FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

B.TECH. COMPUTER SCIENCE & ENGINEERING

(Under Credit Based Continuous Evaluation Grading System)

(SEMESTER: I-VIII)

Session: 2013-14

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	3	0	0
2	ARL196	Engineering Graphics & Drafting	3	1	0
3	ENL101	Communicative English	2	0	0
4	MTL101	Mathematics–I	3	1	0
5	PHL193	Physics–I	2	1	1
6	ECL115	Electrical Engineering	3	1	0
7	PHL195	Material Science & Engineering	3	0	0
8		Elective I	2	0	0
		Sub Total:	21	4	1
		Grand Total:	26		
		List of Electives–I			
1	PBL 121	Punjabi Compulsory OR	2	0	0
2	PBL 122	Basic Punjabi (Mudhli Punjabi)	2	0	0

		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	ENL151	Communicative English	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	PBL 131	Punjabi Compulsory OR	2	0	0
2	PBL 132	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	3	0	0
5	ECL291	Digital Circuits & Logic Design	3	0	1
6	ENL201	Written & Oral Technical Communication	2	1	1
7	MTL201	Mathematics–III	3	1	0
		Sub Total:	18	5	4
		Grand Total:	27		
		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		

***Note:- Credits will not be included in SGPA.**

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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

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Scheme:

S. NO.	Course Code	Course	CREDITS		
		Semester – VII	L	T	P
1	CSL470	Symbolic Logic & Logic Programming	3	1	0
2	CSL471	Formal Languages & Automata Theory	3	1	0
3	CSL472	Internet Protocol	3	1	0
4		Departmental Elective-II	3	1	0
5		Lab (DE II)	0	0	2
6	CSP470	Software Lab VII (SL & LP)	0	0	2
7		Interdisciplinary-IV	4	0	0
		Sub Total:	16	4	4
		Grand Total:	24		
		List of Departmental Electives–**II**			
1	CSL473	Advanced Microprocessors	3	1	0
2	CSP473	Advanced Microprocessors	0	0	2
3	CSL474	Formal Specification & Verification	3	1	0
4	CSP474	Formal Specification & Verification	0	0	2
5	CSL475	Expert Systems	3	1	0
6	CSP475	Expert Systems	0	0	2
7	CSL476	Robotics	3	1	0
8	CSP476	Robotics	0	0	2
		Semester – VIII			
1	CSD480	Industrial Training Cum Projects	22	0	0
		Sub Total:	22	0	0
		Grand Total:	22		

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ECL–117: MANUFACTURING PROCESS

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

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.

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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.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – I
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Subject Code: ENL–101 Duration of Examination: 3 Hrs
Course Title: **Communicative English** Credits: 02 (L=2,T=0,U=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 prescribed 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 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–ups 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 writings. The teacher may also prescribe 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 on *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 questions (at least 5) based on the lessons included in S*election 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. 100 words. One a personal letter involving narration of a personal experience or description of objects, persons, places of 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.

The division of the syllabus and the paper pattern for Minor and Major tests may be as follows:-

Minor-I

The syllabus to be covered; the essay from Sr. No. 1 to Sr. No. 6 from the prescribed book and personal letter.
Paper pattern: The following format is suggested for a test of 20 marks.
1. Personal letter (1 out of 2)
2. Short answer type question from the essay (2 out of 4).
3. Questions on Grammar and Vocabulary.

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Minor-II

The syllabus to be covered; the essay from Sr. No. 7 to Sr. No. 13 from the prescribed book and personal letter.

Paper pattern: The following format is suggested for a test of 20 marks.

1. Personal letter (1 out of 2)
2. Short answer type question from the essay (2 out of 4).
3. Questions on Grammar and Vocabulary.

Major Test

The syllabus to be covered; the essay from Sr. No. 14 to Sr. No. 20 from the prescribed book telegram and diary entry.

The format for 3 hour major test will be mentioned in the syllabus. This test will also include the syllabus covered in Minor-I and Minor-II.

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MTL–101: MATHEMATICS–I

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

UNIT–I

Calculus: 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.

UNIT–II

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.

UNIT–III

Vector calculus: Scalar and Vector point functions, Differentiation of vectors, 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, Green's theorem, Stokes theorem, Gauss divergence theorem (without proofs) and their applications.

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.
4. Murray & Spiegal, Vector Analysis, Schaum Publications Co.

