4-Years B.TECH
COMPUTER SCIENCE AND ENGINEERING

WITH EFFECT FROM 2010-11 ADMITTED BATCH

SYLLABI
(Tentative)

CHAIRMAN
BOARD OF STUDIES

DEPARTMENT OF COMPUTER SCIENCE AND SYSTEMS ENGINEERING
COLLEGE OF ENGINEERING
ANDHRA UNIVERSITY
VISAKHAPATNAM-3
### ANDHRA UNIVERSITY
COLEGE OF ENGINEERING - AUTONOMOUS
VISAKHAPATNAM

COMMON SCHEME OF INSTRUCTION AND EXAMINATION WITH EFFECT FROM 2010-11
ADMITTED BATCH
COMPUTER SCIENCE AND ENGINEERING

I/IV B.E./B.TECH. (FOUR YEAR COURSE) – SEMESTER SYSTEM
I & II SEMESTERS

<table>
<thead>
<tr>
<th>Code No.</th>
<th>Course</th>
<th>Credits</th>
<th>Periods L/T/Lab.</th>
<th>Exam. Hours</th>
<th>Sessional Marks</th>
<th>Exam Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 1001</td>
<td>English</td>
<td>2</td>
<td>2 + 1</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1002</td>
<td>Mathematics-I</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1003</td>
<td>Mathematics-II</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1004</td>
<td>Physics Theory</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1005</td>
<td>Chemistry Theory</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1006</td>
<td>History of Science and Technology</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1007</td>
<td>Comp. Prog. &amp; Num. Methods</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1008</td>
<td>Engineering Graphics</td>
<td>5</td>
<td>2 + 4</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1009</td>
<td>Physics Laboratory</td>
<td>2</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1010</td>
<td>Chemistry Laboratory</td>
<td>2</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1011</td>
<td>Workshop</td>
<td>2</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1012</td>
<td>Programming Laboratory</td>
<td>2</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td></td>
<td><strong>37</strong></td>
<td></td>
<td><strong>39</strong></td>
<td><strong>440</strong></td>
<td><strong>760</strong></td>
<td><strong>1200</strong></td>
</tr>
</tbody>
</table>
### II/IV B.TECH. (CSE) 1 - SEMESTER

#### B.TECH. (CSE) 2nd YEAR 1 -SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION

WITH EFFECT FROM 2010-11 ADMITTED BATCH

<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Tutorial</td>
<td>Lab.</td>
</tr>
<tr>
<td>CSE 2.1.1</td>
<td>ELECTRONICS</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.1.2</td>
<td>ELEMENTS OF ELECTRICAL ENGINEERING</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.1.3</td>
<td>DATA STRUCTURES</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.1.4</td>
<td>DESCRETE MATHEMATICAL STRUCTURES-I</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.1.5</td>
<td>PROBABILITY, STATISTICS &amp; QUEUING THEORY</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.1.6</td>
<td>DIGITAL LOGIC DESIGN</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.1.7</td>
<td>ELECTRONICS LAB.</td>
<td>3</td>
<td></td>
<td>50</td>
</tr>
<tr>
<td>CSE 2.1.8</td>
<td>DATA STRUCTURES LAB.</td>
<td>3</td>
<td></td>
<td>50</td>
</tr>
</tbody>
</table>

**TOTAL CREDITS** 28

### II/IV B.TECH. (CSE) 2 - SEMESTER

#### B.TECH. (CSE) 2nd YEAR 2-SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION

WITH EFFECT FROM 2010-11 ADMITTED BATCH

<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Tutorial</td>
<td>Lab.</td>
</tr>
<tr>
<td>CSE 2.2.1</td>
<td>OPERATIONS RESEARCH</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.2.2</td>
<td>DISCRETE MATHEMATICAL STRUCTURES-II</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.2.3</td>
<td>MICROPROCESSORS-I</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.2.4</td>
<td>COMPUTER ORGANIZATION</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.2.5</td>
<td>OBJECT ORIENTED PROGRAMMING</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.2.6</td>
<td>ENVIRONMENTAL STUDIES</td>
<td>3</td>
<td>1</td>
<td>70</td>
</tr>
<tr>
<td>CSE 2.2.7</td>
<td>MICROPROCESSORS-I LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>CSE 2.2.8</td>
<td>OBJECT ORIENTED PROGRAMMING LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>CSE 2.1.9</td>
<td>HUMAN VALUES &amp; PROFESSIONAL ETHICS</td>
<td>2</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**TOTAL CREDITS** 28
## III/IV B.TECH. (CSE) I - SEMESTER

### B.TECH. (CSE) 3rd YEAR I-SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION WITH EFFECT FROM 2010-11 ADMITTED BATCH

<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Tutorial</td>
<td>Lab.</td>
</tr>
<tr>
<td>CSE 3.1.1</td>
<td>MICROPROCESSOR-II</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.2</td>
<td>SYSTEM PROGRAMMING</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.3</td>
<td>ELECTIVE – I</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.4</td>
<td>FORMAL LANGUAGES &amp; AUTOMATA THEORY</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.5</td>
<td>FILE STRUCTURES</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.6</td>
<td>OPERATING SYSTEMS</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>FE01</td>
<td>FREE ELECTIVE-I</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.7</td>
<td>OPERATING SYSTEMS LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>CSE 3.1.8</td>
<td>MICROPROCESSOR-II LAB</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>CSE 3.1.9</td>
<td>SOFT SKILLS LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
</tbody>
</table>

TOTAL CREDITS 33

### ELECTIVE-I

1. COMPUTER GRAPHICS  
2. DIGITAL SIGNAL PROCESSING  
3. FAULT TOLERANT COMPUTING  
4. COMBINATORICS & GRAPH THEORY.

## III/IV B.TECH. (CSE) II - SEMESTER

### B.TECH. (CSE) 3rd YEAR II-SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION WITH EFFECT FROM 2010-11 ADMITTED BATCH

<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Tutorial</td>
<td>Lab.</td>
</tr>
<tr>
<td>CSE 3.2.1</td>
<td>COMPILER DESIGN</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.2</td>
<td>DESIGN &amp; ANALYSIS OF ALGORITHMS</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.3</td>
<td>DATA BASE MANAGEMENT SYSTEMS</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.4</td>
<td>DATA COMMUNICATIONS</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.5</td>
<td>ELECTIVE – II</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.6</td>
<td>COMPUTER ARCHITECTURE</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.7</td>
<td>FILE STRUCTURES LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>CSE 3.2.8</td>
<td>DBMS LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
</tbody>
</table>

TOTAL CREDITS 28

### ELECTIVE - II

1. PRINCIPLES OF PROGRAMMING LANGUAGE  
2. BIO-INFORMATICS  
3. IMAGE PROCESSING.  
4. VHDL

* The industrial training will be for three weeks during the summer after third year second semester.
### IV/IV B.TECH (CSE) I - SEMESTER

**B.TECH. (CSE) 4\textsuperscript{th} YEAR I-SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION WITH EFFECT FROM 2010-11 ADMITTED BATCH**

<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Theory</th>
<th>Tutorial</th>
<th>Lab.</th>
<th>Exam</th>
<th>Sessional</th>
<th>Total</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 4.1.1</td>
<td>OBJECT ORIENTED SOFTWARE ENGG.</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.2</td>
<td>COMPUTER NETWORKS</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.3</td>
<td>ARTIFICIAL INTELLIGENCE</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.4</td>
<td>PRINCIPLES OF ECONOMICS &amp; MANAGEMENT</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.5</td>
<td>ELECTIVE-III</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.6</td>
<td>WEB TECHNOLOGIES</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.7</td>
<td>GRAPHICS &amp;MULTIMEDIA LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>CSE 4.1.8</td>
<td>OBJECT ORIENTED SOFTWARE ENGG. LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>CSE 4.1.9</td>
<td>INDUSTRIAL TRAINING &amp; SEMINAR*</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td></td>
<td>100</td>
<td>100</td>
<td>2</td>
</tr>
</tbody>
</table>

**TOTAL CREDITS** 30

**ELECTIVE-III:**

1. EMBEDDED SYSTEMS
2. NEURAL NETWORKS & FUZZY LOGIC
3. RANDOM PROCESSES IN ENGINEERING.

* The industrial training will be for three weeks during the summer after third year second semester and assessment will be done in the 4\textsuperscript{th} year first semester with a seminar on the training he/she got.

### IV/IV B.TECH (CSE) II – SEMESTER

**B.TECH. (CSE) 4\textsuperscript{th} YEAR II-SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION WITH EFFECT FROM 2010-11 ADMITTED BATCH**

<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Theory</th>
<th>Tutorial</th>
<th>Lab.</th>
<th>Exam</th>
<th>Sessional</th>
<th>Total</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 4.2.1</td>
<td>DISTRIBUTED OPERATING SYSTEMS</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.2.2</td>
<td>CRYPTOGRAPHY AND NETWORK SECURITY</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.2.3</td>
<td>ELECTIVE-IV</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>FE02</td>
<td>FREE ELECTIVE-II</td>
<td>3</td>
<td>1</td>
<td>--</td>
<td>70</td>
<td>30</td>
<td>100</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.2.4</td>
<td>DATA COMMUNICATIONS &amp; NETWORK PROGRAMMING LAB</td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>2</td>
</tr>
<tr>
<td>CSE 4.2.5</td>
<td>PROJECT</td>
<td>--</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
<td>8</td>
</tr>
</tbody>
</table>

**TOTAL CREDITS** 26

**ELECTIVE-IV:**

1. DATA WARE HOUSING & DATA MINING
2. SERVICE ORIENTED ARCHITECTURE
### I/IV B.E./B.TECH. (FOUR YEAR COURSE) – SEMESTER SYSTEM
#### I & II SEMESTERS

