Midpoint Ellipse Algorithm; Flood and Boundary Filling;
Two Dimensional Geometric Transformation: Translation, Rotation, Scaling, Reflection; Matrix representations; Composite transformations;

UNIT–II

Two Dimensional Viewing: Viewing coordinate reference frame; Window to Viewport coordinate transformation, Point Clipping; Cohen–Sutherland and Liang–Barskey Algorithms for line clipping; Sutherland–Hodgeman algorithm for polygon clipping.
Three Dimensional Transformations: Translation, Rotation, Scaling, Reflection and composite transformations.

UNIT–III

Three Dimensional Viewing: Projections: Parallel and Perspective, Viewing Transformation: View Plan, View Volumes and Clipping.
Curves and Surfaces: Parametric representation, Bezier and B–Spline curves.
Color Models: Properties of Light, Intuitive Color Concepts, RGB Color Model, CMY Color Model, HLS and HSV Color Models, Conversion between RGB and CMY color Models, Conversion between HSV and RGB color models, Color Selection and Applications.

References:

1. D. Hearn and M.P. Baker, Computer Graphics: C version, 2nd Edition, PHI, 2004.
2. D.F. Rogers, Procedural Elements for Computer Graphics, 2nd Edition, Addison Wasley, 2004.
3. D.F. Rogers, Mathematical Elements for Graphics, 2nd Edition., McGraw Hill, 2004.
4. J.D. Foley et al, Computer Graphics, Principles and Practices, 2nd Edition, Addison Wasley, 2004.
5. Roy A. Plastock, Gordon Kalley, Computer Graphics, Schaum's Outline Series, 1986.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – V
(Under Credit Based Continuous Evaluation Grading System)

CSP–335: PROGRAMMING LAB – I
(RDBMS & COMPUTER NETWORKS)

CREDITS		
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RELATIONAL DATABASE MANAGEMENT SYSTEMS – LAB.

UNIT–I

SQL Commands : Data Definition Language (Create, Drop , Alter, Rename and Truncate), Data Manipulation Language (Select, Insert, Update and Delete), Transaction Control (Commit, Rollback and Savepoint) and Data Control Statements (Grant, Revoke) Statements, Querying Multiple Tables using joins, Using Subquery to solve the problem.
PLSQL : Exercises using Variables and Constants, I/O Statements, Control Statements: – Conditional, Iterative and Sequence, Cursor Management, Triggers and Exception Handling.

UNIT–II

Server Management

Installing and Configuring Windows 2003 and SCO UNIX/ LINUX servers.

Implementing LAN using Client Server Architecture.

Creating and Configuring Proxy, DNS and IIS servers

UNIT–III

Unix/Linux Administration

User Mmanagement : Creating groups, Creating Users , Assigning access rights, deleting users.

File Management : File Attributes, File Ownership, File Permissions, Directory Permissions, Managing File permissions and ownership using chmod, chown commands.

Space Management, Backup and Restore Strategies and Security Management.

Scheduling and Monitoring Performance of Server by using inbuilt utilities.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – V
(Under Credit Based Continuous Evaluation Grading System)

CSP–336: PROGRAMMING LAB–II (ALGORITHMS & GRAPHICS)

CREDITS		
L	**T**	**P**
0	0	2

Experiments to plot growth of functions. Implementing heuristics and comparison with algorithms designed with asymptotic complexity in Comparison of various data structures for the same algorithm. Experiments with software packages like LEDA.

Computer Graphics Lab.

UNIT–I

A subset of the following List of Lab Experiments can be undergone.

Do two line segments intersect.
Compute the convex hull of a set of planar points.
Sean convert line segments.
Clip line segments against windows.

UNIT–II

Fill polygon with stipple patterns.
Use Phigs to show objects in various views. The truncated cube of Module 3 employed here.
Display the view volume.
Show a unit cube in perspective.
Implement the de Casteljau algorithm for curves.
Demonstrate the properties of the Bezier curves.

UNIT–III

Run a sample session on Microsoft Windows including the use of Paintbrush.
Run a simple X session including the use of the xfig package.
Run a sample session on the Macintosh.
Compile and link sample Motif program.
Write a simple file browser.
Above said Exercises can be implemented in C / C++ Programming Language.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI
(Under Credit Based Continuous Evaluation Grading System)

CSL–342: OBJECT ORIENTED ANALYSIS AND DESIGN

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Introduction
Introduction to Object Oriented concepts, comparison of object oriented vs Procedural software development techniques. Advantages of Object Oriented Methodology.

Modeling
Modeling as a Design technique, Object modeling technique.

Object Modeling
Object & Classes, Links & Associations, Generalization & Inheritance, Aggregation, Abstract Classes, example of an Object Model.

UNIT–II

Dynamic Modeling
Events and States, Operations, Nested State Diagrams, Concurrency, example of the Dynamic Model.

Functional Modeling
Functional Models, Data Flow Diagrams, Specifying Operations & Constraints, example of a Functional Model.

UNIT–III

Analysis & Design
Overview of Analysis, Problem Statement, example of Analysis Process using Object, Dynamic & Functional Modeling on an example system. Overview of System Design, Object Design, Design Optimization.

Implementation
Implementation of the design using a Programming Language or a Database System.
Comparison of Object Oriented vs Non Object Oriented Languages.

References:

1. "Object Oriented Modeling & Design" by James Rambaugh, Michael Balaha (PHI , EEE)
2. "Object Oriented Software Construction" Hertfordshire PHI International 1988.
3. "Object Oriented Programming" Brad J.Cox Addison Wessley,1986.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI
(Under Credit Based Continuous Evaluation Grading System)

CSL–343: SOFTWARE ENGINEERING

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

1. Introduction to Software Engineering: Software Evolution, Software crisis, Principles of Software Engineering, Software Development Life Cycle.
2. Software Project Management: Management Activities, Project Planning, Project Scheduling, Risk Management.
3. Software Design: Principles, Methodologies, Design specifications, Verification and validation

UNIT–II

4. Coding: Structured programming, Coding styles.
5. Software Testing: Software Testing, Component Testing, Test case design.
6. Software Metrics: Design metrics, Coding metrics, Technical metrics, Testing metrics.

UNIT–III

7. Configuration Management: Configuration Management Planning, Change Management, Version Management and Release Management, System Building
8. CASE Tools
9. Exposure to Rational Rose Tools.

References:

1. Pressman : Software Engineering : A Practitioner's Approach, 3rd Ed., TMH 2004
2. Flecher and Hunt : Software Engineering and CASE : Bridging and Culture Gap, 2000.
3. Shepperd : Software Engineering, Metrics, Volume 1 (EN), McMillan, 1999
4. Robert S. Arnold : Software Re–engineering, IEEE Computer Society, 1994.
5. Pankaj Jalote : An Integrated Approach to Software Engineering, Narosa Publishers, 3rd ed., 2006.
6. Ghezzi, Cario : Fundamentals of Software Engineering, 2nd ed., PHI, 2002.
7. Sommerville, Ian : Software Engineering, 7th edition, Pearson Education, 2004.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI
(Under Credit Based Continuous Evaluation Grading System)

CSL–344: OBJECT ORIENTED PROGRAMMING USING JAVA

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Evolution of Java
Importance of JAVA to Internet, Features of JAVA, Bytecode, Object Oriented Approach.

Data Types, Variables and Arrays
Data types, Declaration of Variable, Type Conversion and Casting, One Dimensional and Multidimensional arrays

Operators and Control Structures
Arithmetic, Bitwise, Relational, Boolean, Assignment Operators, Operator precedence, Selection Statements, Iteration Statements, Jump statements.

UNIT–II

Classes
Class Fundamentals, Declaring objects, introducing methods, constructors, this keyword, Overloading constructors, Recursion, Nested and Inner classes.

Inheritance
Basics, Creating Multilevel hierarchy, Method Overriding, Abstract Classes.

UNIT–III

Packages and Interface
Packages, Access Protection, Importing Packages, Interfaces, Defining, Implementing, Applying Interfaces, Extending Interfaces

Exception Handling
Fundamentals, Exception Types, uncaught exceptions, try and catch.

References:

1. Patrick Naughton & Herbert Schildt: The Complete Reference Java 2, Tata McGraw Hill Edition
2. Balagurusamy: Programming in JAVA, BPB Publications, 2005

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI
(Under Credit Based Continuous Evaluation Grading System)

CSP–340: PROGRAMMING LAB – VI
(ADVANCED DATA BASE MANAGEMENT SYSTEMS)

Credits		
L	**T**	**P**
0	0	4

Programming exercises on the courses of the semester.

Installation and Administration of ORACLE OR SQL Server.

Developing Application with Visual Basic.

Developing Application with JAVA/JDBC/ODBC

Practical based on Java's Introduction

Object Oriented Analysis and Design using Rational Rose/Case Tools

Object Oriented Programming using C++ or Java

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

CSL–345: NATURAL LANGUAGE PROCESSING (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

UNIT–I

Basic course on artificial intelligence, Data Structure & Algorithms.
Introduction to the methods and techniques of Natural Processing – semantics, pragmatics, Applications of Natural Language Processing.

