FACULTY OF ENGINEERING & TECHNOLOGY

SYLLABUS

FOR

B.TECH. COMPUTER SCIENCE & ENGINEERING
(Under Credit Based Continuous Evaluation Grading System)
(SEMESTER: I to VIII)

Session: 2014-15

GURU NANAK DEV UNIVERSITY
AMRITSAR

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       (ii) Subject to change in the syllabi at any time.
           Please visit the University website time to time.
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER SYSTEM
(Under Credit Based Continuous Evaluation Grading System)

Scheme:

<table>
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<tr>
<th>S. No.</th>
<th>Course Code</th>
<th>Course</th>
<th>CREDITS</th>
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<td>Semester – I</td>
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<tr>
<td>1.</td>
<td>ECL117</td>
<td>Manufacturing Process</td>
<td>3</td>
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<tr>
<td>2.</td>
<td>ARL196</td>
<td>Engineering Graphics &amp; Drafting</td>
<td>3</td>
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<tr>
<td>3.</td>
<td>ENL101</td>
<td>Communicative English</td>
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<td>MTL101</td>
<td>Mathematics–I</td>
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<td>PHL193</td>
<td>Physics–I</td>
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<td>6.</td>
<td>ECL115</td>
<td>Electrical Engineering</td>
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<td>7.</td>
<td>PHL195</td>
<td>Material Science &amp; Engineering</td>
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<tr>
<th>List of Electives–I</th>
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<tbody>
<tr>
<td>1. PBL 121 Punjabi Compulsory OR</td>
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<td>2. PBL 122 Basic Punjabi (Mudhli Punjabi)</td>
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CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – I
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ECL–117: MANUFACTURING PROCESS

CREDITS

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UNIT–I

Theory:


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.


4. **Mechanical Working of Metals (Metal forming):** Introduction, hot working, rolling, forging, 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.
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.


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

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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.
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.
Subject Code: ENL-101
Course Title: Communicative English

Duration of Examination: 3 Hrs
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.
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 Selection from Modern English Prose
   App. weighting 30%

2. Questions on grammar and vocabulary (words, phrases, proverbs)
   App. weighting 20%

3. Two short writing tasks of app. 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.
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.
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:

CSAI: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – I
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PHL–193: PHYSICS–I

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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.

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.
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 specialists 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.
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.
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 Gesellschaft Fur Technische Zusammenabelt (GTZ) GMBH.
UNIT- I
Classification of Materials on the basis of their physical properties and applications, Structure-property relationship, structure of materials, crystal system, close packing, crystal planes and directions, Miller indices, Determination of crystal structure using X-Ray diffraction.

UNIT- II
General properties and applications, Phase diagram, Unary and binary, Lever rule, solid solutions, effect of doping and alloying, steel types, non-ferrous materials and alloys. Crystal imperfections, 0, 1, 2 and 3 dimensional defects, deformation in single and polycrystalline materials.

UNIT- III
Plastic and Plastic deformation, Effect of temperature, impurity and grain size. Conductors, Ferro-electric, dielectric, piezoelectric and pyro-electric materials and their applications, Electrode, Electrical contact, register and photo-register materials, properties and applications of photo-conducting materials.

Recommended Books:
4. Introduction to solids by LV Azaroff (TMH).
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – I (ELECTIVES)
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PBL121: pM'bll 2	mI – I

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Credits: 2–0–0

(I) 1. E qaE nq m (sM vir E`m is @ sDLE qyf`. sU@Mr blr is @, g@U@h`@n d@y wDljir tI, EMD sR)
   iv@Nh il Kyh`lk`r :
   (a) g am Eq is @ m`iPr : g `r
   (E) s`j`n is @ : pTx dl Dl
   (e) k r`r is @ d@l : a @l E @l v`l g g`bl
   (k`lx - s`r, ivS` - vsqU kh`lx - k,l `, k`lxlk`r)

2. g am I E DQgr Pl dl j gq, (pMl; mb`rl; ibMl, it @ Pl qyM @k); ivr`m iHMSbd j U
   (SD - ESD)