<table>
<thead>
<tr>
<th>CODE NO.</th>
<th>COURSE</th>
<th>CREDITS</th>
<th>PERIODS L/T/Lab.</th>
<th>Exam. Hours</th>
<th>Sessional Marks</th>
<th>Exam Marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>ENG 1001</td>
<td>ENGLISH</td>
<td>2</td>
<td>2 + 1</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1002</td>
<td>MATHEMATICS-I</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1003</td>
<td>MATHEMATICS-II</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1004</td>
<td>PHYSICS THEORY</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1005</td>
<td>CHEMISTRY THEORY</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1006</td>
<td>HISTORY OF SCIENCE AND TECHNOLOGY</td>
<td>2</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1007</td>
<td>COMP. PROG. &amp; NUM. METHODS</td>
<td>4</td>
<td>3</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1008</td>
<td>ENGINEERING GRAPHICS</td>
<td>5</td>
<td>2 + 4</td>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1009</td>
<td>PHYSICS LABORATORY</td>
<td>2</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1010</td>
<td>CHEMISTRY LABORATORY</td>
<td>2</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1011</td>
<td>WORKSHOP</td>
<td>2</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>ENG 1012</td>
<td>PROGRAMMING LABORATORY</td>
<td>2</td>
<td>--</td>
<td>3</td>
<td>50</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>37</strong></td>
<td><strong>39</strong></td>
<td></td>
<td><strong>440</strong></td>
<td><strong>760</strong></td>
<td><strong>1200</strong></td>
</tr>
</tbody>
</table>
ENGLISH
(Common to all the Branches – B.E./B.Tech/Dual degree ME/ M. Tech Courses and Architecture)

<table>
<thead>
<tr>
<th>Theory Hours</th>
<th>Sessional Marks</th>
<th>External exam marks</th>
<th>Total Marks</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>30</td>
<td>70</td>
<td>100</td>
</tr>
</tbody>
</table>

**Vocabulary**: Word Search, Discuss and Note – Word Quiz – A List of 100 Basic Words – One Word Substitutes – 100 Difficult Words, Synonyms, Antonyms, Idioms, Technical terms

2) **Grammar**: Types of Sentences, Verbs, Adverbs, Pronouns, Adjectives, Gerunds & Infinitives, Articles, Quantifier, Punctuation, Prepositions, Conjunctions, Exclamation.


4) **Listening**: Life in a Hostel – Eating Away those Blues!, Meeting Carl Jung – A Documentary on the Big Cat – A Consultant Interviewing Employees – A Conversation about a Business Idea – An Interview with a Woman Engineer

5) **Speaking**: Your favourite Holiday Destination – Describe yourself – Why we need to Save Our Tigers– a Dialogue – Your First Interview – Pair Work: Setting up a New Business – Great Engineering Achievements.


**Text Book:**

**Reference Books:**
ENG 1002 Mathematics-I

Lectures/week = 3
Exam=3 Hrs,
Sessional Marks =30
Exam. Marks = 70

I Partial Differentiation and its applications:
Functions of Two or More Variables, Partial Derivatives, Homogeneous Functions- Euler’s Theorem, Total Derivative, Differentiation of Implicit Functions, Geometrical Interpretation- Tangent Plane and Normal to a surface. Change of Variables, Jacobians, Taylor’s Theorem for functions of two variables, Errors and approximations. Total Differential, Maxima and Minima of functions of two variables. Lagrange’s method of undetermined multipliers, Differentiation under the integral sign – Leibnitz Rule.

II Solid geometry:

III Multiple integrals and their applications:

IV Infinite series:

V Fourier series:
Euler’s formulæ, Conditions for a Fourier expansion, Functions having points of discontinuity, Change of interval, Odd and even periodic functions – Expansions of odd and even periodic functions. Half range series. Parseval’s formula, Practical Harmonic analysis.

Text Books:
1. Scope and Treatment as in “Higher Engineering Mathematics” by Dr. B.S Grewal,
   42nd edition, Khanna publishers.

Reference Books:
ENG 1003 Mathematics-II

Lectures/week = 3
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

I Linear Algebra:


II Ordinary Differential Equations Of First Order And Its Applications:


III Linear Differential Equations:

Higher order linear differential equations with constant coefficients. Cauchy’s and Legendre’s linear equations, Simultaneous linear equations with constant coefficients.

IV Series solutions of differential equations:

Series Solutions of ODE-Frobenius method (when x=0 is a regular singularity). Bessel’s equation, equations reducible to Bessel’s equations. Legendre Polynomials, Rodrigue’s formula, Generating function. Recurrence relations. Orthogonality relation for Bessel’s functions and Legendre Polynomials.

V Laplace transforms:

Applications to ordinary differential equations and simultaneous linear equations with constant coefficients. Laplace transforms of Unit step function, Unit Impulse function and periodic functions.

Text Books:


Reference Books:

ENG. 1004 Physics

Lectures/week = 3
Exam=3 Hrs, 
Sessional Marks =30
Exam. Marks = 70

Thermodynamics

Electromagnetism
Concept of electric field – Point charge in electric field, dipole in an electric field. Gauss law, some applications, electric potential and field strength, potential due to a point charge and dipole.


Optics

Diffraction – Single slit (Qualitative and quantitative treatment).

Polarisation – Polarisation by reflection, refraction and double refraction in uniaxial crystals, Nicol prism, Quarter and Half wave plate, circular and elliptical polarization and detection.

Lasers and Fibre Optics
Spontaneous and stimulated emissions, population inversions, Ruby laser, Gas laser, Semiconductor laser, Applications of lasers.
Fibre Optics, Optical Fibre and Total Internal Reflection, Acceptance Angle and cone of a fibre, Fibre optics in communications, Optical parts in Fibre. Fibre Optic Sensors.

Ultrasonics
Production of Ultrasonics by Magnetostriction and Piezoelectric effects – Ultrasonics and diffraction pattern, Applications of Ultrasonics.

Modern Physics
The quantization of energy, Photoelectric effect, De Broglie concept of matter waves, uncertainty principle, Schrodinger wave equation, application to a particle in a box.
Elementary concepts of Maxwell-Boltzman, Bose-Einstein’s and Fermi Dirac Statistics. Fermi Dirac Distribution function (no derivations).
Free electron theory of metals, Band theory of solids, Kronig Penny Model, Metals, Insulators and Semiconductors. Ferroelectrics and their applications
Super conductivity, Meisner Effect, Types of Superconductors and Applications of Superconductors.

Nanophase materials – Synthesis, characterization of nanostructured materials, properties and applications.

Renewable energies – Solar, wind and tidal – Applications

Books Recommended
2. Physics by David Halliday and Robert Resnick – Part I and Part II
3. Modern Engineering Physics by A.S. Vadudeva
4. University Physics by Young and Freedman
5. Materials Science by V. Rajendra and A. Marikani
6. Nonconventional Energy by Ashoke V. Desai
ENG 1005 Chemistry

Lectures/week = 3
Exam=3 Hrs, Sessional Marks =30
Exam. Marks = 70

1. Water Chemistry and pollution:
   Water pollution: Source – BOD – COD – Sewage treatment - preliminary, primary, secondary and tertiary.
   Air Pollution: Source – Air pollutants – CO, Sox, NOx, Hydrocarbons and particulates. Acid rain – Green House effect – control of Air pollution (General).

2. Solid State Chemistry:

3. Corrosion Chemistry:

4. Fuels and Lubricants:
   Lubricants: Classification - mechanism - properties of lubricating oils - Selection of lubricants for Engineering applications.

5. Polymers and Plastics:

6. Building Materials:
   Refractories: Classifications - properties - Engineering applications.
   Ceramics: Classification - Properties - uses.

Prescribed Text Books
5. Material Science and Engineering V. Raghavan - Prentice-Hall India Ltd.
ENG 1006 History of Science and Technology

Lectures/week = 3
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

1. Historical Perspective:

2. Policies and Plans After Independence:
Nehru’s vision of Science for Independent India, Science and Technology Developments in the New Era Science and Technology Developments during the Five Year Plan Periods and Science and Technology Policy Resolutions.

3. Research and Development (R&D) in India:

4. Science and Technological Developments in Major Areas:
Space – Objectives of Space Programmes, Geostationary Satellite Services – INSAT System and INSAT Services Remote Sensing Applications, Launch Vehicle Technology
Defense Research --- Spin-off Technologies for Civilian Use;
Biotechnology--Applications of Biotechnology in – Medicine, Biocatalysts, Agriculture, Food, Fuel and Fodder, Development of Biosensors and Animal Husbandry;

5. Nexus between Technology Transfer and Development:
Transfer of Technology—Types, Methods, Mechanisms, Process, Channels and Techniques: Appropriate Technology, Technology Assessment, Technological Forecasting, Technological Innovations and Barriers of Technological Change.

Test Books:
1. Kalpana Rajaram , Science and Technology in India, Published and Distributed by Spectrum Books (P) Ltd., New Delhi-58.

Reference Books:
ENGG 1007 Computer Programming and Numerical Methods

Lectures/week = 3
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

Objectives:
To make the student familiar with programming in C and enable the student to implement the numerical methods described in this course using C as Programming Language

Section A

Computer Programming in C

Functions: Concept of a function – Parameters and how they are passed – Automatic Variables – Recursion – Scope and extent of variables. Writing programs using recursive and non-recursive functions.

Arrays and Strings: Single and multidimensional arrays-Character array as a string- Functions on strings. Writing C Programmes using arrays and for string manipulation.

Structures: Declaring and using structures-Operations on structures – Arrays of structures-User defined data types-Pointers to using files.


Section B

Computer Oriented Numerical Methods

2. Representation for Characters and Numbers: Representation for integer and real numbers. Effect of finite representation on arthimatic operations for example overflow, underflow, associatevity and normalization. Some elementary methods for overcoming these limitations.
4. Solutions of simultaneous Algebraic Equations; Gauss elimination method and Gauss Seidal methods.
5. Interpolation: Lagrange’s Interpolation and difference table methods.

Books:
1. Section A: Programming with C by K.R.Venugopal& Sudeep R Prasad
2. Section B: Introduction to Numerical Methods by S.S Sastry
3. Elementary Numerical Methods by S.D.Conte

Reference:
1. C Programming Language by Kerninghan & Ritchie
ENG 1008 Engineering Graphics

Lectures/week = 2+4
Exam=3 Hrs,

Sessional Marks =30
Exam. Marks = 70

Introduction:
Drawing Instruments and uses. Lettering scales in common use.

Curves:
Curves used in Engineering Practice, conic sections, construction of conics by different methods, rectangular-hyperbola, cycloidal curves, trochoids, epi and hypo-cycloids. involutes and Archemedian spiral.

Orthographic Projections:
Projection of points, projection of straight lines, traces of a line, projection of planes and projection on auxiliary planes.

Solids and Developments:
Projection of solids in simple positions, projection of solids with axis inclined to one of the reference planes and parallel to the other, projection of solids with axis inclined to both the reference planes. Projection of spheres. Development of surfaces of solids. Development of transition piece connecting a square and circular pipe. Helices and screw threads.

Sections and Intersections:
Sections of different solids and true shape of sections. Intersection of surfaces-simple problems with cylinders, prisms and cones.