COURSE CONTENTS:
Components of natural language processing: Lexicography, syntax, Semantics, pragmatics: word level representation of natural languages prosoty & natural languages.

Formal languages and grammars: Shomsky Hierarchy; Left Associative Grammars. Ambiguous Grammars. Resolution of Ambiguities.

UNIT–II

Semantics Knowledge Representation: Semantic Network Logic and inference. Pragmatics, Graph Models and Optimization. Prolog for natural semantic.
Computation Linguistics: Recognition and parsing of natural language structures: ATN & RTN; General techniques of parsing: CKY, Earley & Tomita's Algorithm.

UNIT–III

Application of NLP: Intelligent Work Processors: Machine translation; User Interfaces;
Man–Machine Interfaces: Natural languages Querying Tutoring and Authoring Systems. Speech Recognition Commercial use of NLP.

References:
1) J. Allen, Natural Language understanding, Benjamin/Cunnings, 1987.
2) G. Gazder, Natural Language Processing in Prolog, Addison Wesley, 1989.
3) Mdij Arbib & Kfaury, Introduction to Formal Language Theory, Springer Verlag, 1988.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

CSL–346: SYSTEM HARDWARE DESIGN (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

Basic Electrical Circuits (R.L.C. circuit analysis), Basic Electronic Devices and Circuits (B.J.I.s MOSFETs, basic logic gates).
To provide students an exposure to analysis and design techniques used in digital system hardware design.

Course Contents:

UNIT–I

CMOS Technology:
Logic levels.
Noise Margin.
Power dissipation, supply currents.
Speed delays. [10%]
Interconnect analysis.

UNIT–II

Power/Ground/ droop/bounce.
Coupling analysis.
Transmission line effects/cross talk. [40%]
Power/ground distribution.
Signal distribution.
Logic Design \ Random logic \ programmable logic.
Microcontrollers.

UNIT–III

Memory subsystem design.
Noise tolerant design.
Worst case timing.
Thermal issues in design. [40%]
Real life system design examples. [10%]

References:

1) James E. Buchanan, "BICMOS–CMOS System Design" McGraw Hill International Edition 1991.
2) James E. Buchanan, "CMOS–TTL System Design" McGraw Hill International Edition 1990.
3) John P. Hayes. "Digital System Design & Microprocessors" McGraw Hill International Edition 1985.
4) Darryl Lindsay, "Digital PCB Design and Drafting" Bishop Graphics 1986.
5) Howard W. Johnson & Martin Graham, High Speed Digital Design – A Handbook of Black Magic, Prentice Hall, PTR Englewood Cliffs, 1993.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

CSL–347: REAL TIME SYSTEMS (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

Computer Organization and Operating System.
To give an insight of concepts underlying, Real Time Systems and knowledge based real time systems, to give an understanding of its design and implementation.

COURSE CONTENTS:

UNIT–I

Introduction to Real–time systems: Issues of Real–time Systems, tasks & Task parameters, Real–time Systems components Soft and hard real time system, periodic and aperiodic tasks. Specification of time constraints. [10%]

Need for task scheduling: Issues and scheduling methodologies. Priority based scheduler, value based scheduler & Pre–emptive scheduling multiprocessor environment. Deterministic scheduling, Hardware Schedulers. [25%]

UNIT–II

Real time Operating Systems: A case study of generalized Executive for multiprocessors (GEM). Programming using Real time OS Constructors. Microprocessor based Real time scheduler. [20%]

Real Time Languages: Case study of a language having facilities for time and task management Euclid and Ada for real time programming. [10%]

UNIT–III

Architectural requirements of Real Time Systems: Tightly coupled systems, hierarchical systems, arbitration schemes, Reliability issues, HW/SW faults, diagnosis, functional testing etc. Fault tolerant architectures: TMR systems. [10%]

Real Time Knowledge based systems: Integration of real time and knowledge based systems. Neural networks and fuzzy logic in real time systems. [25%]

REFERENCES:

1) Levi S.T. and Aggarwal A.K. Real Time System Design, McGraw Hill International Edition, 1990.
2) Stankovic J.A. and Ramamritham K., Hard Real Time Systems, IEEE Press, 1988.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

CSL–348: OPERATION RESEARCH (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

Importance of need to take intelligent decisions is to be emphasized. How quantitative approach based on formal modeling concepts can be used has to be presented using OR. Major focus should be on how to model various situations in industries and solve them. Wherever possible attention should also be paid on computer softwares available for this purpose.

Course Contents:

UNIT–I

Introduction to OR modeling approach and various real life situations. [5%]

Linear programming problems & Applications, Various components of LP problem formulation. Solving Linear Programming problem using simultaneous equations and graphical Method Simplex method & extensions:

Sensitivity analysis.
Duality theory.
Revised Simplex.
Dual Simplex.
Transportation and Assignment Problems. [25%]

UNIT–II

Network Analysis including PERT–CPM.
Concepts of network.
The shortest path.
Minimum spanning tree problem.
Maximum flow problem.
Minimum cost flow problems.
The network simplex method.
Project planning & control with PERT & CPM. [20%]

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

UNIT–III

Integer programming concepts, formulation solution and applications.	[10%]
Dynamic programming concepts, formulation, solution and application.	[05%]
Game Theory.	[05%]
Queuing Theory & Applications.	[10%]
Linear Goal Programming methods and applications.	[05%]
Simulation.	[15%]

References:

1) F.S. Hillier & G.J. Lieberman, Introduction to OR, McGraw Hill Int. Series 1995.
2) A Ravindran, Introduction to OR. John Wiley & Sons, 1993.
3) R. Kapoor, Computer Assisted Decision Models, Tata McGraw Hill 1991.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

CSL–349: LANGUAGE PROCESSORS (ELECTIVE – I)

CREDITS		
L	**T**	**P**
3	1	0

Formal Language & Automata Theory, Systems Programming.

At the end of this course on Language processor, the student should be able to:
Understand the influence of Programming languages and architectures on the efficiency of language translation.
Understand the design of lexical analyzers.
Be proficient in writing grammars to specify syntax, understand parsing strategies and be able to use yacc to generate parsers.
Understand issues related to error detection.
Understand the issues in declaration processing, type checking, and intermediate code generation, and be able to perform these through the use of attribute grammars.
Understand the issues involved in allocation of memory to data objects.
Understand the key issue in the generation of efficient code for a given architecture.
Understand the role played by code optimization.

Course Contents:

UNIT–I

Overview of the translation process, **Lexical analysis:** hand coding and automatic generation of lexical analyzers. [08%]
Parsing theory: Top down and bottom up parsing algorithms. Automatic generation of parsers. [08%]
Error recovery: Error detection & recovery. Ad–hoc and systematic methods. [18%]

UNIT–II

Intermediate code generation: Different intermediate forms. Syntax directed translation mechanisms and attributed definition. [07%]
Run time memory management: Static memory allocation and stack based memory allocation schemes. [17%]
Symbol table management. [08%]

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

UNIT–III

Code generation: Machine model, order of evaluation, register allocation and code selection. [17%]

Code optimization: Global data flow analysis. A few selected optimizations like command sub expression removal, loop invariant code motion, strength reduction etc. [17%]

References:

1) Aho, Ravi Sethi, J.D. Ulliman, Compilers tools and techniques, Addison–Wesley, 1987.
2) Dhamdhere, Compiler Construction – Principles and Practice Macmillan, India 1981.
3) Tremblay J.P. and Sorenson, P.G., The Theory and Practice of Compiler Writing, McGraw Hill, 1984.
4) Waite W.N. and Goos G., Compiler Construction Springer Verlag, 1983.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS-402 SYMBOLIC LOGIC & LOGIC PROGRAMMING

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**2**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Exposure to Discrete Structures.
At the end of the course the student will have learnt:
Representation of world knowledge using symbolic logic. Deductive strategies employed in symbolic logic. Programming in Prolog. Advanced techniques for coding specific problems in Prolog. Issues in implementing logic programming languages.

COURSE CONTENTS :

Prepositional logic: Syntax and Semantics: Validity and consequence. Normal forms. Representing world knowledge using prepositional logic. [15%]

First order logic: World knowledge representation and the need for quantifiers. Syntax, semantics validity consequence clause normal form. [20%]

Introduction to Prolog: Syntax of Prolog, Structured data representation. Execution model Introduction to Programming in Prolog, Illustrative examples. [20%]

The connection between logic and logic programming : Interpreting logic programs in terms of Horn clauses Deduction from clause form formulas resolution for prepositional logic Ground resolution. Unification and first order resolution SLD resolution; the computation and search rules. SLD trees and interpretation of non-declarative features of Prolog. [20%]

Advanced Prolog features : Programming techniques : Structural Induction and Recursion, Extra Logical features: Cut and Negation Case Studies. [20%]
Introduction to Fuzzy logic and neural networks. [05%]

TEXTS/REFERENCES:

1. Gries, The Science of Programming, Narosa Publishers, 1985.
2. Stoll, set Theory and Logic, Dover Publishers, new York, 1963.
3. Clocksin, W.F. and Mellish, C.S., Programming in Prolog 2nd edition, Springer - Verlag, 1984.
4. O'Keefe, R., The Craft of Prolog. The MIT Press, 1991.
5. Lloyd, J. W., Foundation of Logic Programming, Springer, 1984.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS–402: SYMBOLIC LOGIC & LOGIC PROGRAMMING LAB

Experiments in Prolog Programming, Deductive databases, Recursion and Prolog list data structures.
Experiments to understand Prolog execution strategies, Cuts and Negation. Search Algorithms. Term Projects.