(II) 1. E qaE nq m (sM vir E`m is @ sDLE qyf`. sU@Mr blr is @, g@U@h`@n d@y wDljir tI, EMD sR) iv@Nh il Kyh`lk`r :
   (a) s`j`k is @ dlr : s`l k M
   (E) k`l`@nEq is @ ivrk : a `V
   (e) m`h`r is @ s`r`n ` : j Q`r m k M is @
   (k`lx - s`r, ivS` - vsqU kh`lx - k,l `, k`lxlk`r)

2. l`rcn` (j lvnl-l prk, sm`j k EqyM l iviSE ~ a @):
   10 l K il Kv``wyMkl` `ivc EqyGr leI EiBE`s)

(III) 1. E qaE nq m (sM vir E`m is @ sDLE qyf`. sU@Mr blr is @, g@U@h`@n d@y wDljir tI, EMD sR) iv@Nh il Kyh`lk`r :
   (a) p`r pR`S : mV` b M`
   (E) g u`r`is @ sDU : k`l@xy
   (e) m`n B M`rl : Gbx`
   (s) vir E`m is @ sDU : dldl
   (k`lx - s`r, ivS` - vsqU kh`lx - k,l `, k`lxlk`r)

2. p` `pVH ypb n ~ dy a @ r dx`
   (E qaE nq m psqk dyk h`lx B`g iv@N15 pYr E ~ dyEiBE`s krv`awy)
PBL-122: ਪ੍ਰੈਕਸੀ ਪ੍ਰੀਨਾਂਕੀ
(In lieu of Punjabi Compulsory)

2-0-0

1. ਪ੍ਰੈਕਸੀ ਪ੍ਰੀਨਾਂਕੀ

2. ਪ੍ਰੈਕਸੀ ਪ੍ਰੀਨਾਂਕੀ

3. ਪ੍ਰੈਕਸੀ ਸਮੂਹਵਾਦ

ਪ੍ਰੋਗਰਾਮ ਅਧਿਆਯ

1. ਪ੍ਰੀਨਾਂਕੀ ਪ੍ਰੀਨਾਂਕੀ: ਪ੍ਰੀਨਾਂਕੀ ਪ੍ਰੀਨਾਂਕੀ

2. ਪ੍ਰੀਨਾਂਕੀ ਪ੍ਰੀਨਾਂਕੀ: ਪ੍ਰੀਨਾਂਕੀ ਪ੍ਰੀਨਾਂਕੀ

3. ਪ੍ਰੀਨਾਂਕੀ ਸਾਹਿਤਕ ਪ੍ਰੀਨਾਂਕੀ

ਸਾਹਿਤਕ ਅਧਿਆਯ

1. ਪ੍ਰੀਨਾਂਕੀ ਪ੍ਰੀਨਾਂਕੀ: ਸਾਹਿਤਕ ਅਧਿਆਯ

2. ਪ੍ਰੀਨਾਂਕੀ ਪ੍ਰੀਨਾਂਕੀ: ਸਾਹਿਤਕ ਅਧਿਆਯ
3. प्रमाणी प्रकार-पहलू: मात्रपत्र प्रकार, विवेक मूल (मिलें व), मूल अवे दिशान्त (मिलें अव); दिशान्त अवे मूल (मिलें व); दिशान्त मूल दिशान्त (मिलें व); वेशजात प्रकार (मिलें भ); दिशाबद्धता प्रकार (मिलें ठ, ते); प्रमाणी प्रकार तत्त्व-1; बिंदु-पृथ्वी, दिव पचत-घट पचल; हंदे हंदे सी प्रमाणी प्रकारहसी-1: घट-पीठ, मजबरती, टूंटं, मैनमिरं, नियाटी, नेमन भागि राम मेंबीधा।
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**Scheme:**

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<tr>
<td>1.</td>
<td>CSL125</td>
<td>Fundamentals of I.T. &amp; Computer Programming</td>
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<td>CYL195</td>
<td>Engineering Chemistry</td>
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<td>Physics – II</td>
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<td><strong>Sub Total:</strong></td>
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**List of Electives–II**

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<td>Basic Punjabi ( Mudhli Punjabi )</td>
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CSL–125: FUNDAMENTALS OF INFORMATION TECHNOLOGY AND
COMPUTER PROGRAMMING

CREDITS

UNIT – I
Block diagram of Computer, Associated peripherals, Memories – RAM, ROM, Secondary
Storage Devices, Classification of Computers and Languages, Introduction to Compilers,
Interpreter and Assemblers, Introduction of various operating system with their file system,
Features of DOS, Internal and External commands of DOS, Introduction to Windows and Linux.