Isometric and Perspective Projections:

Textbook:
1. Elements of Engineering Drawing by N.D. Bhatt

Reference:
ENG 1009 Physics Laboratory

Practicals/week = 3
Exam=3 Hrs,

Sessional Marks =50
Exam. Marks = 50

12 of the following experiments must be completed:

1. Lee’s method- determination of coefficient of thermal conductivity of a bad conductor
2. Melde’s experiment-determination of the frequency of an electrically maintained tuning fork.
4. Diffraction grating-determination of wavelengths in mercury line spectrum-using spectrometer
5. Determination of Cauchy’s constants using Spectrometer and mercury light.
6. Wedge method-det. of thickness of a paper by forming parallel interference fringes.
7. Michelson’s interferometer- a) det. of wavelength of light b) Resolution of spectral lines.
8. Det. of ‘μ’ using calcite crystal.
9. Optical Bench – a) Young’s double slit b) Lloyd’s mirror c) biprism d) diffraction at an edge e) Thickness of wire
11. Variation of magnetic field along the axis of current carrying circular coil – Stewart and Gee’s apparatus
12. Calibration of voltmeter using potentiometer
13. Carey Foster’s bridge a) laws of resistance b) temperature coefficient of resistance
15. Calendar and Barnes method – determination of specific heat of water
16. Hall effect – a) Determination of hall coefficient B) determination of charge density
17. Photoelectric effect – a) characteristics of photoelectric cell b) det. of Planck’s const.
18. Determination of Rydberg constant using hydrogen discharge tube
19. Determination of e/m of am electron – Thomson’s method
ENG 1010 Chemistry Laboratory

Practicals/week = 3
Exam=3 Hrs,

Sessional Marks =50
Exam. Marks = 50

List of Experiments:

01. Determination of Sodium Carbonate.
02. Determination of Sulfuric acid using a strong base.
03. Estimation of Iron ( II ) using Potassium Permanganate.
05. Determination of volume strength of Hydrogen Peroxide.
06. Estimation of Calcium in a sample of Portland cement.
07. Estimation of Chromium (VI) using Ferrous Ammonium Sulphate.
08. Estimation of Copper (II) using Sodium thiosulphate.
09. Analysis of Bleaching powder for Chlorine content.
11. Determination of hardness of a water sample (EDTA Method).
12. Determination of alkalinity of a water sample.

Demonstration Experiments:

14. Preparation of Copper pigment.
15. Preparation of Phenol-Formaldehyde resin.
17. Digital potentiometer.
ENG 1011 Workshop

Practicals/week = 3 
Exam=3 Hrs, 
Sessional Marks =50 
Exam. Marks = 50

1. **Carpentry:**
   Bench work, tools used in carpentry.
   Jobs for class work – half lap joint, mortise and tenon joint, half –lap dovetail joint, corner dovetail joint, bridle joint.

2. **Sheet Metal:**
   Tools used in sheet metal work. Laying developments of sheet metal jobs, soldering.
   Jobs for class work – square tray, taper side tray, funnel, elbow pipe.

3. **Fitting:**
   Tools used in fitting work. Different files, chisels, hammers and bench vice.
   Jobs for class work – hexagon, rectangular, circular and triangular fits. External and internal threads with dies and taps.

**Reference:**
1. Elements of Workshop technology, Vol.1 by S.K. and H.K. Hajra Choudary
ENG 1012 Programming Laboratory

Practical’s/week = 3
Exam=3 Hrs, Sessional Marks =50
Exam. Marks = 50

1. Write a program to read x,y coordinates of 3 points and then calculate the area of a triangle formed by them and print the coordinates of the three points and the area of the triangle. What will be the output from your program if the three given points are in a straight line?

2. Write a program, which generates 100 random integers in the range of 1 to 100. Store them in an array and then print the arrays. Write 3 versions of the program using different loop constructs. (e.g. for, while, and do while)

3. Write a set of string manipulation functions e.g. for getting a sub-string from a given position, Copying one string to another, Reversing a string, adding one string to another.

4. Write a program which determines the largest and the smallest number that can be stored in different data types like short, int., long, float and double. What happens when you add 1 to the largest possible integer number that can be stored?

5. Write a program, which generates 100 random real numbers in the range of 10.0 to 20.0, and sort them in descending order.

6. Write a function for transposing a square matrix in place (in place means that you are not allowed to have full temporary matrix).

7. First use an editor to create a file with some integer numbers. Now write a program, which reads these numbers and determines their mean and standard deviation.

8. Given two points on the surface of the sphere, Write a program to determine the smallest arc length between them.

9. Implement bisection method to find the square root of a given number to a given accuracy.

10. Implement Newton Raphson method to det. a root of polynomial equation.

11. Given a table of x and corresponding f(x) values, write a program which will determine f(x) value at an intermediate x value using Lagrange’s interpolation.

12. Write a function which will invert a matrix.

13. Implement Simpson’s rule for numerical integration.


15. Write a program to solve a set of linear algebraic equations.
<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credit</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 2.1.1</td>
<td>ELECTRONICS</td>
<td>3</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>CSE 2.1.2</td>
<td>ELEMENTS OF ELECTRICAL ENGINEERING</td>
<td>3</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>CSE 2.1.3</td>
<td>DATA STRUCTURES</td>
<td>3</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>CSE 2.1.4</td>
<td>DESCREE MATHEMATICAL STRUCTURES-I</td>
<td>3</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>CSE 2.1.5</td>
<td>PROBABILITY, STATISTICS &amp; QUEUING THEORY</td>
<td>3</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>CSE 2.1.6</td>
<td>DIGITAL LOGIC DESIGN</td>
<td>3</td>
<td>70</td>
<td>100</td>
</tr>
<tr>
<td>CSE 2.1.7</td>
<td>ELECTRONICS LAB.</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
<tr>
<td>CSE 2.1.8</td>
<td>DATA STRUCTURES LAB.</td>
<td>3</td>
<td>50</td>
<td>100</td>
</tr>
</tbody>
</table>

**TOTAL CREDITS**: 28
I. **Semiconductors:**
Electronic Emission from metal carrier concentration in an intrinsic semi-conductors open circuited PN junction—diffusion.

II. **PN Junction Diode:**
PN Junction Diode, VI characteristics of PN Junction Diode, capacitance effects in PN Junction Diode, Quantitative theory of PN Junction Diode.

III. **Special Devices:**
Principles, Working of Zener diode, Tunnel diode, Varactor diode, Schottky diode, SCR and UJT.

IV. **Transistors:**
The bipolar junction Transistor — Operation of PNP and NPN Transistors — Transistor Circuit configurations - characteristics of a CE configuration - h parameter, low frequency small signal equivalent circuit of a Transistor.

V. **Transistor Biasing and thermal stabilization:**
Transistor Biasing, stabilization, Different methods of transistor biasing—Fixed bias, Collector feedback bias—self bias—Bias compensation.

VI. **Field Effect Transistors:**
Junction Field Effect Transistors (JFET) — JFET characteristics, JFET Parameters, Small equivalent circuit—MOSFETS — Depletion and Enhancement MOSFETS.

VII. **Rectifying circuits:**
Half-wave and full-wave rectifiers—Bridge rectifiers—rectifier efficiency, Ripple and regulation—Shunt capacitor filter—Zener regulation.

VIII. **Transistor Amplifiers:**
CE, CB, CC amplifier configurations — Analysis using h-parameters — Multistage amplifier — RC coupled amplifier — frequency response curve and bandwidth.

**TEXT BOOK:**
Electronic Device and Circuits by Sanjeev Guptah

**REFERENCE:**
Integrated Electronics by Millman & Halkias.
CSE2.1.2 ELEMENTS OF ELECTRICAL ENGINEERING

Credits: 4

Instruction: 3 Periods & 1 Tut/week
Univ. Exam: 3 Hours

Sessional Marks: 30
Univ-Exam-Marks: 70

Magnetic Circuits: Definitions of magnetic circuit, Reluctance, Magneto-motive force, magnetic flux, Simple problems on magnetic circuits, Hysteresis loss.


A.C. Circuits: Introduction to Steady State Analysis of A.C. Circuits, Single and Balanced 3 Phase Circuits.


Textbook:
“Elements of Electrical Engineering and Electronics” by V.K. Mehta, S. Chand & Co.

Reference Book:
“A First Course in Electrical Engineering” by Kothari.
CSE 2.1.3  DATASTRUCTURES  Credits: 4

Instruction: 3Periods & 1Tut/week  Sessional Marks: 30
Univ. Exam: 3 Hours  Univ. Exam Marks: 70

**Introduction to Data Structures:** Information and Meaning – Representation of Multi-Dimensional Arrays - Review of C - Programming.

**The Stack:** Primitive operations – As an Abstract Data Type – Implementing the Stack operations in C.

**Infix, Postfix and Prefix:** Definitions, Evaluation and Conversions using C.

**Recursion:** Recursive Definition and Processes, Recursion in C and Recursive Implementation of Applications. Simulation of Recursion – Efficiency of Recursion.

**Queues and Lists:** The Queue as Abstract Data Type – Sequential Representation - Types of Queues – Operations – Implementation in C.

**Linked List:** Operations – Implementation of Stacks, Queues and Priority Queues in C.

**Circular Lists:** Insertion, Deletion and Concatenation Operations – Stacks and Queues as Circular Lists – Doubly Linked Lists - Applications.

**Trees:** Binary Trees Operations and Applications.


**Sorting:** General Background: Efficiency – The big 0 Notation – Efficiency of Sorting, Bubble Sort and Quick Sort and their Efficiency – Selection Sorting – Binary Tree Sort – Heap Sort – Insertion Sorts – Shell Sort – Address calculation Sort – Merge and Radix Sorts.

**Searching:** Basic Searching Techniques: Dictionary as an Abstract Data Type – Algorithmic Notation – Sequential Searching and its Efficiency – Binary Search – Interpolation Search.

**Tree Searching:** Insertion into a Binary Search Tree – Deleting from a Binary Search Tree – Efficiency of Binary Search Tree operation.


**Linked Representation of Graphs:** Dijkstra’s Algorithm – Organizing the set of Graph Nodes – Application to Scheduling and its implication. Graph Traversal and Spanning Forests – Undirected Graph and their Traversals, Applications and Efficiency – Minimal Spanning Trees – Prim’s and Kruskal’s Algorithms.