TEXT/REFERENCE:

Clocksin, W.F. and Mellish, C.S., Programming in Prolog 2nd Edition, Springer - Verlag, 1984.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS-404 FORMAL LANGUAGE & AUTOMATA THEORY

Max Marks : 100		**Time : 3 Hrs.**		
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Data Structure and Programming Methodology.
To give the students a knowledge of number of areas in theoretical computer science and their hierarchical interconnections.

COURSE CONTENTS:

Basic Definitions

Operations on Languages: Closure properties of Language Classes. Context Free Languages: The Chomsky Griebach Normal Forms. Linear Grammars and regular Languages. Regular Expressions Context Sensitive Languages; The Kuroda Normal Form, One sided Context Sensitive Grammars. [35%]

Unrestricted Languages: Normal form and Derivation Graph, Automata and their Languages: Finite Pushdown 2-push down Automata and Turing Machines, The Equivalence of the Automata and the appropriate grammars. The Dyck Language. [25%]

Syntax Analysis: Ambiguity and the formal power Series, Formal Properties of LL(k) and L.R.(k) Grammars. [15%]

Derivation Languages: Rewriting Systems, Algebraic properties, Canonical Derivations, Context Sensitivity. [15%]

Cellular Automata: Formal Language aspects, Algebraic Properties Universality & Complexity Variants. [10%]

TEXTS/REFERENCES:

1. G.E. Reevsz, Introduction to Formal Languages, McGraw Hill 1983.
2. M.H. Harrison, Formal Language Theory Wesley 1978.
3. Wolfman Theory and Applications of Cellular Automata, World Scientific, Singapore, 1986.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS-406 PRINCIPLES OF ENGINEERING ECONOMICS & MANAGEMENT TECHNIQUES

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

COST ANALYSIS : Break-even analysis, two and three alternatives, graphical solution. Break-even charts, effects of changes in fixed and variable costs. Minimum cost analysis, economic order quantity. Effect of risk and uncertainty on lot size. [10%]

REPLACEMENT STUDIES : Reasons for replacement, factors to be considered in replacement studies, discounted cash flow analysis, economic life of a project, challenger and defender. [10%]

ECONOMIC ANALYSIS OF INVESTMENT ALTERNATIVES : Basic economy study patterns and their comparison, decision making in selection of alternative by present worth methods, rate of return method, payout period method and uniform annual cost method, economic analysis of new projects, effect of taxation on economic studies. [10%]

COST ESTIMATION : Difference between cost estimation and cost accounting, qualifications of an estimator. Estimating procedure. Estimate of material cost and labour cost. Estimation of cost in various manufacturing operations. [10%]

DEPRECIATION : Types of depreciation and their Methods. [5%]

HUMAN RESOURCE MANAGEMENT : Introduction to Human Resource Management and its definition, Functions of Human Resource Management & its relation to other managerial. Importance of Human Resource in Industry. [10%]

PROCUREMENT AND PLACEMENT : Need for Human Resource Planning, Process of Human Resource Planning, Method of Recruitment, Psychological tests and interviewing, Meaning and Importance of placement and Induction. [15%]

TRAINING & DEVELOPMENT : Difference between Training & Development, Principles of Training, Employee Development, Promotion merit V/S seniority performance appraisal. [10%]

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

JOB SATISFACTION : Job satisfaction and its importance, Motivation Factor affecting motivation, Introduction of motivation Theory , workers participation ,Quality of working life. [10%]

INTEGRATION & MAINTENANCE : Introduction to Integration and Maintenance. [05%]

RECOMMENDED BOOKS :

1. Dawin B. Flippo Principles of personnel Management (McGraw -Hill)
2. Michael J. Jucius Personnel Management (Richard D. Irwin, Homewood)
3. R.C. Saxena Labour Problems and Social Welfare (K.Math & Co. Meerut)
4. A. Minappa and Personnel Managements M.S. Saiyada (Tata McGraw-Hill)
5. C.B. Mamoria Personnel Management (Himalaya Publishing House, Bombay).
6. T.N. Bhagotiwal Economics of Labour and Industrial Relations (Sahitya Bhawan Agra)
7. Engineering Economy : Thuesen Prentice Hall.
8. Engg. Economic Analysis Bullinger.
9. Introduction to Econometrics : Klien Prentice Hall.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS-408: OVERVIEW OF IT MATERIALS.

L	T	P	MAX. MARKS : 100
2	-	-	INTERNAL : 40
Time : 3 Hrs.			EXTERNAL : 60

Note : Eight Questions are to be set Candidates are required to attempt any five questions. The student can use only Non-programmable & Non-storage type calculator.

PREREQUISITES : Physics and Chemistry

OBJECTIVES :
To familiarize with the structures, properties and their inter-relationship for different materials having electrinic and magnetic applications.

Course Contents :
Electrical and Thermal Properties of Metals : The electron gas model of an electron in an electric field, mobility and conductivity, factors affecting the conductivity of electrical materials, effect of temperature on electrical conductivity of metals, superconductivity. [20%]

Dielectric Properties of materials : Polarization of dielectric constant of monatomic gases, other polarization methods, the internal fields in solids and liquids, the polaribility catastrophe Frequency dependence of polarisability dielectric losses, dipolar relaxation, frequency and temperature dependence of dielectric constant of polar dielectrics, ionic conductivity in insulators, insulating materials, Ferro-electricity, Piezo-electricity. [20%]

Magnetic Properties of Materials : Classification of magnetic materials, the origin of permanent magnetic dipoles, diamagnetism, paramagnetism, ferromagnetism, ferromagnetic domains, the magnetization curve, hystersis loop, magnetostriction magnetic materials, antiferromagnetism, Ferro-magnetism, magnetic resonance ferrites, their properties and uses. [20%]

Optoelectronic Materials : Photoemission, Photomassive materials and Photocathodes, Multialkali photocathodes, Electroluminiscence, Electroluminiscence panels, junction photoemitters, injection losses, gallium arsenide, gallium phosphide and other losing materials. [15%]

Special Electrical and Electronic Materials : Alloys and compounds, Solid solution and solubility, phase diagram, alloy composition and properties, multi phase materials, ceramics preparation, Silicate Structure and polymorphism, Properties of ceramics, High temperature ceramics, Crystalline and amorphous phases, Amorphous and polycrystalline materials. [15%]

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

Engineering plastics : Polymer Structures : Preparation and characterization of plastics, clastomers and fibers ; Applications of polymers in electronics and optoelectronic device technology. [10%]

TEST/REFERENCES :

1. V. Raghavan, Material Science and Engg. A first course, Prentice Hall of India, 1988.
2. C. M. Srivastava and C. Srinivasan, Science of Engineering Materials, Wiley Eastern Ltd., 1987.
3. Kenneth M. Ralls and Thomas H. Courtney and John Wulff, Introduction to Materials Science and Engineering, Wiley Eastern Ltd., 1976.
4. William D. Callister Jr. Materials Science and Engineering-An Introduction, John Wiley and Sons, Inc. N.Y.1994.
5. John Allison, Electronic Engineering Materials and Devices, Tata McGrow Hill, 1981.
6. J.Dekker, Electrical Engineering Materials, Prentice Hall of India.
7. D.V.Morgan and K.Board, an Intorduction to Semicondoctor Microtechnology, John Wiley and Sons Inc. N.Y.1983.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS-410 SOFTWARE LAB - VII

Max Marks :	**50**			
Internal Marks :	**25**	**L**	**T**	**P**
External Marks :	**25**	**-**	**-**	**6**

Development Programs for Genetic Algorithms & their Applications.

Development of Programs in OOP.

Windows Programming.

Java Programming, Web Publishing.