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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

L T P
3 1 0

PURPOSE

Engineers today are required to work with multi disciplinary (including electrical, electronics, computer and mechanical) systems. They have to have understanding of the basic knowledge of electrical engineering for appreciating its application in the machinery, power and control circuits and analyse simple problems in consultation with specialitists in electrical engineering. The subject imparts basic concepts, principles and skills in electrical engineering.

INSTRUCTIONAL OBJECTIVES

Understanding the basic concepts, principles and theories of electrical sciences relating to application of electrical engineering in industries.
Explain the distribution of electrical power from power station to consumers after going through transmission and distribution lines.
Recognise accessories, devices, equipment and protection employed in lines, machines and circuits.
Understand construction, working principles and application of transformer, induction motor, DC motor and fractional horse power motors.
Select motors for various applications in Engineering.
Diagnose simple faults in wiring, installation, motor control circuits, protection systems and earthing.
Understand requirements of lighting for various industrial applications and select lighting devices.
Use measuring instruments for measuring current, voltage and power in supply circuit and machines.
Calculate current, voltage and power in simple single phase and three phase AC circuits.
Prepare report of experimentation done on an electrical circuit or electrical machines.
Analyse motor control circuits and distribution circuits to identify and operate control and protective devices.

CONTENTS:

A. THEORY

UNIT–I

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 connections, voltage and current relations (formula only).
2. Power Supply :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 and single phase AC circuits. Three phase AC circuits, phaser 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.
   Electrical Machinery :
4. Transformers, its working principle, types of transformers 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 three 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 motors.

UNIT–III

9. Control and Protection: Control mechanism, principle and application of servo motors, protection devices for wiring installation and motors – fuses MCB, LCB, relays.
10. Cables: Types of cables, construction of LT and HT cables, laying of cables, selection of cables.
11. Earthing and Grounding: Need, types, Indian Electricity Rules, use of meggar and earth tester for 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,
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.
8. Basic electrical engineering by T.K. Naggarkar & Ms. Sakhija seventh edition 2008, Oxford University Press, Bombay.

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PHL-195: MATERIAL SCIENCE AND ENGINEERING

L T P
3 0 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 diffr action.

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, register and photo-register materials, properties and applications of photo-conducting materials.

Recommended Books:

1 Materials Science and Engineering by WD Callister Jr. (John Wiley).
2 Elements of Materials Engineering by LH Van Vieck (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)

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PBL121: pj`bl l`zml – I

p`T-km Eq p`T-psqk~

Credits: 2–0–0

(I) 1. **E`qm En`qm** (sp. virE`m isG sD Eq f`. sihdrblr isG, gr n`nk dv wnlvristl, Eimqsr) ivcl hT ilK kh`xlk`r :

(a) grmK isG ms`iPr : **gt`r**
(E) sj`n isG : **pT`x dl Dl**
(e) krq`r isG dgl : **acl Elfl v`ll grg`bl**
(kh`xl-s`r, ivS`-vsq, kh`xl-kl`, kh`xlk`r)

2. grmKl ErQgr`Pl dl jgq, (pqql; mh`rnl; ibdl, itpl q EDk); ivr`m icn, Sbd jV (SD-ESD)

(II) 1. **E`qm En`qm** (sp. virE`m isG sD Eq f`. sihdrblr isG, gr n`nk dv wnlvristl, Eimqsr) ivcl hT ilK kh`xlk`r :

(a) sqK isG Dlr : **s~Jl klD**
(E) klvq isG ivrk : **aj`V**
(e) mihdr isG srn` : **jQd`r mkd isG**
(kh`xl-s`r, ivS`-vsq, kh`xl-kl`, kh`xlk`r)

2. lK rcn` (jlvnl-prk, sm`jk Eq clq iviSE~ aq):
10 lK ilKv`ax (kl`s ivc Eq Gr lel EiBE`s)

(III) 1. **E`qm En`qm** (sp. virE`m isG sD Eq f`. sihdrblr isG, gr n`nk dv wnlvristl, Eimqsr) ivcl hT ilK kh`xlk`r :

(a) pm pk`S : **m`V` bd`**
(E) glz`r isG sD : **kl lCx**
(e) mhn Bf`rl : **Gtx`**
(s) virE`m isG sD : **dldl**
(kh`xl-s`r, ivS`-vsq, kh`xl-kl`, kh`xlk`r)

2. pr` pV k pSn~ d aqr dx`
(**E`qm En`qm** psqk d kh`xl B`g ivcl 15 pirE~ d EiBE`s krv`ax)