**Textbooks:**
1. Data Structures Using C++ by Yidish Langsam, Moshe J. Augenstein and Aaron M. Tanenbaum, Prentice Hall Of India (2nd Edition) (Chapters 1 to 8)

**Note:** All Implementation are Using C Language only.
CSE 2.1.4  DISCRETE MATHEMATICAL STRUCTURES-I  Credits: 4

Instruction: 3 Periods & 1 Tut/week  Sessional Marks: 30
Univ. Exam: 3 Hours  Univ. Exam Marks: 70


Recurrence Relations: Generating Functions of Sequences – Calculating their Coefficients – Recurrence relations – Solving recurrence relations – Method of characteristic roots – Non-homogeneous Recurrence relations and their solutions


Text Book:

Reference Books:
2) “Discretemathematics”byRichardJohnsonbaugh,Pearson Education, New Delhi
CSE 2.1.5  PROBABILITY, STATISTICS & QUEUING THEORY  Credits: 4

Instruction: 3 Periods & 1 Tut/week  Sessional Marks: 30
Univ. Exam: 3 Hours  Univ. Exam Marks: 70

**Probability:** Definitions of probability, Addition theorem, Conditional probability, Multiplication theorem, Bayes theorem of probability and Geometric probability.

Random variables and their properties, Discrete Random variable, Continuous Random variable, Probability Distribution joint probability distributions their properties, Transformation variables, Mathematical expectations, probability generating functions.

**Probability Distributions/Discretedistributions:** Binomial, Poisson Negative binomial distributions and their properties. (Definition, mean, variance, moment generating function, Additive properties, fitting of the distribution.)

**Continuous distributions:** Uniform, Normal, exponential distributions and their properties.

Curve fitting using Principle of Least Squares.

**Multivariate Analysis:** Correlation, correlation coefficient, Rank correlation, Regression Analysis, Multiple Regression, Attributes, coefficient of Association, $\chi^2$ – test for goodness of fit, test for independence. Sample, populations, statistic, parameter, Sampling distribution, standard error, unbiasedness, efficiency, Maximum likelihood estimator, notion & interval estimation.

**Testing of Hypothesis:** Formulation of Null hypothesis, critical region, level of significance, power of the test.

**Small Sample Tests:** Testing equality of means, testing equality of variances, test of correlation coefficient, test for Regression Coefficient.

**Large Sample tests:** Tests based on normal distribution

**Queuing theory:** Queue description, characteristics of a queuing model, study state solutions of M/M/1: $\alpha$ Model, M/M/1; N Model.

**Text Book:**

**Reference Book:**
Probability & Statistics with Reliability, Queuing and Computer Applications by Kishor S. Trivedi, Prentice Hall of India, 1999

2. Combinational Logic Design, Gate-Level Minimization.
   Combinational Logic

3. Sequential Logic Design, Synchronous Sequential Logic
   Registers and Counters.
   Fundamental Asynchronous Sequential Logic

4. Memory and Programmable Logic


REFERENCE BOOKS:
2. Fundamentals of Digital Circuits, A. Ananda Kumar, PHI, 2002
CSE2.1.7  ELECTRONICS LAB  Credits:2
Lab: 3 Periods/week  SessionalMarks:50
Univ.Exam:3Hours  Univ-Exam-Marks:50

1. Familiarization of electronics component and equipment’s like C.R.O, Function generator and power supplies etc.

2. To study the V-I characteristics of pn junction diode and determine static resistance and dynamic resistance.

3. To study the characteristics of zener diode and hence determine the dynamic resistance from the characteristics.

4. Determine the voltage regulation of zener diode stabilizer.

5. To study and plot the wave form of half wave and full wave rectifier with and without capacitor filter.

6. To study and plot the input and output characteristics of common emitter transistor and calculate its input and output resistance.

7. To study and plot the input and output characteristics of common base transistor and calculate its input and output resistance.

8. To study the characteristics of FET(Field effect transistor) and hence calculate dynamic (rd), mutual conductance (gm) and amplification factor(µ).

9. To study the frequency response of single stage CE amplifier and hence calculate the band width (3dbBW).

10. To demonstrate the operation, characteristics and design of a saturated bipolar transistor switch.
1. Write a program to implement the operations on stacks.
2. Write a program to implement the operations on circular queues.
3. Write a program for sorting a list using Bubble sort and then apply binary search.
4. Write a program to create a binary search tree and for implementing the in order, preorder, post order traversal using recursion.
5. Write a program for finding the Depth First Search of a graph, and Breadth First Search of a graph.
6. Write a program for converting a given infix expression to postfix form.
7. Write a program for evaluating a given postfix expression.
8. Write a program for implementing the operations of a dequeue.
9. Write a program for the representation of polynomials using circular linked list and for the addition of two such polynomials.
10. Write a program for quick sort.
11. Write a program for Heap sort.
12. Write a program for Merge sort.
13. a) Write a program for finding the transitive closure of a digraph.
   b) Write a program for finding the shortest path from a given source to any vertex in a digraph using Dijkstra’s algorithm.
<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 2.2.1</td>
<td>OPERATIONS RESEARCH</td>
<td>3</td>
<td>70</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30</td>
<td>4</td>
</tr>
<tr>
<td>CSE 2.2.2</td>
<td>DISCRETE MATHEMATICAL STRUCTURES-II</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>CSE 2.2.3</td>
<td>MICROPROCESSORS-I</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 2.2.4</td>
<td>COMPUTER ORGANIZATION</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>CSE 2.2.5</td>
<td>OBJECT ORIENTED PROGRAMMING</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>CSE 2.2.6</td>
<td>ENVIRONMENTAL STUDIES</td>
<td>3</td>
<td>70</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>30</td>
<td></td>
</tr>
<tr>
<td>CSE 2.2.7</td>
<td>MICROPROCESSORS-I LAB.</td>
<td>--</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>CSE 2.2.8</td>
<td>OBJECT ORIENTED PROGRAMMING LAB.</td>
<td>--</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>CSE 2.2.9</td>
<td>HUMAN VALUES &amp; PROFESSIONAL ETHICS</td>
<td>2</td>
<td>100</td>
<td>2</td>
</tr>
</tbody>
</table>

**TOTAL CREDITS 28**
CSE 2.2.1

OPERATIONS RESEARCH

Instruction: 3 Periods & 1 Tut/week
Univ. Exam: 3 Hours

Credits: 4

Sessional Marks: 30
Univ-Exam-Marks: 70

Overview of operations Research: OR models – OR Techniques


Dynamic Programming: Recursive nature of dynamic programming – Forward and Backward Recursion

Deterministic Inventory Models: Static EOQ Models – Dynamic EOQ models.


Books:

1. Introduction to Operations Research by HILLIER/LIEBERMAN, Tata McGraw Hill
### CSE2.2.2  DISCRETE MATHEMATICAL STRUCTURES - II  

**Credits:** 4  

Instruction: 3 Periods & 1 Tut/week  

Univ-Exam: 3 Hours  

Univ-ExamMarks: 70

**Introduction:** Relations - Types of relations - Matrix representation of relations - Representation of relations as graphs - Ordering - Partial Ordering - Functions - Composition of Functions - Binary and n-ary Operations - Characteristic Functions of asset - Hashing functions - Recursion - Primitive recursive functions - Recursive functions.

**Algebraic Structures:** Algebraic Systems - Semi groups and Monoids - Grammars and Languages - Polish expression and their compilation - Groups - The application of residue arithmetic to Computers - Group Codes

**Lattices:** Lattices as Partially Ordered Sets - Properties of Lattices - Sub lattices - Direct Product and Homomorphism’s - Isomorphism’s - Modular Lattices - Distributive lattices - Complimented lattices - Their Properties

**Boolean Algebra:** Definition - Subalgebra - Direct Product - Homomorphism’s - Isomorphism’s - Boolean Functions - Representation of Boolean Functions - Minimization of Boolean Functions - Design examples of Boolean Algebra

**Computability:** Introduction - Finite State Machines - Introductory Sequential Circuits - Equivalence of Finite State Machines - Finite State Acceptors and Regular Grammars - Turing Machines and Partial Recursive Functions.

**Text Book:**  

**Reference Books:**  
1) Discrete and Combinatorial Mathematics by Ralph G. Grimaldi Pearson Education, New Delhi  
CSE2.2.3 Microprocessors-I Credits:4

Instruction:3Periods&1Tut/week Unv-Exam:3Hours
SessionalMarks:30 Univ-ExamMarks:70

The 8085A µP. Architecture and InstructionSet:

Programming the8085µP:

The 8086µP. Architecture andInstructionSet:

Programming the8086µP:
AssemblyLanguageRequirements,DataDefinition,COMand EXEprogramFilesProgramming techniques:LogicalProcessing Arithmetic processingTime DelayLoopsProcedures,Data tables, Modularprogramming, andMacros

TEXTBOOKS:

REFERENCE BOOK:
**CSE2.2.4 COMPUTER ORGANIZATION**

**Credits:** 4

**Instruction:** 3Periods & 1Tut/week  
**Univ-Exam:** 3Hours

**Sessional Marks:** 30  
**Univ-Exam Marks:** 70

**Register Transfer and Microoperations:**
- Register Transfer Language
- Register Transfer
- Bus and Memory Transfers
- Arithmetic Micro-operations
- Logic Micro-operations
- Shift Micro-operations
- Arithmetic Logic Shift Unit

**Basic Computer Organization and Design:**
- Instruction Codes
- Computer Registers
- Computer Instructions
- Timing and Control
- Instruction Cycle
- Memory Reference Instructions
- Input-Output and Interrupt
- Complete Computer Description

**Microprogrammed Control:**
- Control Memory
- Address Sequencing
- Microprogram Example

**Central Processing Unit:**
- Introduction
- General Register Organization
- Stack Organization
- Instruction Formats
- Addressing Modes
- Data Transfer and Manipulation
- Program Control

**Computer Arithmetic:**
- Introduction
- Addition and Subtraction
- Decimal Arithmetic Unit

**Input-Output Organization:**
- Peripheral Devices
- Input-Output Interface
- Asynchronous Data Transfer
- Modes of Transfer
- Priority Interrupt
- Direct Memory Access

**Memory Organization:**
- Memory Hierarchy
- Main Memory
- Auxiliary Memory
- Associative Memory
- Cache Memory
- Virtual Memory

**Text Book:**

**Reference Book:**
1. Procedural Paradigms, Object Oriented Paradigm, Concept of Data Abstraction Encapsulation, Inheritance and Polymorphism

**C++**

3. **Basics of Object Oriented Programming**: Benefits of OOP, datatypes, declarations, expressions and operator precedence, functions, scope of variables
4. **Introduction to OOP**: Classes and objects, Constructors & Destructors, Operator Overloading & type conversions.
5. **Inheritance**: Derived classes, syntax of derived classes, making private members inheritable, single, multilevel, multiple, hierarchical, hybrid inheritance
6. **Polymorphism**: Pointers, virtual functions and polymorphism—pointers to objects, this pointer, pointers to derived classes, virtual and pure virtual functions.
7. **Templates, Exception handling, console I/O and File I/O**: Class templates, Function templates, member function templates, exception handling, managing console I/O operations, working with files.