SPSS Packages

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 412 INTERNET PROTOCOLS (ELECTIVE - II)

Max Marks : 100		**Time : 3 Hrs.**		
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Computer Networks

Course Contents :

Introduction & Overview : The need for Internet, The TCP/IP Internet, Internet services, history & scope, protocol standardization. [15%]

Review of underlying Technologies : LAN, WAN, MAN, Archnet & Ethernet topology, Token Ring, ARPANET, PROnet technology. [50%]

Internet working concepts and architectural model, Application level Internet connection, Interconnection through IP Gateways, Users View. [20%]

Internet Address : Universal Identifiers, Three Primary classes of IP Addresses, network & Broadcasting Addresses, Address Conventions, Addressing Authority, Mapping Internet Addresses to physical Addresses, Determining Internet Address at startup (RARP). [30%]

Internet as virtual Network, Detailed concept of Routers & Bridges. Protocols Layering, Difference between X.25 and Internet layering, gate to Gate Protocol (GGP), Exterior Gateway Protocol (EGP). Managing Internet, reliable transactions & Security on Internet. [30%]

TEXTS / REFERENCES:

1. Internet working with TCP/IP Vol. - I
2. Principal Protocols & Architecture Comer & Stevens.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS – 414: COGNITIVE PSYCHOLOGY (ELECTIVE - II)

Max Marks : 100		**Time : 3 Hrs.**		
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

At the end of this course, the student would have learnt about the current state of knowledge in how: world knowledge is represented by humans & machines concepts are formulated and learnt organization of information (textual, usual, etc.) these tasks are done by computer today (artificial intelligence).

COURSE CONTENTS :

Introduction to the development of the cognitive view, perception, pattern recognition, picture processing, communication and language processing, the generic scheme, world view and models, relationships to information processing systems. [30%]

The paradigms of verbal learning, learning theories, coding processes, short term and long term memories, encoding processes, organization in memory, simulation models of learning and memory. Mnemonics, language comprehension, syntactic and semantic issues, sentence processing, text processing comparisons of sentence and picture processing, concept formation, puzzle and problem solving. [35%]

Contributions of cognitive psychology to advances in artificial intelligence, computer based learning/teaching systems, knowledge acquisition and knowledge based systems, expert systems. [35%]

TEXTS / REFERENCES :

1) Marc de May, “The Cognitive Paradigm” Reidel - 1982.
2) Kintsch, Memory and Cognition, John Wiley, 1977.
3) Gregg. Cognition in Learning and Memory, John Wiley, 1972.
4) R.C. Schank, P. Childers, Cognitive Computer on Language, learning and Al, 1984.
5) P.C. Kendall, Advances in Cognition Behavioral Research and Therapy, Academic Press, 1984.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 416 ORGANIZATIONAL STRUCTURES (ELECTIVE - II)

Max Marks	**: 100**	**Time : 3 Hrs.**		
Internal Marks	**: 40**	**L**	**T**	**P**
External Marks	**: 60**	**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

The major objective of the course is to help students acquire an understanding of organizations and the ways in which they are structured. It will also examine the influence of structure on the behaviour of individuals and groups.

COURSE CONTENTS :

Understanding the nature of organizations. [7.5%]

A systems approach to organizations. [7.5%]

Explaining predicting Behaviours in Organizations. [2.5%]

The individual in the organizations

Organizational Structure its dimensions, its influence. [25%]

Taxonomy of organizations. Types of structures. [7.5%]

Forms of Organizational structures - product, process, functional, territorial and matrix, SBUs. [20%]

Organizational Theory and Designs. [10%]

TEXTS / REFERENCES :

1) Robbins, S.P. Organizational Behaviour: Concepts, Controversies and Applications, Prentice Hall, 1994.
2) Luthans, F. Organizational Behaviours, McGraw Hill, 1992.
3) Newstorm, J.W. & Davis, K. Organizational Behaviour Human Behaviour at work, Tata McGraw Hill, 1993.
4) Dwivedi, R.D. Human Relations and Organizational Behaviour -A Global Perspective, Macmillan India Ltd. 1995.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS – 418: INDUSTRIAL MANAGEMENT (ELECTIVE - II)

Max Marks : 100		**Time : 3 Hrs.**		
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Basic mathematics and probability and statistics.
To sensitize the student on the issues related to why and how resources are to be managed effectively. The basic concepts of how productivity has to be managed in any organization are to be presented. However, the emphasis should be on typical industrial organizations. The focus should be on the basic resources of man, material, machines, methods and money. Students are to be exposed to important points related to human factors also.

COURSE CONTENTS :

History of modern management concepts.	[5%]
Management of resources & productivity.	[5%]
Forecasting.	[5%]
Materials management Basic inventory models & MRP.	[10%]
Quality management TQM, SQC & ISO 9000.	[15%]
Maintenance management, Maintenance, replacement & spare parts policies.	[10%]
Production scheduling methods, Sequencing & scheduling in job shop Strategies for batch manufacturing.	[20%]
Plant layout and material handling.	[5%]
Workstudy & workplace design.	
Method study Timestudy & Ergonomics.	[10%]
Industrial Safety.	[5%]
Engineering economic analysis.	[10%]

TEXTS / REFERENCES :

1. K.V. Rao, Management Science, Tata McGraw Hill 1986.
2. J.B. Dilworth, Operations, management, McGraw Hill International editions, 1992.
3. Charry, Operations Management problems & cases, Tata McGraw Hill 1995.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 420 INDUSTRIAL ECONOMICS (ELECTIVE - II)

Max Marks	**: 100**	**Time : 3 Hrs.**		
Internal Marks	**: 40**	**L**	**T**	**P**
External Marks	**: 60**	**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

To sensitize the student on the issues related to how an economic systems functions. The salient details of what are relevant to a firm a national and system of nations are to be exposed using important issues related to demand, production, prices, sales etc. Some ideas regarding investment, cost benefit analysis. International monetary system, national economic policies, International trends etc. are to be presented to make the students aware of various economic issues.

COURSE CONTENTS :

The firm Objectives & constraints : growth of a firm, **Economic development :** Measurements & related factors. [15%]
Measurements of economic development and the related factors. [10%]
Demand price and Revenue analysis. [10%]
Production Analysis, Price and output determinations. [5%]
Investment analysis & social cost benefit analysis. [10%]
International monetary system & foreign exchange rates; theory of international trade, tariffs, restrictions & their impact on international trade. [15%]

National economy : Planning & economic development. [10%]
Regulatory, legislative, fiscal, monetary & promotional policies of the government. [10%]
New economic policy : International trends & their impacts. [10%]

TEXTS / REFERENCES :

1. R. Dutt & KMP Sundaram, Indian Economy, S CHAND & CO. 1991.
2. Rao, V.K.R.V. India's National Income, Asia Publication House, 1983.
3. Economic development, JS Hogendom, Harper Collins publishers, 1987.
4. Multinational Business Finance, D. Eteman & Stonehiel, Addison Wesley, 1986.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 422 TRANSACTIONAL ANALYSIS (ELECTIVE - II) (BEHAVIOURAL SCIENCE)

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

To teach the students the practical technique of Transactional Analysis as a method of improving interpersonal relationships in the work place.

COURSE CONTENTS :

An historical perspective. [7%]

What is transactional Analysis (TA) [3%]

Egostates the Parent, the Adult and the Child. [20%]

Types of transactions Complementary and crossed. [20%]

Life positions - I am not O.K. - You are O.K., I am not O.K. - You are not O.K., You are not O.K. - I am O.K., I am O.K. - You are O.K. [14%]

Analyzing the transactions, functional differences. [10%]

Applications - Employment, Sales Problem solving, Grievance Handling, Stroking leadership and conflict resolution. [26%]

TEXTS / REFERENCES :

1. Eric Berne, Transactional Analysis in Psychotherapy, New York: Grove Press Inc. 1961.
2. Eric Berne, Games people Play, New York: Grove Press Inc. 1964.
3. Thomas A Harris, I am O.K. You are O.K. A practical guide to Transactional Analysis, New York Harper & Row Publication include. 1969.
4. Graham Barnes, Transactional Analysis after Eric Berne, Harper and Row, 1977.
5. J. Allyn Bradford and Reuben Guberman : Transactional Awareness, Addison Wesley Publication Co. 1978.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 424 ADVANCED MICROPROCESSOR (ELECTIVE–III)

Max Marks : 100		**Time : 3 Hrs.**		
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**-**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Computer Architecture and Microprocessor and Interfaces.

Having undergone a first course on Microprocessors and Interfaces, this course exposes the student to the Advanced Architectural features of the State of the art Microprocessors. This course clearly brings out the technological advancements made in Computer Architecture.

Course Contents:

Review of 8 bit microprocessor and support components. [5%]

Selected Case Studies of 16/32/64 bit microprocessors and support Contents. [20%]

RISC Architectures and Case Studies : RISC Vs CISC. [10%]

Power PC 601 Alpha 21064, Pentium super space, Transputer Architectures and Case Studies :

High Performance Embedded Microcontrollers, Case Studies. [25%]

403 GA Development Systems and support. [25%]

Selected Applications. [15%]

Texts / References:

1. J.T. Cain, Selected Reprints on Microprocessors and Microcomputers, IEEE Computer Society Press., 1984.
2. Rafiquzzaman, Microprocessors & Micro Computers Development Systems, Harper Row, 1984.
3. Rafiquzzaman, Microprocessors & Micro Computers - Based System Design, Universal Book Stall, New Delhi, 1990.
4. INMOS Ltd., Transputer Development System, Prentice Hall, 1988.
5. INMOS Ltd. Communicating Process Architecture, Prentice Hall, 1988.