UNIT – II
Algorithm and Flowchart, Introduction to C language, Various Data Types- Basic, Derived, user
declared and void, Operators, Expressions, Variable, Constant, Header files, Formatted and
unformatted input and output statements, Control and conditional statements. Arrays.

UNIT – III
String Handling, Functions- call by value and call by references, Structures and Unions, Array of
structure, Pointers, Dynamic memory allocation using malloc and calloc functions, File
Handling, Modes of file handling, File handling Input and Output statements.

PRACTICALS:
I. 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.
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.
Exercises (at least fifteen) involving assignment, looping, functions, arrays, structure, string,
pointers and files in C.

Recommended Books:
3. DOS Instant Reference by Harvey and Nelson.
4. Fundamentals of Computers and IT, Dr. Gurvinder Singh, Rachhpal Singh and K.K.
   Saluja, Kalyani Publishers.
7. Mastering Turbo C by Brottle Stan Kelly.
ENGINEERING CHEMISTRY-(CYL-195)

<table>
<thead>
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<th>Class B. Tech. 1(^{st}) and 2(^{nd}) Semester</th>
<th>Evaluation</th>
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<tr>
<td>Schedule per week</td>
<td>Examination Time = Three (3) Hours</td>
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<tr>
<td>Lectures : 2</td>
<td>Maximum Marks = 100</td>
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<td>Tutorial : 1</td>
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UNIT – I

Water:
- Common Impurities of water
- Hardness of water: Determination of hardness by Clark’s test and complex metric (EDTA) method, Degree of hardness
- Numerical based on hardness and EDTA method
- Municipal Water Supply: Requisites of drinking water, Steps involved in purification of water, Sedimentation, coagulation, Filtration and Sterilization, Break point chlorination

Water Treatment:
- Softening of water: Lime-Soda Method, Permutit (Zeolite) Method and Deionization or Demineralization Method
- Boiler troubles their causes, disadvantages and prevention: Formation of solids (Scale and Sludge), Carry over (Priming and Foaming), Corrosion and Caustic Embrittlement
- Numerical problems based on Lime-Soda and Zeolite softening methods

UNIT – II

Cement:
- Definition, Composition, basic constituents and their significance, Manufacturing of Portland cement by Rotary Kiln Technology
- Chemistry of setting and hardening of cement and role of gypsum

Glass:
- Definition, Properties, Manufacturing of glass
- Types of silicate glasses and their commercial uses
- Importance of annealing in glass making

Refractories:
- Definition, classification, properties, Requisites of good refractory and manufacturing of refractory
- Detailed study of silica and fire clay refractory and their uses
- Seger’s (Pyrometric) Cone Test and RUL Test
UNIT – III

Polymers:
• Different methods of classification and constituents of polymers
• Plastics: Themosets and Thermoplasts
• Preparation, Properties and uses of polyethylene, Bakelite, Terylene and Nylon • Elastomers – Natural rubber, vulcanization, Synthetic Rubbers viz. Buna-S, Buna-N, Butyl and neoprene rubbers

Lubricants:
• Introduction, classification and uses of lubricants.
• Types of lubrication.
• Viscosity & viscosity index, flash and fire point, cloud and pour point, steam emulsification number, precipitation number and neutralization number

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

ECL–196: ELECTRONICS AND INSTRUMENTS

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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, bipolar 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)


**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)


Working Principles of the following instruments: CRO, Electronic multimeter, digital multimeter, signal generator, Block diagram of data acquisition system. (2)
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.
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:**
3. Electronics Instrumentation and Measurements by Cooper and Heyrick (Phi).
**CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – II**  
(Under Credit Based Continuous Evaluation Grading System)

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.