**JAVA**

8. **Introduction to JAVA**: Introduction, Classes and Objects, Arrays, strings and Vectors, Exception Handling, Managing I/O files in Java.
9. **Packages and Interface and Multi-threading**: Packages, Interfaces, creating, extending, stopping, blocking threads, thread states, thread methods, exceptions, priority in threads, synchronization, Runnable interface.

**Text Books:**
1. JAVA 2.0-Complete Reference: Herbert Schildt & F. Naughton.
2. Introduction to JAVA PROGRAMMING by Y. Daniel Liang (PHI)
3. Object-oriented Programming using C++: E. Balagurusamy, PHI.
4. Programming with JAVA - A primer: E. Balagurusamy, PHI
5. The Unified Modeling Languages user Guide by Grady Booch Etal. (Pearson Education)

**References:**
6. Object Oriented Programming in C++: N. Barkakati, PHI
7. Object Oriented Programming through C++ by Robat Laphore.
8. Object Oriented Analysis and Design by Andrew Haigh—Tata Mc-graw Hill.
CSE2.2.6  
ENVIRONMENTAL STUDIES  
Credits: 2

Instruction: 3 Periods & 1 Tut/week  
Univ-Exam: 3 Hours  
Sessional Marks: 30  
Univ-Exam Marks: 70

Module 1: Introduction  
Definition, Score and importance, Measuring and defining environmental development: Indicators

Module 2: Ecosystems  
Introduction, Types, Characteristic features, Structure and functions of ecosystems, Forest, Grassland, Desert, Aquatic (lakes, rivers and estuaries).

Module 3: Environment and Natural Resources Management  
Land Resources: Land as a resource, Common property resources, land degradation, Soil erosion and desertification, Effects of modern agriculture, fertilizer-pesticide problems, Forest Resources: Use and over-exploitation, Mining and dams – their effects on forest and tribal people, Water resources: Use and over-utilization of surface and ground water, Floods, Droughts, Water logging and salinity, Dams – benefits and costs, Conflicts over water, Energy Resources: Energy needs, Renewable and non-renewable energy sources, Use of alternate energy resources, Impact of energy use on environment.

Module 4: Bio-Diversity and its Conservation  
Value of bio-diversity – Consumptive and productive use, Social, Ethical, Aesthetic and option values, Biogeographical classification of India – India as a mega diversity habitat, Threats to biodiversity – Hot-sports, habitat loss, poaching of wildlife, loss of species, seeds etc., Conservation of biodiversity – in – situ and ex-situ conservation.

Module 5: Environmental Pollution – Local and Global Issues  
Causes, Effects and control measures of: Air pollution, Indoor air pollution, Water pollution, Soil pollution, Marine pollution, Noise pollution, Solid waste management, Composting, Vermiculture, Urban and industrial wastes, Recycling and re-use, Nature of thermal pollution and nuclear hazards, Global warming, Acid rain, Ozone depletion.

Module 6: Environmental Problems in India  
Drinking water, Sanitation and public health, Effect of activities of the quality of environment: Urbanization, Transportation, Industrialization, Green revolution, Water scarcity and ground water depletion, Controversies on major dams – Resettlement and rehabilitation of people problems and concerns, Rain water harvesting, Cloud seeding and watershed management.

Module 7: Economy and Environment  
The economy and environment interaction, Economics of development, Preservation and conservation, Sustainability: Theory and practice, Limits to growth, Equitable use of resources for sustainable lifestyles, Environmental impact assessment.

Module 8: Social Issues and the Environment  
Population growth and environment, Environmental education, Environmental movements, Environment Vs development.

Module 9: Institutions and Governance  
Regulation by Government, Monitoring and enforcement of environmental regulation, Environmental acts: Water (Prevention and control of pollution) act, air (Prevention and control of pollution) act, Environmental Protection Act, Wild life protection act, Forest conservation act, Costal zone regulations, Institutions and policies relating to India, Environmental Governance.
Module 10: International Conventions

Module 11: Case Studies
Chipko movement, Narmada bachao andolan, Silent valley project, Madhura refinery and Taj Majal, Industrialization of pattancheru, Nuclear reactor at Nagarjuna Sager, Tehri Dam, Ralegaon Siddhi (Anna Hazare), Kolleru lake – Acquaculture, Florosis in Andhra Pradesh.

Module 12: Field Work
Visit to a local area to document and mapping environmental assets – River / forest / grassland / hill / mountain, Study of local environment – Common plants, Insects, Birds, Study of simple ecosystems – Pond, river, hill, slopes etc. Visits to industries, Water treatment plants, Affluent treatment plants.

Textbooks: Kaushik – Kaushik, Anubha

Digital Logic Design Experiments:

1. TTL Characteristics and TTL IC Gates
2. Multiplexers & Decoders
3. Flip-Flops
4. Counters
5. Shift Registers
6. Binary Adders & Subtractors
7. ALU

Assembly Language Programming:

1. 8085 Assembly Language Programming according to theory course microprocessors-using the following trainers:
   - Keyboard Monitor of 8085μP Trainer
   - Serial Monitor of 8085μP Trainer with Terminal
   - 8085 Line Assembler of 8085μP Trainer with PC as Terminal
   - 8085 Cross Assembler using In-Circuit Emulator (ICE) with 8085μP Trainer and PC as Terminal

2. 8086 Assembly Language Programming according to theory course Microprocessor-using the following:
   - PC Assembler using TASM or MASM, TD or SYMDDBor CVD (Code View debugger)

Graded Problems are to be used according to the syllabus of MICROPROCESSORS-I
OBJECT ORIENTED PROGRAMMING LAB

Credits: 2

Lab: 3 periods/week
Univ. Exam: 3 hours.

Sessional Marks: 50
Univ. Exam marks: 50

C++
1. Program that implements stack operations using classes and objects.
2. Program performing complex number addition using friend functions.
3. Program for complex number addition using operator overloading.
4. Program to perform string operations by overloading operators.
5. Program on hierarchical inheritance showing public, private and protected inheritances.
6. Program for computation of students result using hybrid inheritance.
7. Program implementing bubble-sort using templates.
8. Program on virtual functions.
10. Program for copying one file to another file using streams.
11. Program for writing and reading a class object to a file.

JAVA
1. Program on packages.
2. Write a program to copy contents of a file into another file using File streams.
3. Program on hierarchal inheritance.
4. Program for handling ArrayIndexOutOfBoundsException and Divide-by-zero Exception.
5. Program for creating custom exceptions.
6. Program on multi-threading showing how CPU time is shared among all the threads.
8. Program for BannerApplet.
10. Program for implementing mouse events, (drawing lines, curves using mouse etc.)
11. Program on JDBC connectivity where database is Oracle.
12. Program to send messages across two machines using simple sockets.
CSE2.2.9 Human Values & Professional Ethics Credits:2
Instruction: 2Periods SessionalMarks:100 Pass. Mark: 40

UNIT-I: Ethical Theories
- Basic Moral Theories:
  i) Beneficence: doing good to others
  ii) Non-violence or peace
  iii) Justice

UNIT-II
- Classification of Ethical Theories:
  i) Consequentialism–Mill’s utilitarianism–greatest happiness to greatest number of people.
  ii) Deontology-Kantianism-Actions must satisfy the categorical imperative.
  iii) Virtue theory-Aristotelianism virtue is a mean between two extremes of action or passion.

UNIT-III
- Rights & Responsibilities of a citizen:
  i) Fundamental duties as stipulated in the constitution of India.
  ii) The rights to individuals guaranteed by Indian constitution.
  iii) (a) Rights of a professional
       (b) Professional responsibilities.

UNIT-IV
- Human Values & Attitudes:
  i) Classification of Values
  ii) Analysis of desirable values
  iii) The importance of attitudes in personal & Professional lives.

UNIT-V
- Ethical Living:
  i) Maslow’s theory of Hierarchy of needs.
  ii) Clayton Alderfer’s ERG (Existence, Relatedness and Growth) theory.
  iii) Concept of harmony in life.

### III/IV B.TECH(CSE) I - SEMESTER

#### B.TECH. (CSE) 3RD YEAR I-SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION WITH EFFECT FROM 2010-11 ADMITTED BATCH

<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Tutorial</td>
<td>Lab.</td>
</tr>
<tr>
<td>CSE 3.1.1</td>
<td>MICROPROCESSOR-II</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.2</td>
<td>SYSTEM PROGRAMMING</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.3</td>
<td>ELECTIVE – I</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.4</td>
<td>FORMAL LANGUAGES &amp; AUTOMATA THEORY</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.5</td>
<td>FILE STRUCTURES</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.6</td>
<td>OPERATING SYSTEMS</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>FE01</td>
<td>FREE ELECTIVE-I</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.1.7</td>
<td>OPERATING SYSTEMS LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>CSE 3.1.8</td>
<td>MICROPROCESSOR-II LAB</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>CSE 3.1.9</td>
<td>SOFT SKILLS LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL CREDITS** 33

**ELECTIVE-I**

1. COMPUTER GRAPHICS
2. DIGITAL SIGNAL PROCESSING
3. FAULT TOLERANT COMPUTING
4. COMBINATORICS & GRAPH THEORY.
CSE 3.1.1  MICROPROCESSORS - II  Credits:4

Instruction: 3 Periods & 1 Tut/Week  
Univ. Exam: 3 Hours

Sessional Marks: 30  
Univ. Exam Marks: 70

Interfacing Semiconductor Memories:
Semiconductor Memories: Classification, Internal Organisation & Functional Description. Interfacing SRAMs, and EPROMs to 8085/8086

Interfacing I/O Devices:

Interfacing Peripheral Csto Intel 8085/8086:
Parallel I/O Interface - 8255, Serial I/O Interface – 8251, Timer Interface - 8253, Keyboard / Display Interface - 8279, Interrupt Controller Interface - 8259

Interfacing Data Converters to 8085/8086:
D/A Conversion Methods, A/D Conversion Methods, Interfacing DAC, Interfacing ADC.