6. Wunnava V. Subbarao, 16/32 Bit Microprocessors 68000/68010/68020, Software, Hardware & Design Applications, Macmillan Publishing Company, 1991.
7. Kenneth Hintz, Daniel Tabak, Microcontrollers : Architecture, Implementation & Programming McGraw Hill Inc., 1992.
8. Data Books By Intel, Motorola, etc.
9. Daniel Tabak, Advanced Microprocessors, McGraw Hill Inc., 1995.
10. Andrew m. Veronis, Survey of Advanced Micro Processors, van Nostrand Reinhold, 1991. McGraw Hill Inc., 1992.
11. Daniel Tabak, RISC Systems, John Willey & Sons, 1990.
12. The Power PC Architecture: A Specification for a New family of RISC Processors, Edited by Cathy May, Ed Silha, Rick Simpson, hank Warren, Morgan Kaufmann Publishers, Inc., San Francisco, California, 2nd Edition (May 1994)
13. Charles M, Gilmore, microprocessors Principles and Applications, McGraw Hill International Editions, 2nd Edtion, 1995.
14. PowerPC 403GA Embedded Controller User's Manual.PowerPC Tools - Development Tools For PowerPC Microprocessor (Nov. 1993).PowerPC 601 RISC Microprocessor User's Manual - 1993.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 426 ADVANCED MICROPROCESSOR LAB.

Max Marks :	**50**			
Internal Marks :	**25**	**L**	**T**	**P**
External Marks :	**25**	**-**	**-**	**4**

Students are expected to design and implement micro processor based systems for real life problem and evaluate the performance of various H/W plate forms.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 428 FORMAL SPECIFICATION AND VERIFICATION (ELECTIVE - III)

Max Marks	**: 100**	**Time : 3 Hrs.**		
Internal Marks	**: 40**	**L**	**T**	**P**
External Marks	**: 60**	**4**	**-**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Exposure to concepts in Symbolic Logic.

Detecting errors in software, fixing the bugs, and releasing versions is the most costly aspect of software systems. The need for producing "correct" software meeting the "Specifications" is vital. Formal methods for doing this are gaining importance and is the main topic of course. At the end of this course, the student will have learnt the techniques, languages and systems available for specifying and verifying programs.

COURSE CONTENTS :

Specification of sequential programs : Pre-post conditions Partial and total correctness, First Order Logic, Abstract data types and data type refinement. Case study of specification languages like Z and VDM. [25%]

Axiomatic System for first order logic. Proofs by mathematical induction. Hoare Logic, Techniques for proving non deterministic programs.

Dijkstra's weakest pre-condition semantics. Extension of Hoare Logic to deal with Languages involving advanced constructs like procedures with parameters, non-determinism, concurrency, communication and fairness. [50%]

Advanced Topics : Specification and verifications of reactive programs. Safety and Liveness Properties, Temporal Logic for specifying safety and liveness properties. Techniques for proving safety and liveness properties. [15%]

Computer-aided Verification : Deductive and model-theoretic approach. Automatic verification of finite state systems. [10%]

TEXTS / REFERENCES :

1. Apt and Olderog, Program Verification, Springer Verlag, 1991.
2. S. Alagic and M. Arbib, Design of Well Structured and correct Programs, Springer Verlag, 1978.
3. A. Pnueli and Z. Manna Temporal Logic of Reactive and Concurrent Systems, Springer Verlag, 1992.
4. D. Gries, Science of Programming, Narosa Pub.1985.
5. J. Loeckx and K. Siber, Found of Prog. Verification, John Wiley, 1984.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 430 FORMAL SPECIFICATION AND VERIFICATION (ELECTIVE - III)

Max Marks : 50				
Internal Marks : 25	**L**	**T**	**P**
External Marks : 25	**-**	**-**	**4**

FORMAL SPECIFICATION AND VERIFICATION Lab.

Students are expected to develop programs to illustrate various concepts e.g. Automatic verification of the finite state of machine and their logic etc.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 432 EXPERT SYSTEMS

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**-**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Data Structure and Programming. Design & Analysed Algorithm, Symbolic Logic and Logic programming.

The major objective of this course is to provide students with a view of various models of expert systems, its design. Implementation methods to Knowledge extraction and representation, Fuzzy and connectionist systems.

COURSE CONTENTS :

Expert Systems, Definitions types, components, Expert System Development Process. [15%]

Knowledge Representation Techniques - Logic Frames, Semantic Nets, etc. [15%]

Domain Exploration - Knowledge elicitation. Conceptualization, bathering, Formaliztions

Methods of Knowledge Acquisition : interviewing Sensor Data Capturing. [20%]

Learning, Planning and Explanation in Expert System : Neural Expert System, Fuzzy Expert System, Real Time Expert Systems. [30%]

Implementation Tools : Prolog, Expert System Shell Expersys, etc. Study of existing expert systems - TIERES, As Mycin & AM. [20%]

TEXTS / REFERENCES :

1. Patterson, Introduction to AI Expert System, PHI, 1993.
2. Jackson, Building Expert System, John - Wiley, 1991.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 434 EXPERT SYSTEMS LAB

Max Marks : 50				
Internal Marks : 25	**L**	**T**	**P**
External Marks : 25	**-**	**-**	**4**

Students are required to develop expert system for various industrial / real life problems.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 436 ROBOTICS (ELECTIVE - III)

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**-**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Exposure to Mechanics and Automatic Control.

The objective of this course is to introduce the students to the anatomy of robots and sensors followed by issues crucial to control. Subsequently emphasis is on higher level control like obstacle avoidance and path planning.

COURSE CONTENTS :

Introduction to Robotics, Introduction to Manipulators & Mobile Robots, Classification of Robots, Robot Applications. Industrial application environment and workcells, feeders and Orienting devices. [15%]

Robot Anatomy, Robot and Effectors, Transmission and actuators, with special reference to servomotors. [5%]

Robot Arm Kinematics, World, Tool and Joint coordinators, DH transformation and Inverse Kinematics. [20%]

Fundamentals of Closed loop control, PWM amplifiers, PID control. [10%]

Robotics Sensors : Range, Proximity, Touch, Force & Torque Sensing, Uses of sensors in Robotics. [5%]

Machine Vision : Introduction to machine Vision, The sensing and digitizing function in Machine Vision, Image Processing and analysis, Training and Vision system, Robotics Application. Low & High Level vision. [15%]

Robot Programming & Languages & Environment : Different methods, Features of various programming methods, Case study, Robot Task Planning. : concept, Different Methods, Robots learning.

Mobile Robot : Introduction, Obstacle Representation, Motion Planning in fixed, Changing structured, Unstructured environment based on different requirements. [15%]

TEXTS / REFERENCES :

1. M.P. Groover, M. Weins, R.N. Nagel, N.C. Odrey, Industrial Robotics, McGraw Hill, 1986.
2. Klafter D. Richard, Chmielewski T. A. and Negin Michael "Robotic Engineering", Prentice Hall of India Ltd., 1993.
3. K.S. Fu, RC Gonzalez, CSG Lee, Robotics Control, Sensing, Vision and Intelligence, McGraw Hill, International Edition, 1987.
4. Andrew C. Straugard, Robotics & AI, Prentice Hall, Inc.
5. S. Sitharama Iyengar, Alberto Elefes, Autonomous Mobile Robots, Perception, mapping & Navigation, IEEE Computer Society Press.
6. S. Sitharama Iyengar, Alberto Elefes, Autonomous Mobile Robots-Control, Planning and Architecture, IEEE Computer Society Press.
7. Various Research papers in area of Robotics.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 438 ROBOTICS (ELECTIVE - III)

Max Marks :	**50**			
Internal Marks :	**25**	**L**	**T**	**P**
External Marks :	**25**	**-**	**-**	**4**

Students are expected to implement the concept of Robot motion by interfacing the Robot with Computer System and remote operation of the Robot etc.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 440 IMAGE PROCESSING AND PATTERN RECOGNITION (ELECTIVE - III)

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**-**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

SIGNAL PROCESSING, LINEAR ALGEBRA.
This is an introductory course in Image Processing which will familiarize the students with the basic concepts and algorithms in Image Processing and Pattern recognition areas.

COURSE CONTENTS :

Background : Introduction to electronic systems for image transmission and storage, computer processing and recognition of pictorial data, overview of practical applications. [5%]

Fundamentals : Mathematical and perceptual preliminaries, human visual system model, image signal representation, imaging system specification building image quality, role of computers, image data formats. [15%]

Image Processing Techniques : Image enhancement, image restoration, image feature extraction, image data compression and statistical pattern recognition. [45%]

Hardware architecture for image processing : Distributed processing of image data, role of array processing, standard image processor chips (as example). [10%]

Techniques of colour image processing : Colour image signal representation, colour system transformations, extension of processing techniques to colour domain. [15%]

Applications of Image processing : Picture data archival, machine vision, medical image processing. [10%]

TEXTS / REFERENCES :

1. Pratt, W.K. Digital Image Processing, John Wiley, N.Y./1978.
2. Rosenfield, A and Kak, A.C., Picture processing, Academic Press N.Y., 1982.
3. Jain, A.K., Fundamentals of Digital Image Processing, Englewood Cliffs, Prentice Hall, 1989.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 442 IMAGE PROCESSING AND PATTERN RECOGNITION (ELECTIVE - III)

Max Marks :	**50**			
Internal Marks :	**25**	**L**	**T**	**P**
External Marks :	**25**	**-**	**-**	**4**

At least 10 experiments using suitable interactive tools (PCs with imaging interface with at least 2 exp. Involving independent program development by each student. Experiments should demonstrate effect of IP algorithms and parameter variation on processed images qualitatively and quantitatively.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 444 EMERGING TECHNOLOGIES AND CURRENT IT - TRENDS

Max Marks : 100		**Time : 3 Hrs.**		
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**4**	**-**	**4**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

COMPUTER NETWORKS AND RDBMS.