**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 Writing
4. Note Making and Summarizing
5. Transcoding

Recommended Books:

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:

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

PHL–199: MECHANICS

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:


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

PHL–198: PHYSICS–II

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

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

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

Books Recommended:
PBL-131: विद्वानी लक्ष्य-II

Credits: 2-0-0

(I) 1. E`qm En`qm (sM. virE`m is G sMUE qyf`. suhmbr br is G, gau`nk dy wDlvrIstl, EMNERS) iv@NH ~I lKykvl:

(a) B'el vl is G
(b) pApbn is G
(c) pAmbrn is G
(kivq`-s`r, ivS`-vsqUK iv-kl`, kvI)

2. pMbl Sbd bxqr: D'qUMl, vDgr (Egr`, ipCgr, ivanpq Eqyr pqrl), s`m`i

(II) 1. E`qm En`qm (sM. virE`m is G sMUE qyf`. suhmbr br is G, gau`nk dy wDlvrIstl, EMNERS) iv@NH ~I lKykvl:

(a) EMNR` pRq m
(b) f`. hrBjn is G
(c) isv kvn` bt`lvl
(kivq`-s`r, ivS`-vsqUK iv-kl`, kvI)

2. pYHrcn`: kl`is iv@10 ivISE ~(siBE`c`rk, D'rimk Egr`j nIqk) qypr'Hrcn`dy EIBE`s krv`awy

(III) 1. E`qm En`qm (sM. virE`m is G sMUE qyf`. suhmbr br is G, gau`nk dy wDlvrIstl, EMNERS) iv@NH ~I lKykvl:

(a) f`. jsvM is nkl
(b) f`. jgg`r
(c) f`. saiq p`qr
(s) pS
(kivq`-s`r, ivS`-vsqUK iv-kl`, kvI)

2. mb`vryqY K`x (EK`x qymb`vr`k S iv@) 200 mb`vir E-Eqy100 K`x-nM`k -iv@vrqx dyEIBE`s krv`awy(kl`is iv@qyGr l el)
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – II (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

PBL-132: ਪ੍ਰਭਾਵੀ ਪ੍ਰਸ਼ਨਾਂ
(In lieu of Punjabi Compulsory)

2-0-0

ਪਠ-ਚੌਠ

1. ਪ੍ਰਸ਼ਨਾਂ ਸਥਾਨ-ਰੀਤੀ
   ਮੁਖਵਤਰ ਅਤੇ ਭਿਸਤਾਨ ਸਥਾਨ
   ਘਾਟ-ਵੋਹਾਂਕੇਲੀ ਸਥਾਨ

2. ਪ੍ਰਸ਼ਨਾਂ ਦਲਵ-ਰੀਤੀ
   ਮਪਾਨਵਤਰ-ਰੀਤੀ : ਵਿਸਾਮਾਂ
   ਮੁਖਵਤਰ-ਰੀਤੀ : ਵਿਸਾਮਾਂ
   ਭਿਸਤਾਨ-ਰੀਤੀ : ਵਿਸਾਮਾਂ

3. ਪ੍ਰਸ਼ਨਾਂ ਪ੍ਰਭਾਵੀ
   ਜੀਨਿੀ ਪ੍ਰਸ਼ਨ
   ਸੇਵਾ ਉਤਸਥਾ
   ਸੰਪੰਧ ਉਤਸਥਾ
   ਅਭਾਵ ਅਤੇ ਭਾਸ਼ਾਵੇ