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PBL-122: ਮੁੱਢਲੀ ਪੰਜਾਬੀ

(In lieu of Punjabi Compulsory)

2–0–0

ਪਾਠ–ਕ੍ਰਮ

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

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ
   ਸੁਰ 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, ਸੁਰ ਵਾਹਕ (ਓ ਅ ਏ), ਲਗਾਂ ਮਾਤਰਾਂ, ਪੈਰ ਵਿਚ ਬਿੰਦੀ ਵਾਲੇ ਵਰਣ, ਪੈਰ ਵਿਚ ਪੈਣ ਵਾਲੇ ਵਰਣ, ਬਿੰਦੀ, ਟਿੱਪੀ, ਅੱਧਕ।

2. ਗੁਰਮੁਖੀ ਆਰਥੋਗ੍ਰਾਫੀ ਅਤੇ ਉਚਾਰਨ; ਸੁਰਾਂ ਦੀ ਬਣਤਰ ਅਤੇ ਉਚਾਰਨ (ਲਘੂ-ਦੀਰਘ ਸੁਰ); ਸੁਰ 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।

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – I (ELECTIVES)
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3. ਪੰਜਾਬੀ ਸ਼ਬਦ-ਬਣਤਰ : ਸਾਧਾਰਨ ਸ਼ਬਦ; ਇਕੱਲਾ ਸੁਰ (ਜਿਵੇਂ ਆ); ਸੁਰ ਅਤੇ ਵਿਅੰਜਨ (ਜਿਵੇਂ ਆਰ); ਵਿਅੰਜਨ ਅਤੇ ਸੁਰ (ਜਿਵੇਂ ਪਾ); ਵਿਅੰਜਨ ਸੁਰ 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।

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

CSL–125: FUNDAMENTALS OF INFORMATION TECHNOLOGY AND COMPUTER PROGRAMMING

CREDITS		
L	**T**	**P**
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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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(Under Credit Based Continuous Evaluation Grading System)

CYL–195: GENERAL CHEMISTRY

CREDITS		
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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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Subject Code: ENL–151 Duration of Examination : 3 Hrs
Course Title: **Communicative English** Credits : 02 (L=2,T=0,U=0)

Objectives: To Introduce 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.

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

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.

Writing:

a) Developing Vocabulary and using it in the Right Context

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

b) Developing Skills in Formal Writing

Students will be required to do write–ups involving skills of making formal complaints, requests, orders etc., reporting, note taking, summarizing 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 format and usual conventions followed in such writings. The following chapters in the prescribed book may be consulted for exercise materials on these tasks:

1. Paragraph and essay writing
2. Report Writing
3. Letter Writig
4. Note Making and Summarizing
5. Transcoding

Recommended Books:

1. A Course in Grammar and Composition by Geeta Nagaraj, Foundation Book, 2006.
2. Oxford Guide to Effective Writing and Speaking by John Seely.

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MTL–102: MATHEMATICS–II

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

UNIT – I

Differential equations: Exact differential Equation, Higher order linear Differential equations, ODE's with constant coefficients.

Laplace Transforms: Laplace transforms, Properties of Laplace transforms, 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

UNIT–II

Fourier Series and Fourier Transform: Fourier series expansion, Fourier series for even and odd functions, half range series, harmonic functions, Modulation theorem, Shifting properties, convolution theorems, sine and cosine transforms, Fourier transform of derivatives and integrals, inverse Fourier transform, applications to PDE's & ODE's .

UNIT–III

Complex Analysis: De Moivre's theorem with applications, Analytic functions, Cauchy–Riemann equations, Laplace equation, Cauchy's integral theorem, Cauchy's integral formula (without proofs), Taylor series and Laurent series (without proofs), Residues and their application in evaluating real improper integrals

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–199: MECHANICS

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

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

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-131: ਪੰਜਾਬੀ ਲਾਜ਼ਮੀ–II

p`T-kim Eq| p`T psqk~

Credits: 2-0-0

(I) **1.** E`qm En`qm **(**sp. virE`m isG sD Eq| f`. sihdrblr isG, gr| n`nk dv wnlvristl, Eimqsr) ivc| hT~ ilK| kvl :

(a) B`el vlr isG
(E) p: prn isG
(e) p: mhn isG
(kivq`-s`r, ivS`–vsq, k`iv-kl`, kvl)