TO PROVIDE HANDS ON EXPERIENCE TO THE STUDENTS ON CURRENT IT TRENDS & EMERGING TECHNOLOGIES.

COURSE CONTENTS :

Introduction to DVD technology and its advantages over CD technology. [5%]

Introduction to SNA Sever fundamentals, SNA server network overview, Why SNA server and its connectivity with PC's. [5%]

Introduction to ISDN Services and alternatives to ISDN technology, Operating System software for ISDN, Connection of multiple devices to ISDN lines. [10%]

MAPI and its open architecture, other messaging API's, cross platform API's, advantages and disadvantages of cross MAPI's, Windows Open Systems Architecture (WOSA). [10%]

Evaluation of the performance of AS400 & TCP/IP connectivity in an AS400 environment, integration of IBM mainframes with TCP/IP networks. [15%]

Distributed computing environment (DCE), DCE services, Remote Procedure Call (RPC) & DCE security services, Cell Directory Services (CDS), Global Directory Services. [10%]

(GDS), Distributed Tine Services (DTS), Thread services, Distributed File Services (DFS). [15%]

Introduction to proxy server and SQL server, Internet & Online services, Internet security framework And its overview, Intranet concepts & related term development toolbox. [10%]

Introduction to Open Database connectivity (ODBS), Object Linking Embedding. (OLE). [10%]

Introduction to Telephone Application Programming Interface (TAPI). [10%]

TEXT / REFERENCE :

1. Reference Technical Information Network From Microsoft.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 446 EMERGING TECHNOLOGIES AND CURRENT IT TRENDS LAB.

Max Marks	**:**	**50**		
Internal Marks	**:**	**25**	**L**	**T**	**P**
External Marks	**:**	**25**	**-**	**-**	**4**

Students are expected to study and implement the various concepts of current IT trends of emerging Technology taught in the subject.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 448 SYSTEM SIMULATION & MODELING

Max Marks : 100		**Time : 3 Hrs.**		
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**2**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

COURSE CONTENTS :

Concept of a system, stochastic activities, continuous and discrete system, principals used in simulation and modeling for various applications.

Techniques of simulation, Monte Carlo method, type of system simulations, real time simulation stochastic variables, discrete probability function, generation of random number, poisson arrival pattern, exponential distribution, service time, normal distribution, queuing and discipline, measures of queues.

Representation of time, generation of arrival pattern, Discrete simulation languages queuing and inventory control.

Discrete simulation languages an overview of use of GPSS as a simulation.

Inventory control systems for illustration of applications.

BOOKS :

1. Gordon, G., System Simulation, 2nd ed. 198., Prentice Hall of India Pvt. Limited.
2. Deo, Narsingh, System Simulation with Digital Computers, PHI, New Delhi, 1993.
3. K.S. Trivedi, "Probability and Statistics with Reliability, Queuing and Computer Science Application, P.H. is Engleuood Cliff.
4. Subramanian, K.R.V and Sundaresan R. Kadayam, System Simulation : Introduction to GPSS, CBS, New Delhi, 1993.
5. W. Feller, " An Introduction to Probability Theory and its Applications." Vol. 182, Wiely Eastern Ltd. ND.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 450 SYSTEM SIMULATION & MODELING

Max Marks :	**50**			
Internal Marks :	**25**	**L**	**T**	**P**
External Marks :	**25**	**-**	**-**	**4**

Students ate expected to develop simulation program for static and dynamic system.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 452 OBJECT ORIENTED PROGRAMMING

Max Marks	**: 100**	**Time : 3 Hrs.**		
Internal Marks	**: 40**	**L**	**T**	**P**
External Marks	**: 60**	**4**	**-**	**4**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Programming Languages.

COURSE CONTENTS :

OO CONCEPTS : Objects, classes messages, inheritance, dynamic binding, polymorphism, oo paradigm, reusability and extensibility abstract data types, encapsulation, information hiding, generosity.

DATA ABSTRACTION IN C++ : Classes, ADT implementation, interface and implementation, members, methods, static member and member. Functions, public and private, initialization, constructors and destructors, operator and function overloading, IO operators, parameter passing by value and reference, function returning a reference, function signatures and name mangling, dynamic memory allocation and new and delete operators, assignment operator overloading, shallow and deep copies, copy constructor, encapsulation and friend functions and classes, generosity and template functions and classes.
Container classes, integrators, isotherm class library, error handling and exceptions in C++.

Inheritance and C++ : Base and derived classes, public, private and protected derivations, control of access and visibility using public/private/protected keyboards, type compatibility among super and sub-types, value/pointer/reference assignment semantics, virtual functions and polymorphism, multiple inheritance and repeated inheritance, virtual derived classes. Object oriented design and programming using classes and inheritance.

BOOKS :

1. The C++ Programming Language (2nd ed) by Bjarne Stroustrup, Addison-Wesley, 1991.
2. An Introduction to Object Oriented.
3. Programming by Timothy Budd, Addison Wesley, 1991.
4. Objected-Oriented Programming with C++ by W. Balagurusamy, Tata McGraw Hill, New Delhi, 1965.
5. Object-Oriented Programming in C++ by Nabajyoti Barkakti, Prentice Hall of India, Eastern Economy edition, New Delhi, 1991.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
SEMESTER-VII (OLD SYSTEM)

CS - 454 OBJECT ORIENTED PROGRAMMING LAB

Max Marks : 50				
Internal Marks : 25	**L**	**T**	**P**
External Marks : 25	**-**	**-**	**4**

Students are expected to write program's using classes and inheritance & small projects using OOP.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 352 MICROPROCESSOR AND ITS APPLICATIONS

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

COURSE CONTENTS:

INTRODUCTION: Overview of microcomputer System, Hardware, Software, Computer Languages, Microprocessors in digital system Design.

8086 ARCHITECTURE: Microprocessor Architecture, Memory, Input / Output, Interfacing Devices, Bus Architecture, Date, Address and Control Bus. Multiplexed Address / Data Bus, Bus Timing, generating Control signals. Decoding and executing an instruction. Internal Date operations and Registers Peripheral or Externally initiated operations Contemporary 8 bit microprocessors.

INSTRUCTION AND TIMINGS: Instruction classification instruction Format. How to write and execute a simple program. Instruction Timing and operation status. Overview of 8086 Instruction set.

INTRODUCTION TO BASIC INSTRUCTIONS: Data transfer (copy) Instructions. Arithmetic operation, Logic operations. Branch operations. Writing Assembly Language programs. Debugging a program.

PROGRAMMING TECHNOLOGY WITH ADDITIONAL INSTRUCTIONS: Looping, counting and indexing. Additional data transfer and 16 bit Arithmetic instructions. Arithmetic operations related to memory. Logic operations. Rotate and compare. Dynamic Debugging, counters and time delays counters and delays debugging. Stack, subroutine conditional call and return instructions. Advanced subroutine accept.

I/O INTERFACE: Basic interface concepts. Interfacing output displays. Interfacing input keyboards. Memory mapped 1/0 interfacing memory. PPI 8255, USART 8251. PIT 8253.

INTERRUPTS: TRAP, RST 7.5, 6.5 and restart as Software Instruction. Programmable interrupt Controller. The 8259 A Direct Memory Access (DMA) and 8257 DMA controller.

SERIAL I/O AND DATA COMMUNICATION: Basic concepts in serial 1/0. Software Controlled Asynchronous serial 1/0. The 8086-serail 1/0 lines SOD and SID. Hardware controlled serial 1/0 using programmable chips.

BOOKS RECOMMENDED:

1. A.P. Mathur, “Introduction to Microprocessors”, Tata McGraw-Hill.
2. R.S. Gaonkar, “Microprocessor Architecture”, Programming and Applications with 8086/8080 A. Wiley Eastern Limited.
3. L. Short, “Microprocessor and programmed Logic”, Prentice Hall Inc.

CS - 354 MICROPROCESSORS AND ITS APPLICATIONS LAB

Assembly Language Programming in 8085/8086. Familiarity with the Microprocessor and Microcontroller Kits. Selected Exercises in interfacing selected peripherals to these kits lab Project involving designs fabrication and testing of 8 bit Microprocessor based minimum configurations.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 356 INTERACTIVE COMPUTER GRAPHICS

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

COURSE CONTENTS :

1. **INTRODUCTION :** Origin of Computer Graphics, New display devices, display of solid objects. Point Plotting Techniques, Incremental Method. Line drawing, 2-D and 3-D Transformation clipping and windowing.