Introduction to Microcontrollers:
Intel 8051 Architecture and Programming

Introduction to Hardware and Software of PCs:
Hardware Organization, DOS Internals, ROM BIOS and BIOS Function Calls, DOS Function Calls, Introduction to Pentium Processors

TEXT BOOKS:

REFERENCE BOOKS:
4. Sanjay KBose, Hardware and Software of Personal Computers, New Age International (P) Ltd., 1991
5. Myke Predko, Programming and Customizing the 8051 Microcontroller, TMH, 1999
CSE3.1.2 SYSTEMS PROGRAMMING Credits:4

Instruction:3Periods&1Tut/Week
Univ.Exam:3Hours
Univ.ExamMarks:70

SessionalMarks:30

Introduction to Systems Programming, Introduction to Assembly Language Programming-IntroductiontoInstructionFormats, Dataformats –Roleof Base Register, IndexRegister.

Introduction to Assembler, databases used in assembler design, Design of Assembler-SinglePass & DoublePass.

Introduction to Macros, various types of Macros, Design of MacroProcessor – SinglePass & DoublePass. Introduction to Loaders, functions of a loader, types of Loaders, databases used in Loaders, Design of Loaders - Absolute & DLL.

Introduction to Software Tools, Text editors, Interpreters, Program Generators, Debug Monitors.

TextBook: Systems Programming by Donovan Tata McGraw Hill

CSE 3.1.3  
ELECTIVE-I(1) COMPUTERGRAPHICS  
Credits:4

Instruction: 3 Periods & 1Tut/Week  
Univ. Exam: 3 Hours  
Univ. Exam Marks: 70  
Sessional Marks: 30


Attributes of Output Primitives: Line and Curve Attributes – Color and Gray scale levels – Area Fill Attributes – Character Attributes – Bundled Attributes – Inquiry Functions – Antialiasing.


Two Dimensional Viewing: The viewing pipeline – Viewing Coordinate Reference Frame – Window – to – Viewport Coordinate Transformation – Two Dimensional Viewing Functions – Clipping Operations – Point Clipping – Line Clipping – Polygon Clipping – Curve Clipping – Text and Exterior Clipping


Chapters 1 to 12 except 10-9 to 10-22 of the Textbook


Reference Books:
CSE 3.1.3 ELECTIVE-I (2) DIGITAL SIGNAL PROCESSING Credits:4

Instruction:3Periods&1Tut/Week
Univ.Exam:3Hours
Univ.Exam:3Hours

SessionalMarks:30
Univ.ExamMarks:70

AnOverviewofDigitalSignalProcessing anditsApplications
Introduction to Programmable DSPs
ArchitectureofTMS320C3X
Addressing Modes and AssemblylanguageInstructionsof ‘C3X
ApplicationProgramsin C3X
AnOverview of TMS320C54X
TMS320C54X Assemblylanguage Instructions
ApplicationProgramsin C54X FPGA–based
DSP SystemDesign

Text Book:

Reference Books:
CSE 3.1.3  ELECTIVE-I(3) FAULT TOLERANT COMPUTING  Credits:4

Instruction: 3 Periods & 1 Tut/week  Sessional Marks: 30
Univ. Exam: 3 Hours  Univ. Exam Marks: 70

Basic Concepts of Reliability
Faults in Digital Circuits
Test Generation


Introduction to Self-Checking Logic: The two rail Checker, Design for Testability: Testability, Controllability and Observability, Design of Testable Combinational Logic Circuits, Testable Design of Sequential Circuits, The scan path technique, Designing testability into logic boards

TextBooks:
Fault Tolerant and Fault Testable Hardware Design, Parag K. Lala, PHI, 1985

Reference:
PART I: COMBINATORICS

3. **RECURRANCE RELATIONS:** Generating Functions of Sequences – Calculating Coefficients of Generating Functions – Recurrence Relations – Solving Recurrence Relations using Substitution and Generating Functions– Method of Characteristic Roots- Solutions of homogeneous and inhomogeneous recurrence relations.

PART II: GRAPH THEORY

4. **FUNDAMENTAL CONCEPTS:** What is a Graph- Paths- Cycles- Trails- Vertex Degrees and Counting- Directed Graphs- Trees and Distance- Spanning Trees – Enumeration – Optimization and Trees.

TEXTBOOKS:

2. Douglas B. West, “Introduction to Graph Theory”, Pearson Education Asia, New Delhi (Chapters 1, 2, 3, 4, 5, 6, 7)

REFERENCE BOOKS:

3. Robin J. Wilson, “Introduction to Graph Theory” Pearson Education Asia, New Delhi.
1. Finite Automata and Regular Expressions:

2. Regular sets & Regular Grammars:

3. Context Free Grammars and Languages:
   Context Free Grammars and Languages, Derivation Trees, Simplification of Context Free Grammars, Normal Forms, Pumping Lemma for CFL, Closure properties of CFL’s, Decision Algorithm for CFL.

4. Push down Automata and Deterministic CFL:
   Informal Description, Definitions, Push-Down Automata and Context free Languages, Parsing and Push-Down Automata.

5. Universal Turing Machines and Undecidability:
   Design and Techniques for Construction of Turing Machines, Undecidability of PCP, Chomsky Hierarchy, Regular Grammars, Unrestricted Grammars, Context Sensitive languages, Relationship between classes of languages.

TEXTBOOKS:

REFERENCE BOOKS:
   Theory of Computer Science by Mishra & Chandra Sekharan, PHI.
   An Introduction to Formal Languages and Automata, 3e by Peter Linz – Narosa Publishing House.
FILE STRUCTURES

CSE 3.1.5

Instruction: 3 Periods & 1 Tut/Week
Univ. Exam: 3 Hours

Credits: 4
Sessional Marks: 30
Univ. Exam Marks: 70

**File Processing Operations**
Physical and logical files, opening, reading & writing and closing files in C, seeking and special characters in files, physical devices and logical files, file – related header files in C

**Secondary Storage**
Disks – organization, tracks, sectors, blocks, capacity, non - data overhead, cost of disk access, Magnetic Tape – types, performance, organization estimation of tape length and data transmission times, disk vs tape, CD-ROM – CD-ROM as a file structure, physical organization, strengths and weaknesses of CD-ROMs, storage hierarchy

**Byte Journey and Buffer Management**
File manager, I/O buffer, I/O processing, buffer strategies and bottlenecks

**File Structure Concepts**
A stream file, field structures, reading a stream of fields, record structures and that uses a length indicator, Mixing numbers and characters – use of hexdump, reading the variable length records from the files

**Managing records in C files**
Retrieving records by keys, sequential search, direct access, choosing record structure and record length, header records, file access and file organization

**Organizing files for performance**
Data compression, reclaiming space – record deletion and storage compaction, deleting fixed-length records for reclaiming space dynamically, deleting variable-length records, space fragmentation, replacement strategies.

**Indexing**
Index, A simple index with an entry sequenced file, basic operations on a non-indexed, entry sequenced file, index that are too large to hold in memory, index to provide access by multiple keys, retrieving using combination of secondary keys, improving the secondary index structure – inverted lists

**Indexed sequential file access and prefix B+ Trees**
Indexed sequential access, maintaining a sequenceset, adding a simple index to the sequenceset, the tree, simple prefix, content of the index: separators instead of keys, the simple prefix, B+ tree, maintenance, index set block size, internal set block size, and internal structure of index set blocks: a variable B+ tree, maintaining, loading a simple prefix

**Special Note:** Implementation in C only

**Hashing**
Collisions in hashing, simple hashing algorithms, hashing functions and record distributions, memory requirements, collision resolution by progressive over flow, buckets, deletions

**Extendable Hashing**
Working of extendable hashing, implementation, deletion, extendable hashing performance

**Designing file structure for CD-ROM**
Tree structure on CD-ROM, hashing files on CD-ROM, CD-ROM file structure

**TextBook:** File Structures – An Object Oriented Approach with C++ by Michael J. Folk, Bill Zoellick and Greg Riccardi, Pearson

For Admitted Batch 2013-2014
CSE 3.1.6  OPERATING SYSTEMS  Credits: 4

Instruction: 3 Periods & 1 Week/Week
Univ. Exam: 3 Hours

Sessional Marks: 30
Univ. Exam Marks: 70


Processes: Introduction to Processes, InterProcessor Communication, Classical IPC Problems, Process Scheduling

Memory Management: Memory Management without Swapping or Paging, Swapping, Virtual Memory, Page Replacement Algorithms, Modeling paging algorithms, Design issues for paging systems, Segmentation


Deadlocks: Resources, Deadlocks, The Optical Algorithm, Deadlock Detection and Recovery, Deadlock Avoidance, Deadlock Prevention, Other Issues


Text Book: Modern Operating Systems by Andrew S. Tanenbaum

Introduction to Data Structures: Introduction, Data Information, Overview of Data Structures, Types of Data Structures, Primitive and Non-primitive Data Structures and operations, Binary and Decimal Integers, Logical Information, Storage Information, Hardware and Software, Concepts of Data Types, Data Types in 
c, Abstract Data Types, Pointers, Structures in C, Unions, Algorithms.


Stack and Queues: Introduction, Stack-related terms, Stack Implementation, Operation on stacks, Pointers and stack, Introduction to Queues, various positions of Queues, Queue Implementation, Operation on Queues, Disadvantages of Simple Queues, Dynamic implementation (Pointers), Insertion and Deletion of Queues, Application of Queues.


Trees: Introduction, Basic terms, Binary trees, Extended Binary tree, Binary trees Representation, Operation on Binary Tree, Traversal of Binary Tree, Binary Search tree.

Sorting: Introduction, Sorting and Insertion sort, Selection Sort, Bubble Sort, Quick Sort, Tree Sort, Merging List, Heap Sort, Radix Sort and Partition Exchange Sort.


Graph: Introduction, Terminology, Graph Representation, Traversal in Graph (Breadth first and Depth searches), Spanning Trees, Prim’ algorithm.

Textbooks:
Introduction to Data Structures in C by Ashok N. Kamthane, Pearson Education.

Reference Books:

Note: All Implementation are Using C Language only.
CSE 3.1.7 OPERATING SYSTEMS LAB Credits: 2

Lab: 3 periods/week
Univ. Exam: 3 hours.