2. pj`bl Sbd bxqr : D`q/ml, vDqr (Egqr, ipCqr, iva|qpq Eq rp~qrl), sm`s |

(II) 1. **E`qm En`qm (**sp. virE`m isG sD Eq| f`. sihdrblr isG, gr| n`nk dv wnlvristl, Eimqsr) ivc| hT ilK kvl :

(a) Eimq` plqm
(E) f`. hrBjn isG
(e) iSv km`r bt`lvl
(kivq`-s`r, ivS`-vsq, k`iv-kl`, kvl)

2. **plr`| rcn` :** kl`s ivc 10 iviSE~ (siBE`c`rk, D`rimk Eq r`jnlqk) q pr` rcn` d EiBE`s krv`ax |

(III) 1. **E`qm En`qm (**sp. virE`m isG sD Eq| f`. sihdrblr isG, gr| n`nk dv wnlvristl, Eimqsr) ivc| hT ilK kvl :

(a) f`. jsvq isG nkl
(E) f`. jgq`r
(e) f`. srjlq p`qr
(s) p`S
(kivq`-s`r, ivS`-vsq, k`iv-kl`, kvl)

2. mh`vr q EK`x (EK`x q mh`vr` kS ivc) 200 mh`virE~ Eq 100 EK`x~ n| v`k~ ivc vrqx d EiBE`s krv`ax (kl`s ivc q Gr lel) |

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PBL-132: 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 ਧੂੜ 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।

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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, ਸ਼ੋਪਿੰਗ 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।

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

CSL–230: COMPUTER ARCHITECTURE

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

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.

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

CSL–231: DATA STRUCTURES & PROGRAMMING METHODOLOGY

CREDITS		
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Theory:

UNIT – I

Introduction: Define data structure, Data structure operations. Algorithm: Def., Complexity, Time-space tradeoff, Algorithmic notations. Big O notation.
Arrays: Linear array, Representation of Linear array in memory, Traversing linear array, Inserting, Deleting, Sorting (Bubble sort), Searching (Linear search, Binary search).
Linked List: Representation in memory, Traversing, Searching, Insertion, deletion, Header Linked List, Two ways List: operations.

UNIT – II

Queues: Define Queues, Operations, Dequeues, Priority Queues.
String Processing: Introduction, Basic terminology, Storing strings, Character data type, String operations, Word processing.

Stacks: Introduction, operations, Arithmetic expression, Polish notations, Transforming infix to postfix, Quick sort, Recursion concept.

UNIT – III

Trees: Binary trees, Representation in memory, Traversing, Traversal algorithms using stacks, Binary Search trees: Searching, Inserting and Deleting. Heap and Heap sort.
Graphs: Graph Theory Terminology, Sequential Representation, Wars hall's Algorithm, Linked Representation, Traversing a graph.
Hashing.

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.

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – III
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CSL–232: PROGRAMMING LANGUAGES

CREDITS		
L	**T**	**P**
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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.

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.

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

ENL–201: WRITTEN & ORAL TECHNICAL COMMUNICATION
(Communication Skills for Scientists and Engineers)

CREDITS		
L	**T**	**P**
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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.

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

Uniform Pseudo random number generation and random variable generation, Generating random variate from standard statistical distribution (discrete and continuous distribution), Monte – Carlo integration

Books Recommended:

1. Hogg, R.V., Mckean, J.W. and Craig, A.T.: Introduction to Mathematical Statistics.
2. Gupta, S. C. and Kapoor, K.: Fundamentals of Mathematical Statistics, Sultan Chand & Co.
3. Rubinotein, R.Y.: Simulation and the Monte Carlo Method, John Viley.
4. Probability and Statistics with Reliability by KS Trivedi, Prentice Hall.

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

CSL–240: OPERATING SYSTEM

CREDITS		
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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		
L	**T**	**P**
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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.

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(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.

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

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**
3	1	0

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

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**
3	1	0

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		
L	**T**	**P**
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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 SYSTEMS

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

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 ALGORITHM

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

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

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 (ALGORITHM & 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 PROCESSOR (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%]

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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.

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CSL-470 SYMBOLIC LOGIC & LOGIC PROGRAMMING

CREDITS		
L	T	P
3	1	0

Course Contents:

UNIT-I

Prepositional Logic: syntax and semantics: Validity and consequence. Normal forms. Representing world knowledge using prepositional logic.

First Order Logic: World knowledge representation and the need for quantifiers. Syntax, semantics validity consequence clause normal form.

UNIT-II

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

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.