2. **RASTER GRAPHICS :** Fundamentals of Raster Scan Graphics, solid Area-Scan conversion, display hardware.

3. **THREE DIMENSIONAL GRAPHICS :** Realism in 3-d Graphics, curves & surfaces, 3-d transformations and perspections. Perspective depth, Hidden surface-elimination, shading.

4. **GRAPHICS SYSTEMS :** Display Processors, device independent graphics systems, user interface design, examples and circuit drawing with pattern plotting.

BOOKS :

1) Newmen, W.M. and SPRAULL, R.F., "Principles of interactive Computer. Graphics" McGraw Hill, 1981.

2) Foley J.D., Vandam A. "Fundamentals of interactive Computer graphics."

3) Baker - Computer Graphics.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 358 INTERACTIVE COMPUTER GRAPHICS LAB

Max Marks : 50				
Internal Marks : 25	**L**	**T**	**P**
External Marks : 25	**-**	**-**	**2**

A subset of the following List of Lab Experiments may be performed.

Do two line segments intersect.

Compute the convex hull of a set of planar points.

Sean convert line segments.

Clip line segments against windows.

Fill polygon with stipple patterns.

Use Phigs to show objects in various views. The truncated cube of Module 3 employed here.

Display the view volume.

Show a unit cube in perspective.

Implement the de Casteljau algorithm for curves.

Demonstrate the properties of the Bezier Curves.

Run a sample session on Microsoft Windows including the use of Paintbrush.

Run a simple X session including the use of the xfig package.

Run a sample session on the Macintosh.

Compile and link sample Motif program.

Write a simple file browser.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 360 INFORMATION TECHNOLOGY TOOLS FOR ENGINEERS

Max Marks	**: 100**	**Time : 3 Hrs.**		
Internal Marks	**: 40**	**L**	**T**	**P**
External Marks	**: 60**	**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

COURSE CONTENTS :

POWER POINT : Basics, Pictures, Charts & Graphs, Working with files.

POWER BUILDER : Introduction, Power Script Language, Power Script Painter, Creating & Manipulation of Windows.

LINEAR PROGRAMMING.

DYNAMIC PROGRAMMING.

PERT/CPM.

Introduction to Genetic Algorithms.

Extensive use of SPSS and Data Processing.

TEXTS / REFERENCES :

1. Principles & Operations Research by Harvey M. Wagner, PHI.
2. A Management guide to PERT/CPM by J.D. Wiest and F.K. Lery, PHI.
3. Linear Programming and Economics Analysis by R. Dorfman, P. Sonnelson, R. Solow.
4. Powerbuilder 4 A Developer's Guide by Mclanahan, BPB.
5. PowerPoint 4 for Windows for Dummies by Lowe, BPB.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 362 INFORMATION TECHNOLOGY TOOLS FOR ENGINEERS LAB

Max Marks : 50				
Internal Marks : 25	**L**	**T**	**P**
External Marks : 25	**-**	**-**	**2**

Students are required to be exposed with the scientific and management Computer Based Tools such as GA's, PERT/CPM etc.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 364 DISTRIBUTED DATABASE MANAGEMENT SYSTEMS

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Introduction : Concepts, Advantages and Disadvantages of Distributed Database Management System (DDBMS), Homogeneous and Heterogeneous DDBMS. Functions of DDBMS.

Distributed Database Management System Architecture : Architectural Models for DDBMS (Distributed Database Management System) : Autonomy, Distribution, Heterogeneity factors ; Client Server Systems, Peer-to-Peer Distributed Systems, Global Directory Issues.

Distributed Relational Database Design : Fragmentation : Reasons, Alternatives, Degree, Information requirement. Horizontal, Vertical, Hybrid Fragmentation.
Allocation : Allocation Problem, Information Requirements for allocation.

Distributed Relational Database Query Processing & Optimization : Query Decomposition, Localization of Distributed Data, Query Optimization, Introduction to Distributed Query Optimization Algorithms.

Distributed Concurrency Control : Objectives, Distributed Serializability, Centralized two-phase locking, Distributed two-phase locking.

Mobile Databases : Mobile Databases Directory Management, Caching, Broadcast Data, Query Processing & Optimization.

References :

1. M.Tamer Ozsu, Patrick Valdureiz, 'Principles of Distributed Database Systems' Second Edition, Prentince Hall.
2. Romez Elmasri, Shamkant B. Navathe, 'Fundamentals of Database Systems' Pearson Education.
3. Silberschatz, Korth, Sudershan "Database System Concepts" 4th Ed. McGraw Hill.
4. Connolly & Begg " Database Systems - A practical approach to design, Implementation and Management, 3rd Ed. Pearson Education.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 366 DISTRIBUTED DATABASE MANAGEMENT SYSTEMS

Time : 3 Hrs.
Max Marks : 50
Internal Marks : 25
External Marks : 25

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Laboratory exercise of Distributed Database Management Systems.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 368 APPLICATION PROGRAMMING FOR ENGINEERS

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

COURSE CONTENTS :

Introduction to contemporary application programming languages like Visual Basic, C++, Visual C, Java, introduction to C++ data types, expression and statement, Functions, scope and the free store overloaded and template functions, classes, member functions class templates, class derivation and inheritance. Object oriented programming and object oriented design, C++ input / output library. Exception handling.

Developing an application program using C++ and JAVA.

TEXTS /REFERENCES :

1. Programming with C++, BPB Publication by Robert Lafore.
2. Object oriented programming using C+, by Bjarne Stoustrup.
3. C++ Privier, Addison-Wesley by Stanley B. Lipparan.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 370 APPLICATION PROGRAMMING FOR ENGINEERS LAB

Max Marks : 50				
Internal Marks : 25	**L**	**T**	**P**
External Marks : 25	**-**	**-**	**2**

Students should be given small project to be implemented in C++ and JAVA.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CSE- 372 INSIDE WINDOWS NT SERVER

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

COURSE CONTENTS :

Introduction to Windows NT Server, Windows NT features, hardware requirements, planning the network, Windows NT network security model, special purpose servers licensing.

Server hardware, motherboard, mass storage devices, interfaces and adapters.

INSTALLATION OF WINDOWS NT SERVER

Planning storage strategies, options, working with disk administrator and backup Networking and network protocols.

Configuration of Windows NT

Windows NT services Architecture and security Architecture, planning and managing groups and user accounts File services, distributed file system, remote administration, remote access services, Internet & Intranet, Printing and supporting network clients, performance tuning.

REFERENCES :

MCSE : NT SERVER 4 GUIDE - MATHEW STREBE, CHARLES PERKINS FROM BPB PUBLICATIONS.
MASTERING WINDOWS NT SERVER 4 - MARK MINASI, CHRISTA ANDERSON, ELIZABETH.

LAB WORK :

1. System Administration Windows NT Server.
2. Security Features.
3. Remote access services, Internet & Intranet administration.
4. Network Auditing & Performance tuning.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 374 INSIDE WINDOWS NT SERVER

Max Marks : 100		**Time : 3 Hrs.**	
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Course Contents:

Introduction: The basics of netware, the connectivity in a network, thick ethernet, thin ethernet, benefits of netware networks.

The netware 12.3 software package, configuration guidelines for netware v2.2 networks, the servers. Date of Time, getting on line help, creating the system login script, login script commands, accessing files with netware, printing environment.

The netware v3.11 software package, servers workstations adapter cards, types of memory available to DOS workstations, using expanded and extended memory shells, integrating windows on the netware network, printing environment, planning and implementation of backups, process of partitions.

Netware v 4.0 software packages and netware directory services, server memory management, configuration guidelines, network wide login with NDS, NDS database, service advertising protocol and custom configuration technique.

Netware Life - servers, workstations and adapter cards, installing, using and loading, communicating with Users, mapping network drives, printing, supervision, directories, configuration setting, the net commands.

Texts / References:

Novell Netware Tips - Tricks - Technologies - Rakesh Narang, BPB Publications.

Lab Work:

1. System Administration NOVELL NETWARE Server.
2. Security Features.
3. Remote Access Services, Internet & Intranet Administration.
4. Network Auditing & Performance Tuning.

B.TECH (COMPUTER SCIENCE & ENGINEERING)
(OPEN ELECTIVES)

CS - 380 ROBOTICS & ARTIFICIAL INTELLIGENCE

Max Marks : 100		**Time : 3 Hrs.**		
Internal Marks : 40		**L**	**T**	**P**
External Marks : 60		**3**	**1**	**-**

Note : Eight questions are to be set. The candidates are required to attempt any five questions.
The student can use only Non-programmable & Non-storage type calculator.

Course Contents:

Introduction:
Background, historical development, robot definitions, robot arm kinematics and dynamic robot sensing, robotic market and prospects, human systems & robotics, specification of robots, safety measures in robotics.