1. Study of laboratory environment:
   Hardware specifications, software specifications
2. Simple Unix-C programs:
   Programs using system calls, library function calls to display and write strings on standard output device and files.
3. Programs using fork system calls.
2. Programs for error reporting using errno, perror() function.
3. Programs using pipes.
4. Shell programming.
5. Programs to simulate process scheduling like FCFS, Shortest Job First and Round Robin.
6. Programs to simulate page replacement algorithms like FIFO, Optimal and LRU.
7. Programs to simulate free space management.
8. Programs to simulate virtual memory.
10. Programs to simulate deadlock detection.

References:
Unix concepts and applications by Sumitabha Das, TMH Publications. Unix programming by Stevens, Pearson Education.
Shell programming by Yashwanth Kanetkar.
Operating System Concepts by Silberschatz, and Peter Galvin.
CSE 3.1.8 MICROPROCESSOR-II LAB Credits: 2

Lab: 3 Periods/week  SessionalMarks: 50
Univ. Exam: 3 Hours  Univ. ExamMarks: 50

INTERFACING WITH 8085 TRAINER

1.1 Memory Interface (Interfacing SRAM and PROM)
1.2 Toggle Switch Keyboard and LED Display Interface
1.3 Hex Keyboard and Dot Matrix Hex LED Display Interface
1.4 ASCII Keyboard Interface
1.5 Push Button Keyboard Matrix (8x3) Interface with 8085 Ice
1.6 8279-Programmable Keyboard/Display Interface
1.7 CRT Terminal Interface

INTERFACING WITH PC

2.1 Stepper Motor Controller
2.2 DAC/ADC Interface
2.3 8253 Timer Interface
2.4 Multiplexed Dot Matrix Hex LEDs Interface
2.5 40-COL/80COL D.M. Printer Interface
2.6 8051 Programming Exercises
2.7 Traffic Light Controller Interface
Communication:
Importance of communication
Non verbal communication
Personal appearance
Posture
Gestures
Facial expressions
Eye contact
Space distancing

Goal setting:
Immediate, short term, long term,
Smart goals, strategies to achieve goals

Time management:
Types of time
Identifying time wasters
Time management skills

Leadership and team management:
Qualities of a good leader
Leadership styles
Decision making
Problem solving
Negotiation skills

Group discussions:
Purpose (Intellectual ability, creativity, approach to a problem, solving, tolerance, qualities of a leader)
Group behaviour, Analysing performance

Job interviews:
Identifying job openings
Preparing resumes & CV
Covering letter
Interview (Opening, body-answer Q, close-ask Q),
Types of questions

Reference books:
1. ‘Effective Technical Communications’ by Rizvi M. Ashraf, McGraw–Hill Publication
2. ‘Developing Communication Skills’ by Mohan Krishna & Meera Banerji, Macmillan
3. ‘Creative English for Communication’ by N. Krishnaswami & T. Siriman, Macmillan
### III/IV B.TECH (CSE)  II - SEMESTER

#### B.TECH. (CSE) 3rd YEAR II-SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION WITH EFFECT FROM 2010-11 ADMITTED BATCH

<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td>Tutorial</td>
<td>Lab.</td>
</tr>
<tr>
<td>CSE 3.2.1</td>
<td>COMPILER DESIGN</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.2</td>
<td>DESIGN &amp; ANALYSIS OF ALGORITHMS</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.3</td>
<td>DATA BASE MANAGEMENT SYSTEMS</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.4</td>
<td>DATA COMMUNICATIONS</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.5</td>
<td>ELECTIVE – II</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.6</td>
<td>COMPUTER ARCHITECTURE</td>
<td>3</td>
<td>1</td>
<td>--</td>
</tr>
<tr>
<td>CSE 3.2.7</td>
<td>FILE STRUCTURES LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
<tr>
<td>CSE 3.2.8</td>
<td>DBMS LAB.</td>
<td>--</td>
<td>--</td>
<td>3</td>
</tr>
</tbody>
</table>

**TOTAL CREDITS** 28

### ELECTIVE - II

1. PRINCIPLES OF PROGRAMMING LANGUAGE
2. BIO-INFORMATICS
3. IMAGE PROCESSING
4. VHDL

* The industrial training will be for three weeks during the summer after third year second semester.
Instruction: 3 Periods & 1 Week/Week  
Univ. Exam: 3 Hours

**The Theory of Automata:** Definition and description, Transitions systems, properties, Acceptability of string, NDFA, Equivalence between DFA & NDFA, Grammars, Types of Grammars, Grammars and Automata, Regular expressions, Finite Automata and Regular expressions, Regular sets and Regular Grammars.

**Overall view of Compilers:** Brief discussion on various phases of Compilers.

**Design of Parsers:** ShiftReduce parser, Operator Precedence Parser, Predictive Parser, LR parser, SLRParser, LALR parser

**Syntax Directed Translation:** Syntax directed translation and implementation, Intermediate code, Postfix notation, Parsing tree, Three address Code, Quadruples, Triples.

**Intermediate Code Optimization:** The principle sources of optimization, Loop Optimization, DAG, Global data flow analysis.

**Code Generation:** Problems, Machine model, A simple code generator, Register allocation and assignment, Code generation from DAG, Peep hole optimization.

**Brief discussion** on symbol tables, Run-time storage administration.

**Chapters:** 1, 2, 3, 4, 5, 6, 7, 9, 10, 11, 12, 15 of the textbook.

**Text Book**
- Principles of Compiler Design by Aho, D. Ullman

**Reference Books:**
CSE 3.2.2 DESIGN AND ANALYSIS OF ALGORITHMS Credits:4

Instruction: 3 Periods & 1 Tut/week
Univ. Exam: 3 Hours

Sessional Marks: 30
Univ Exam Marks: 70


Divide – and – Conquer – Mergesort – Quicksort – Binary Search – Binary Tree Traversals and Related Properties – Multiplication of large integers and Strassen’s Matrix Multiplication – Closest Pair Convex Hull Problems by Divide and Conquer


Text Book:
Introduction to Design and Analysis of Algorithms by Anany Levitin, Pearson Education, New Delhi, 2003

Reference Books:
3. Fundamentals of Algorithmics, Gilles Brassard & Paul Bratley, Prentice Hall of India, New Delhi
Introduction to DBMS: Overview, Filesystem vs DBMS, Advantages of DBMS, Storagedata, queries, Transaction Management, DBMS structure

E-Rmodel: Entities, Attributes and Entity sets, Relationship and Relationship sets, Features of ERModel, Conceptual database design with ERmodel

Relational model: Integrity constraint over relations and enforcement, Querying relation data, Logical database design, views, destroying/altering tables and views

Relationallanguages: Algebra and calculus

SQL: Basic SQL, Query, union, interest, except, Nested Queries, Aggregated Operation, Null values, Embedded SQL, cursors, ODBC and JDBC, Triggers and Active database, designing active databases

Schema refinement and normal forms: Schematic refinement, fds, reasoning normal forms, normalization up to 3rd & BC normal forms, lossless join & dependency-preserving decomposition

Transaction management: Transaction concept, transactions and schedules, concurrent execution of transactions, lock – based concurrency control, crash recovery

Concurrency control: Lock management, specialized locking techniques, concurrency control without locking

Crash Recovery: Aries, recovering from a system crash, media recovery

Text Book:
Database Management Systems by Raghu Ramakrishnan and Johannes Gehrke, McGraw-Hill
1. An Introduction to Data Communications:
A Communications Model, Data Communications and Data Communications Networking, Protocols and Protocol Architecture, Characteristics of Data Transmission: Concepts and Terminology, Analog and Digital Data Transmission, Transmission Impairments

2. Transmission Media:

3. The Data Communication Interface:
Asynchronous and Synchronous Transmission, Line Configurations, Interfacing, Data Link Control, Flow Control, Error Detection, Error Control, High-Level Data Link Control (HDLC), Other Data Link Control Protocols.

4. Data Communications Hardware: Terminals

5. Modems:

TEXTBOOKS:
2. Mary E.S. Loomis, Data Communications, PHI-N.J. 1983 (Chapter 3, Chapter 5)
3. Paul Bates, Practical Digital and Data Communications, PHI-N.J. 1987 (Chapter 5)

REFERENCEBOOKS:
CSE 3.2.5 ELECTIVE-II (1) PRINCIPLES OF PROGRAMMING LANGUAGES Credits:4

Instruction:3 Periods & 1 Tut/week  
Univ. Exam:3 Hours  
Sessional Marks:30  
Univ. Exam Marks:70

Language Design Issues: Why Study Programming Languages, A Short History of Programming Languages, Role of Programming Languages, Programming Environments  
Impact of Machine Architectures: The Operation of a Computer, Virtual Computers and Binding Times  
Elementary Data Types: Properties of Types and Objects, Scalar Data Types, Composite Data Types. Encapsulation: Structured Data Types, Abstract Data Types, Encapsulation by Subprograms, Type Definitions.  
Inheritance: Abstract Data Types Revisited, Inheritance, Polymorphism  
Sequence Control: Implement and Explicit Sequence Control, Sequence with Arithmetic Expressions, Sequence Control Between Statements, Sequencing with Non-arithmetic Expressions  
Subprogram Control: Subprogram Sequence Control Attributes of Data Control, Parameter Transmission, Explicit Common Environment.  
Storage Management: Elements Requiring Storage, Programmer – and System – Controlled Storage, Static Storage Management, Heap Storage Management  
Distributed Processing: Variations on Subprogram Control, Parallel Programming, Hardware Developments, Software Architecture  

Text Book:  

References:  
1. **Introduction:**
   Definitions, Sequencing, Biological sequence/structure, Genome Projects, Pattern recognition, Folding problem, Sequence Analysis, Homology and Analogy.

2. **Protein Information Resources**
   Biological databases, Primary sequence databases, Protein Sequence databases, Secondary databases, Protein pattern databases, and Structure classification databases.

3. **Genome Information Resources**
   DNA sequence databases, specialized genomic resources

4. **DNA Sequence Analysis**
   Importance of DNA analysis, Gene structure and DNA sequences, Features of DNA sequence analysis, EST (Expressed Sequence Tag) searches, Gene hunting, Profile of a cell, EST analysis, Effect of EST data on DNA databases.

5. **Pairwise alignment techniques**
   Database searching, Alphabets and complexity, Algorithms and programs, Comparing two sequences, sub-sequences, Identity and similarity, The Dotplot, Local and global similarity, differential alignment techniques, Dynamic Programming, Pairwise database searching.