ਪ੍ਰਿਧਟ ਭਾਵ ਵੀਮ

1. ਪ੍ਰਸ਼ਨਾਂ ਸਥਾਨ-ਰੀਤੀ : ਮੁਖਵਤਰ ਸਥਾਨ, ਮਸਾਲੀ ਸਥਾਨ (ਸ਼ੈਲੇ ਵੇਬ ਭਾਲੋ), ਰੇਂਡੇਰੀ ਸਥਾਨ (ਸ਼ੈਲੇ ਵਰਤਣ ਭਾਲੋ), ਰੇਡਵੇ ਸਥਾਨ/ਸ਼ਕਾਦਤਰੀ (ਸ਼ੈਲੇ ਪੁਰਨੇ ਪਾਣੀ/ਰਕਾਉ ਭਾਲੋ), ਭਿਸਤਾਨ ਸਥਾਨ ਦੀ ਘਾਟਤਰ/ਵਿਸਾਮਾਂ, ਅਕਾਦਮੀ ਉਤਸਥਾ (ਸ਼ੈਲੇ ਵਰਤਣ ਭਾਲੋ), ਸਸ਼ਕਤ ਸਥਾਨ/ਸ਼ਕਾਦਤਰੀ (ਸ਼ੈਲੇ ਵਰਤਣ ਭਾਲੋ), ਪ੍ਰਸ਼ਨਾਂ ਸਥਾਨ
   ਕਾਰਜ-2: ਸ੍ਰੋਤਾਂਕ ਕੂਹ, ਚਿੱਤਰਾਂ/ਸਰਗਿਤਿਵਦ ਚਿੱਤਰਾਂ ਦੇ ਕੂਹ, ਹੁੰਦੇ ਪਾਣੀ ਦੀ ਪ੍ਰਸ਼ਨਾਂ ਸਥਾਨਾਂ-2: ਭਾਵਨਾਵਾਂ/ਸਮਾਵਾਂ, ਦਮਤ, ਪ੍ਰਸ਼ਨਾਂ ਰਾਸ ਮੰਚਸਵੀ।
2. प्रारंभिक उद-उदाहरण : वर्गविभाग, क्लास, क्लासिफाइर, अध्याय, अध्याय-प्रारंभ, अध्याय-पश्चात, अध्याय-पश्चात के दृश्य के लिए, अध्याय, अध्याय-पश्चात, अध्याय-पश्चात के दृश्य के लिए, अध्याय, अध्याय-पश्चात, अध्याय-पश्चात के दृश्य के लिए, अध्याय, अध्याय-पश्चात, अध्याय-पश्चात के दृश्य के लिए, अध्याय, अध्याय-पश्चात, अध्याय-पश्चात के दृश्य के लिए, अध्याय, अध्याय-पश्चात, अध्याय-पश्चात के दृश्य के लिए, अध्याय, अध्याय-पश्चात, अध्याय-पश्चात के दृश्य के लिए
3. ध्यान पुशित दिशा दिनी पैंड (तिंबी/पॉल्टी/पोल्पल), पैंड पश्चात, पैंड पश्चात अर्थ अध्याय भविष्यवाणी दृष्टि दर्शन दर्शन दिशा भविष्यवाणी दृष्टि भविष्यवाणी दृष्टि भविष्यवाणी दृष्टि भविष्यवाणी दृष्टि भविष्यवाणी दृष्टि भविष्यवाणी दृष्टि
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER SYSTEM  
(Under Credit Based Continuous Evaluation Grading System)

Scheme:

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<th>Course</th>
<th>Semester – III</th>
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<td>Computer Architecture</td>
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<td>2.</td>
<td>CSL231</td>
<td>Data Structures &amp; Programming Methodology</td>
<td>2 1 1</td>
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<td>3.</td>
<td>CSL232</td>
<td>Programming Languages</td>
<td>2 1 1</td>
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<td>4.</td>
<td>*ESL220</td>
<td>Environmental Studies</td>
<td>3 0 0</td>
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<td>5.</td>
<td>ECL291</td>
<td>Digital Circuits &amp; Logic Design</td>
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<td>6.</td>
<td>ENL201</td>
<td>Written &amp; Oral Technical Communication</td>
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<td>7.</td>
<td>MTL201</td>
<td>Mathematics–III</td>
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Sub Total: 18 5 4

Grand Total: 27

*Note:* Credits will not be included in SGPA.
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – III
(Under Credit Based Continuous Evaluation Grading System)

CSL–230: COMPUTER ARCHITECTURE

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UNIT–I
Principles of computer design – software / hardware interaction, cost/benefit concept of layers in architecture design.  

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

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

UNIT – II
Memory hierarchy design caches, main memory, interleave memory, virtual memory architectural aids in implementing these.  

I/O Modes – Program interrupt, DMA, Channel, I/O Processor.  

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.  

Performance evaluation SPEC marks LINPACK Whetstone Dhrystone etc., Transaction processing benchmarks.  

Multiprocessors – Parallel & distributed computers – SIMD SPMD and MIMD machines.  