UNIT-III

Advanced Prolog Features: Programming Techniques: Structural Induction and Recursion, Extra Logical features: Cut and Negation Case Studies.
Introduction to Fuzzy logic and neural networks.

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.

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CSP-470 SOFTWARE LAB VII (SL & LP)

CREDITS		
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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.

TEXTS/REFERENCES :

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

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CSL-471 FORMAL LANGUAGES & AUTOMATA THEORY

CREDITS		
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3	1	0

COURSE CONTENTS :

Basic Definitions

UNIT-I

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.

UNIT-II

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.

UNIT-III

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

Derivation Languages : Rewriting Systems, Algebraic properties, Canonical Derivations, Context Sensitivity.

Cellular Automata : Formal Language aspects, Algebraic Properties Universality & Complexity Variants.

TEXTS/REFERENCES :

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

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CSL - 472 INTERNET PROTOCOL

CREDITS		
L	T	P
3	1	0

Course Contents :

UNIT-I

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

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

UNIT-II

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

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).

UNIT-III

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.

Texts / References:

1) Internet working with TCP/IP Vol. - I

2) Principal Protocols & Architecture Comer & Stevens.

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CSL - 473 ADVANCED MICROPROCESSORS (ELECTIVE II)

CREDITS		
L	T	P
3	1	0

COURSE CONTENTS :

UNIT-I

Review of 8 bit microprocessor and support components.

Selected Case Studies of 16/32/64 bit microprocessors and support Contents.

RISC Architectures and Case Studies : RISC Vs CISC.

UNIT-II

Power PC 601 Alpha 21064, Pentium super space, Transputer Architectures and Case Studies : High Performance Embedded Microcontrollers, Case Studies.

UNIT-III

403 GA Development Systems and support.

Selected Applications.

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.

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CSP - 473 ADVANCED MICROPROCESSORS (Elective) – II

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

CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VII
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CSL - 474 FORMAL SPECIFICATION AND VERIFICATION (ELECTIVE - II)

CREDITS		
L	T	P
3	1	0

COURSE CONTENTS :

UNIT-I

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.

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

UNIT-II

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.

UNIT-III

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.

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

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. Pnueli and Z. Manna Temporal Logic of Reactive and Concurrent Systems, Springer Verlag, 1992.
4. Gries, Science of Programming, Narosa Pub.1985.
5. J. Loeckx and K. Siber, Found of Prog. Verification, John Wiley, 1984.

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CSP - 474 FORMAL SPECIFICATION AND VERIFICATION (ELECTIVE - II)

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

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CSL - 475 EXPERT SYSTEMS

CREDITS		
L	T	P
3	1	0

COURSE CONTENTS :

UNIT-I

Expert Systems, Definitions types, components, Expert System Development Process.

Knowledge Representation Techniques - Logic Frames, Semantic Nets, etc.

UNIT-II

Domain Exploration - Knowledge elicitation. Conceptualization, bathering, Formaliztions

Methods of Knowledge Acquisition : interviewing Sensor Data Capturing.

UNIT-III

Learning, Planning and Explanation in Expert System : Neural Expert System, Fuzzy Expert System, Real Time Expert Systems.

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

TEXTS / REFERENCES :

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

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CSP - 475 EXPERT SYSTEMS (Elective)

CREDITS		
L	T	P
0	0	2

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

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CSL - 476 ROBOTICS (ELECTIVE - II)

CREDITS		
L	T	P
3	1	0

COURSE CONTENTS :

UNIT-I

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

Robot Anatomy, Robot and Effectors, Transmission and actuators, with special reference to servomotors.

UNIT-II

Robot Arm Kinematics, World, Tool and Joint coordinators, DH transformation and Inverse Kinematics.

Fundamentals of Closed loop control, PWM amplifiers, PID control.

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

UNIT-III

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.

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.

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.

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CSP - 476 ROBOTICS (ELECTIVE - II)

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

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CSD - 480 Industrial Training-cum-Projects

CREDITS		
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Industrial attachment & projects work in the same industry.
A candidate should work on the project for 5 months and 6-8 hours on each working day.

Ist synopsis (containing mainly literature survey corresponding to the problem taken up for the project work and line of attack to solve the problem) within one month of joining the training is to be submitted and will be evaluated for 4 credits.

IInd synopsis (containing essentially the progress of work in comparative details) within three months of joining the training is to be evaluated will be evaluated for 6 credits.

Credits for Final Project Report & Viva Voce: 12

The evaluation shall be done as per the common ordinances for courses under Credit Based Continuous Evaluation Grading System.