Robot Technology - robot and its peripherals, robot kinematics, basic control systems, concepts and models, controllers, robot Motion, analysis and control, robot and effectors.

Sensors and intelligent robots - AI & robotics, need for sensing systems.

Robot languages & Programming - Robot languages classification, computer control & robot S/w, characteristics of robot languages.

Artificial Intelligence - Introduction., goals of AI research, AI techniques, lisp in the factory. Expert systems & knowledge engineering.

Application of robotics - Introduction, capabilities of robots, robotics applications, work cell control, graphical stimulation of robotic work cells. Other uses of robots, robotics in India, future of robotics & simple exercises.

Texts / References:

1. K.S. Fu, Gonzalez, Lee - Robotics Control, Sensing, Vision and Intelligence.
2. S.T. Deb - Robotics technology and flexible automation.
3. Mikell, Mitchell, Nagel & Ordey - Industrial robotics.
4. Artificial Intelligence by E Rich and K Knight, McGraw Hill / Kogakusha Student Edition, 1991.
5. Artificial Intelligence (3rd Edition) by P H. Winston, Addison Wesley, 1992.

6. Introduction to Artificial Intelligence by E Charniak and D Mcdermott, Addison Wesley, 1985.
7. Rule Based Expert Systems : A Practical.
8. Introduction by M. Sasikumar, S. Ramani, S. Muthu Raman, KSR Anjaneyulu and R Chanderasekar, Narosa Publishing House, New Delhi and Addison - Wesley, Singapore, 1993.
9. LISP (3rd Edition) by P H Winston and BKP Horn, Addison Wesley, 1989.
   Introduction to Artificial Intelligence and Expert Systems by DW Patterson, Prentice Hall, 1990.

Lab Work:

Students are expected to write programmes to control motion of the Robot and study the kinematics.

Interfacing robot with computer system and remote accessing.

B.TECH (COMPUTER SCIENCE & ENGINEERING) SEMESTER-VIII

CS - 401 INDUSTRIAL TRAINING CUM PROJECTS

Max. Marks : 625
Internal Marks : 300 **L T P**
External Marks : 325 **28 weeks**

Industrial attachment & projects work in the same industry for total period of 28 weeks (Six months) to be continued during the Eighth Semester also.

INSTRUCTIONS FOR THE CANDIDATES/PAPER SETTER OF THE SYLLABI OF B. TECH. (COMPUTER ENGG.)/BCA/B.Sc. (IT).

Time : 3 Hours **M. Marks : 100**

Instructions for the Paper Setter:

Ten questions in all, based on entire syllabi has to be set. Candidates should be asked to attempt any five.

The student can use only Non-programmable & Non-storage type calculator.

Instructions for the Candidates:

1. Attempt any five questions.
2. Use of Non Sciencefic calculator is allowed.
3. All questions carry equal marks.

Foundation Course in Mathematics for B.Tech. (Computer Sc. & Engg.)

1. Number System, Mathematical Induction and Quadratic equations.

Complex number in the form a+i b, Representation of a complex number by point in a plane, Argand-diagram. Algebra of complex numbers, Real and imaginary parts of a complex number, Modulus and argument of a complex number, square root of a complex number, cube roots of unity, triangle inequality.

$$\left| Z_1+A_2 \right| S \left| Z_1 \right| + \left| Z_2 \right| \text{and} \left| Z_1 Z_2 \right| = \left| Z_1 \right| \left| Z_2 \right|$$

Statements of the principle of mathematical induction in respect of natural numbers and simple applications.

Quadratic equations and their solutions. Relationship between the roots and coefficients. Formation of quadratic equations with given roots. Criteria for the nature of the roots of a quadratic equation.

2. Permutation and Combination, Binomial Theorem

Fundamental Principle of counting and meaning of n : Permutation as arrangements, meaning of ${}^{n}P_{r}$ and ${}^{n}C_{r}$; Simple applications including circular permutations.

Proof of the Binomial theorem for positive integral exponent using the principle of induction, General and particular term, Binomial theorem for any index (without proof), Applications of binomial theorem for approximation, Properties of Binomial Co-effecient.

3. Sequence and series, Exponential and Logarithmic series

Sequence, examples of finite and infinite sequences, First term, Common difference and nth term of an A.P., Sim of n terms of an A.P., Arithmetic means, Insertion of A.M. between any two given numbers.

Geometric progression, First term, Common ratio and nth term of geometric progression, Sum of n terms and sum to infinity, Geometric Means, Insertion of G.M. between any two given numbers, recurring decimal numbers as G.P., Special cases n, n^2 n^3 and Arithmetic-Geometric series.

The infinite series for e, proof that it lies between 2 and 3 ; expansion of e^x

(without proof), the infinite series for log (1-x), log (1-x)/(1-x) etc. ; calculation of the logarithm of a number using suitable logarithmic series.

4. Trigonometry

Review of the concept of a function, its domain nad range-even and odd function, Relation between degrees and radians, the six trigonometric functions sine, cosine, tangent, cosecent, secant, cotangent, Values of trigonometric functions of 0^o ,30^o , 45^o , 60^o and 90^o graph of sine x and cosine x.

The inverse of a function, Inverse trigonometric functions. Addition formulae, Sine, cosine and tangenet of multiples and sub multiples of angles. Trigonometrical ratios of related angles.

5. Co-ordinate Geometry

Co-ordinate systems in a plane, Distance Formula, Area of a triangle, condition for collinearity of three points, Section formula, Centroid and Incentre, slope of a non-vertical line, parrallel and perpendicular lines.

The straight line : How to describe a line by an equation, various forms of the equation of a line viz. Point-slope form, slope intercept form. The general form of the equation of a line, intersection of lines, consistent equations, inconsistent equations, dependent equations.

Angle between two lines, Condition for parallelism and perpendicularity. Condition for concurrency of three lines. Distance of a point from a line.

Circles : Standard form of the equation of a circle, General form of the equation of circle its radius and centre, equations of a circle in the parametric forms. Equations of a circle when the end points of a diameter are given, points of intersection of a line and circle with centre at the origin and condition for a line to be tangent to the circle, length of the tangent, equation to the tangent at the point (x_1 , y_1).

Conic sections : parabola, ellipse, hyperbola in the standard form, condition for y=mx+c to be tangent and point of tangency.

6. Vectors & 3-Dimenstional Geometry

Vector as a directed line segment. Addition of vectors. Multiplication of a vector by a real number. Position vector of a point. Section formula. Application of vectors to prove some geometrical results. Scalar and vector product of two vectors. Scalar triple product, vector triple product.

Decomposition of a vector into three non-coplanar directions i,j,k as base in 3-dimenstions. Distance between two points, Section formula.

Equations of lines and planes in 3-dimenstions, Angle between two lines between a line and a plane as also between two planes. Distance of a point from a line and a plane. Shortest distance between two lines. Equation of any plane passing through a intersection of two planes.

Equation of a sphere in the form $(r-c)^2 = a^2$. Equation of a sphere with position vectgors on the extremities of diameter.

7. Differential Calculus

Concept of real function, its domain and range, one-one and inverse functions, composition of functions, Notions of right hand and left hand limits and the limit of a function. Fundamental theorems on limits.

Continuity of a function. Porperties of continuous-functions. Continuity of polynomial, trigonometric, exponential, logarithmic and inverse trigonometric functions.

Derivative of a function, its geometrical and physical significance, relationship between continuity and differentiability.

Derivative of sum, difference, product, quotient function and of the functions of a function (chain rule), derivatives of trigonometric and inverse trigonometric functions. Logarithmic and exponential functions. Differentiation of functions expressed in parametric form, derivatives of higher order.

Applications of the derivative : increasing and decreasing functions, maxima and minima, Rolle's and Mean value theorems (without proof).

8. Integral Calculus

Integration as the inverse of differentiation, indefinite, integral or antiderivative ; properties of integrals. Fundamental integrals involving algebraic, trigonometric and exponential functions ; integration by subtitution ; Integral of the type :

$Dx/(x^2 \pm a^2)$ $dx/(a^2 - x^2)$ $dx/\ (x^2 \pm a^2)$ $dx/\ (a^2 - x^2)$

Integration by parts, Partial fractions and their use in integration.

9. Metrices and Determinants

Addition, scalar multiplication and multiplication of matrices, non-computability of matrix multiplication. Singular and non-singular matrices. Linear equations in matrix notatins.

Minors and cofactors, Expansion of determinant, properties of elementary transformation of determinants. Application of determinants in solutions of equations. Cramer's rule. Adjoint and inverse of a matrix and its properties. Applications of matrices in solving simultaneous equations in three variables.

10. Statistics and Probability

Mean and standard deviation ; Meidan and mean deviation about the median.

Definition of probability of an event as the ratio of the number of favourable equally likely events to the total number of equally likely events. Addition rule for mutually exclusive events, conditional probability Independent events, independent experiments, calculation of probabilities of events associated with independent experiments.

Suggested Reading:

1. Mathematics: Text Books for Class XI and XII, N.C.E.R.T.