Texts References:
CSL–231: DATA STRUCTURES & PROGRAMMING METHODOLOGY

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Theory:

UNIT – I
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:

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

CSL–232: PROGRAMMING LANGUAGES

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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.
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 resources:** 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 warming, acid rain, ozone layer depletion, nuclear accidents and holocaust. 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 of environmental legislation
   * Public awareness

---

Due to the nature of the content, specific formatting details such as bold text and bullet points are not applicable for this transcription.
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:

8. Down to Earth, Centre for Science and Environment, New Delhi.
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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3  0  1

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 recogniser.
4 bit ALU.
Serial to parallel shifter and parallel to serial shifter.
Priority resolver.
Binary to gray code converter.
Traffic light controller.
Pattern Generator.
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – III
(Under Credit Based Continuous Evaluation Grading System)

Texts / References:

ENL-291: WRITTEN & ORAL TECHNICAL COMMUNICATION
(Communication Skills for Scientists and Engineers)

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

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

Texts / References:
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:
6. IEEE Transactions on “Written and Oral Communication” has many papers.
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:

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<th>Course Code</th>
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<td>Operating System</td>
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<td>Data Communication</td>
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<td>3.</td>
<td>CSL242</td>
<td>Microprocessors &amp; Assembly Language Programming</td>
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<td>4.</td>
<td>CSL243</td>
<td>System Programming</td>
<td>2  1   1</td>
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<td>5.</td>
<td>ECL296</td>
<td>Control &amp; Instrumentation</td>
<td>3  1   0</td>
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<td>6.</td>
<td>MTL202</td>
<td>Discrete Structures</td>
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*CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER SYSTEM*  
(Under Credit Based Continuous Evaluation Grading System)
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – IV
(Under Credit Based Continuous Evaluation Grading System)

CSL–240: OPERATING SYSTEM

UNIT–I

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


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:

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.

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
Fundamental of Data Compression Techniques and Cryptography.

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

CSL–242: MICROPROCESSORS AND ASSEMBLY LANGUAGE PROGRAMMING

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

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

**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:**

CSL–243: SYSTEM PROGRAMMING

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<td>UNIT–I</td>
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</table>

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:

C.E.L–296: CONTROL AND INSTRUMENTATION

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

UNIT–II
Digital sensors, I.C. sensors and chemical sensors.
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.

UNIT–III

Text / References:

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

MTL–202: DISCRETE STRUCTURES

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UNIT–I


(10 Lectures)

UNIT–II


(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:
4. Narsingh Deo: Graph Theory.
### CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER SYSTEM
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<td>System Analysis Design</td>
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<td>CSL331</td>
<td>Network Operating Systems</td>
<td>3 1 0</td>
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<td>CSL332</td>
<td>Relational Database Management Systems</td>
<td>3 1 0</td>
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<td>CSL333</td>
<td>Design &amp; Analysis of Algorithm</td>
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<td>CSL334</td>
<td>Computer Graphics</td>
<td>3 1 0</td>
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<td>CSP335</td>
<td>Programming Lab–I(RDBMS &amp; Computer N/W)</td>
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<td>CSP336</td>
<td>Programming Lab–II(Algorithm &amp; Graphics)</td>
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<td>Interdisciplinary Course–I</td>
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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 Implementation: System testing, Quality assurance, Documentation tools, Managing system implementation.

UNIT–III

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

References:

CSL–331: NETWORK OPERATING SYSTEMS

UNIT–I


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.


UNIT–III


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..
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


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.


UNIT–III


References:

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


Backtracking: General Method, 8–Queens Problem, Graph Coloring and Hamiltonian Cycles.

Search and Traversal Technique: Techniques for Binary Trees, Techniques for Graphs,

UNIT–III


Approximation Algorithms: Introduction, Absolute Approximation (Planner Graph Coloring and NP–Hard Absolute Approximations), ε–Approximations (Scheduling Independent Tasks and Bin Packing).

References:

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
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
Curves and Surfaces: Parametric representation, Bezier and B–Spline curves.

References:
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 Management : Creating groups, Creating Users, Assigning access rights, deleting users.


Space Management, Backup and Restore Strategies and Security Management.

Scheduling and Monitoring Performance of Server by using inbuilt utilities.
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.**
# CSAI: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER SYSTEM
(Under Credit Based Continuous Evaluation Grading System)

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<td>CSL343</td>
<td>Software Engineering</td>
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<td>CSL344</td>
<td>Object Oriented Programming using JAVA</td>
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## Electives–I

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<td>CSL346</td>
<td>System Hardware Design</td>
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<td>3.</td>
<td>CSL347</td>
<td>Real Time Systems</td>
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<td>CSL348</td>
<td>Operation Research</td>
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<td>CSL349</td>
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CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI
(Under Credit Based Continuous Evaluation Grading System)

CSL–342: OBJECT ORIENTED ANALYSIS AND DESIGN

CREDITS
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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

UNIT–III
Analysis & Design

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

CSL–343: SOFTWARE ENGINEERING

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UNIT–I

2. Software Project Management: Management Activities, Project Planning, Project Scheduling, Risk Management.

UNIT–II

4. Coding: Structured programming, Coding styles.

UNIT–III

8. CASE Tools

References:

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

CSL–344: OBJECT ORIENTED PROGRAMMING USING JAVA

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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:

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

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
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 prosoy & natural languages.


UNIT–II


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

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

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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.
Interconnect analysis. [10%]

UNIT–II

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:

4) Darryl Lindsay, “Digital PCB Design and Drafting” Bishop Graphics 1986.
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

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

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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:

   1990.
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VI (ELECTIVES)
(Under Credit Based Continuous Evaluation Grading System)

CSL–348: OPERATION RESEARCH (ELECTIVE – I)

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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%]
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:
CSL–349: LANGUAGE PROCESSOR (ELECTIVE – I)

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**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%]
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:
**CSAI: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER SYSTEM**  
(Under Credit Based Continuous Evaluation Grading System)

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**Sub Total: 16  4  4**

**Grand Total: 24**

**List of Departmental Electives–II**

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CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VII
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CSL-470 SYMBOLIC LOGIC & LOGIC PROGRAMMING

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Course Contents:

UNIT-I


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


Texts/References:

CSP-470 SOFTWARE LAB VII (SL & LP)

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SYMBOLIC LOGIC & LOGIC PROGRAMMING LAB

Experiments in Prolog Programming, Deductive databases, Recursion and Prolog list data structures.

TEXTS/REFERENCES :

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

CSL-471 FORMAL LANGUAGES & AUTOMATA THEORY

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COURSE CONTENTS :

Basic Definitions

UNIT-I


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.


TEXTS/REFERENCES :

CSL - 472  INTERNET PROTOCOL

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

Texts / References:

1) Internet working with TCP/IP Vol. - I
2) Principal Protocols & Architecture Comer & Stevens.
CSL - 473 ADVANCED MICROPROCESSORS (ELECTIVE II)

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
3. Rafiquzzaman, Microprocessors & Micro Computers - Based System Design, Universal
   Book Stall, New Delhi, 1990.
6. Wunnava V. Subbarao, 16/32 Bit Microprocessors 68000/68010/68020, Software, Hardware
8. Data Books By Intel, Motorola, etc.
12. The Power PC Architecture: A Specification for a New family of RISC Processors, Edited by
     Francisco, California, 2nd Edition (May 1994)
     For PowerPC Microprocessor (Nov. 1993).PowerPC 601 RISC Microprocessor User’s
CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER – VII
(Under Credit Based Continuous Evaluation Grading System)

CSP - 473 ADVANCED MICROPROCESSORS (Elective) – II

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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.
COURSE CONTENTS:

UNIT-I

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


TEXTS / REFERENCES:
CSP - 474 FORMAL SPECIFICATION AND VERIFICATION (ELECTIVE - II)

Students are expected to develop programs to illustrate various concepts e.g. Automatic verification of the finite state of machine and their logic etc.
CSL - 475 EXPERT SYSTEMS

COURSE CONTENTS:

UNIT-I

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

UNIT-II
Domain Exploration - Knowledge elicitation. Conceptualization, bathering, Formalization.

Methods of Knowledge Acquisition: interviewing Sensor Data Capturing.

UNIT-III

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

TEXTS / REFERENCES:
Students are required to develop expert system for various industrial / real life problems.
COURSE CONTENTS:

UNIT-I
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
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:

4) Andrew C. Straugard, Robotics & AI, Prentice Hall, Inc.
7) Various Research papers in area of Robotics.
Students are expected to implement the concept of Robot motion by interfacing the Robot with Computer System and remote operation of the Robot etc.
**CSA1: B.TECH. (COMPUTER SCIENCE & ENGINEERING) SEMESTER SYSTEM**

*(Under Credit Based Continuous Evaluation Grading System)*

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

CSD - 480 Industrial Training-cum-Projects

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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.