6. **Multiple sequence alignment**
   Definition and Goal, The consensus, computational complexity, Manual methods, Simultaneous methods, Progressive methods, Databases of Multiple alignments and searching.

7. **Secondary database searching**
   Importance and need of secondary database searches, secondary database structure and building sequence search protocol.

8. **Analysis packages**
   Analysis package structure, commercial databases, commercial software, comprehensive packages, packages specializing in DNA analysis, Intranet Packages, Internet Packages.

**Text Books:**
1. Introduction to Bioinformatics, T K Attwood & D J Parry-Smith
   Addison Wesley Longman

**Reference Books:**
1. Introduction to Bioinformatics, Arthur M. Lesk, OXFORD publishers (Indian Edition)
1. Fundamentals of Image Processing
   Image Acquisition, Image Model, Sampling, Quantization, Relationship between pixels, distance
   measures, connectivity, Image Geometry, Photographic film, Histogram: Definition, decision of contrast basing
   on histogram, operations basing on histograms like image stretching, imagesliding, Image classification.
   Definition and Algorithm of Histogram equalization.

2. Image Transforms:
   A detail discussion on Fourier Transform, DFT, FFT, properties. A brief discussion on WALSH Transform,
   WFT, HADAMARD Transform, DCT.

3. Image Enhancement: (by SPATIAL Domain Methods)
   a) Arithmetic and logical operations, pixel or point operations, size operations, b. Smoothing filters
      Mean, Median, Mode filters – Comparative study, etc. Edge enhancement filters – Directional filters, Sobel,
      Laplacian, Robert, Kirsch, Homogeneity & DIFF Filters, prewitt filter, Contrast Based edge
      enhancement techniques, Comparative study. d. Low Pass filters, High Pass filters, sharpening filters. –
      Comparative Study e. Comparative study of all filters f. Color image processing.

4. Image enhancement: (By FREQUENCY Domain Methods). Design of Low pass, High pass, EDGE
   Enhancement, smoothing filters in Frequency Domain, Butterworth filter, Homomorphic filters in
   Frequency Domain. Advantages of filters in frequency domain, comparative study of filters in frequency domain
   and spatial domain.

5. Image Compression: Definition, A brief discussion on – Run length encoding, contour coding, Huffman
   code, compression due to change in domain, compression due to quantization, Compression at the time of image
   transmission. Brief discussion on: Image Compression standards.

6. Image Segmentation: Definition, characteristics of segmentation. Detection of discontinuities, thresholding
   Pixel based segmentation method. Region based segmentation methods – segmentation by pixel aggregation, segmentation by
   sub region aggregation, histogram based segmentation, spatial and merge technique. Use of motion in segmentation
   (spatial domain technique only)

7. Morphology:
   Dilation, Erosion, Opening, Closing, Hit-and-Miss transform, Boundary extraction,
   Region filling, connected components, thinning, Thickening, skeletons, Pruning
   Extension to Gray – Scale Images: Application of Morphology in I.P

Textbook:
   Digital Image Processing, Rafael C. Gonzalez and Richard E. Woods, Addison Wesley

Reference books:
   1. Fundamentals of Electronic Image Processing, Arthur R. Weeks, Jr. (PHI)
   2. Image processing, Analysis, and Machine vision, Milan Sonka, Vaclav Hlavac, Roger Boyle, Vikas
   Publishing House.
CSE 3.2.5  ELECTIVE-II (4) V H D L  Credits:4
Instruction:3Periods& 1Tut/Week  SessionalMarks:30
Univ. Exam: 3Hours  Univ. Exam. Marks:70

1. Overview of Digital Design with Vermilion HDL
2. Hierarchical Modeling Concepts
3. Basic Concepts
4. Modules and ports
5. Gate-Level Modeling
6. Dataflow Modeling
7. Behaviour Modeling
8. Tasks and Functions

Text Book:

1. VerilogHDL—AGuidetoDigitalDesign and Synthesis, Samir Palnitkar, Pearson Education Pte. Ltd. (chapters: 1,2,3,4,5,6,7,8), 2001

Reference Books:

CSE3.2.6 COMPUTERARCHITECTURE Credits:4

Instruction:3Periods & 1Tut/Week
Univ. Exam:3Hours

SessionalMarks:30
Univ. ExamMarks:70

Computer Evolution, Computational Models The Concept of Computer Architecture
Introduction to Parallel Processing
Introduction to Instruction – Level Parallel Processors
Pipeline Processors VLIW Architectures Superscalar Processors
Processing of Control Transfer Instructions Code Scheduling of ILP Processors Introduction to Data
Parallel Architectures Introduction to MIMD Architectures

Text Books:

Reference Text
FILE STRUCTURES LAB

Credits: 2

Lab: 3 Periods/week  
Univ. Exam: 3 Hours

1. **File Operations:**
   Opening, reading, writing, closing, and creating of files in C++

2. **Study of secondary storage devices:**
   Tracks, sectors, block capacity of disk, tape, and CD-ROMs

3. **File Structures in C++**
   Reading a stream of fields, record structures and its length indicators, Mixing of numbers and characters, Use of a hex dump, Retrieving records by keys using sequential search, direct access

4. **File Performance**
   Data compression, storage compacting, reclaiming space dynamically

5. **Indexing and Indexed Sequential Files**
   Index file, inverted file operations, usage of B and B^+ trees

6. **Hashing Files**
   Hashing functions, algorithms, record distribution and collision resolution by progressive overflow, Extendable hashing and improved hashing performance
Study features of a commercial RDBMS packages such as ORACLE/DB2, MSAccess, MySQL & Structured Query Language (SQL) used with the RDBMS. (Select two of RDMs)

Laboratory exercises should include defining schemas for applications, creation of a database, writing SQL queries, to retrieve information from the database, use of host languages, interface with the embedded SQL, use of forms & report writing packages available with the chosen RDBMS product.

Some sample applications, which may be programmed, are given below: Accounting package for shop, Databasemanager for a Magazine agency or a newspaper agency, Ticketbooking for performances, Preparing greeting cards & birthday cards, Personal accounts - Insurance, loans, mortgage payments, etc., Doctor's diary & billing system, Personal bank account, Class marks management, Hostel accounting, Video Tape library, History of cricket scores, Cable TV transmission program manager, Personallibrary.
### B.TECH. (CSE) 4\textsuperscript{th} YEAR 1-SEMESTER SCHEME OF INSTRUCTION AND EXAMINATION WITH EFFECT FROM 2010-11 ADMITTED BATCH

<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>CSE 4.1.1</td>
<td>OBJECT ORIENTED SOFTWARE ENGG.</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.2</td>
<td>COMPUTER NETWORKS</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.3</td>
<td>ARTIFICIAL INTELLIGENCE</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.4</td>
<td>PRINCIPLES OF ECONOMICS &amp; MANAGEMENT</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.5</td>
<td>ELECTIVE-III</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.6</td>
<td>WEB TECHNOLOGIES</td>
<td>3</td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.1.7</td>
<td>GRAPHICS &amp;MULTIMEDIA LAB.</td>
<td>--</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>CSE 4.1.8</td>
<td>OBJECT ORIENTED SOFTWARE ENGG. LAB.</td>
<td>--</td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>CSE 4.1.9</td>
<td>INDUSTRIAL TRAINING &amp; SEMINAR*</td>
<td>-</td>
<td>100</td>
<td>2</td>
</tr>
</tbody>
</table>

**ELECTIVE-III:**

1. EMBEDDED SYSTEMS
2. NEURAL NETWORKS & FUZZY LOGIC
3. RANDOM PROCESSES IN ENGINEERING.

* The industrial training will be for three weeks during the summer after third year second semester and assessment will be done in the 4\textsuperscript{th} year first semester with a seminar on the training he/she got.
1. Software Engineering:
   Software related problems, software engineering, concepts, development activities
2. Modeling: Modeling with UML
3. Project Communications:
   Project communication, modes, mechanisms, and activities
4. Requirements:
   Requirements elicitation, concepts, activities, and managing requirements elicitation
5. Analysis:
   Analysis overview, concepts, activities, and managing analysis
7. System Design:
   Design overview, concepts, activities, and managing system design
7. Object Design:
   Object design overview, concepts, activities, and managing object design
8. Rationale Management:
   Rationale overview, concepts, activities, and managing rationale
8. Testing:
   Testing overview, concepts, activities, and managing testing
10. Software Configuration Management:
    Configuration management overview, concepts, activities, and managing configuration management
11. Project Management:
    Project management overview, concepts, activities, and managing project management models and activities.

Textbook:
Object-Oriented Software Engineering: Conquering Complex and Changing Systems Bernd Bruegge and Allen H. Dutoit, Pearson Education Asia

Reference Book:
Object-Oriented Software Engineering: Practical software development using UML and Java Timothy C. Lethbridge and Robert Laganiere, McGraw-Hill Higher Education
Asynchronous Transfer Mode: Protocol Architecture, ATM Logical Connections, ATM Cells, ATM Service Categories, Routing in Switched Networks
Congestion Control in Switched Data Networks: Effect of Congestion, Congestion Control, Traffic management, Congestion Control in Packet-Switched networks, Principles of Cellular Networks
Local Area Network Overview: Background, Topologies and Transmission Media, LAN Protocol Architecture, Bridges, Layer 2 and Layer 3 Switches
High Speed LANs: The Emergence of High Speed LANs, Ethernet
Wireless LANs: Overview, Wireless LAN Technology, IEEE 802.11 Architecture and Services
Internet Protocols: Basic Protocol Functions, Principles of Internetworking, Connectionless Internetworking, Internet Protocol
Distributed Applications: Electronic Mail: SMTP, HTTP Overview, Network Management Systems, SNMPv1


Reference Books:
CSE 4.1.3 ARTIFICIAL INTELLIGENCE Credits: 4

Instruction: 3 Periods & 1 Tut/Week
Univ.-Exam: 3 Hours
Sessional Marks: 30
Univ. Exam Marks: 70

Introduction to Artificial Intelligence, Artificial Intelligence Technique, Representation of a problem as State Space Search, Production Systems, Problem Characteristics, Production System Characteristics

Heuristic Search Technologies
Generate & Test Hill Climbing, Best First Search, Problem Reduction, Constraint Satisfaction, Means End Analysis

Predicate Logic
Proof with Backward Chaining, Resolution, question answering.

Representing Knowledge Using Rules:
Procedural Vs Declarative Knowledge, Logic Programming, Forward vs Backward Reasoning, Matching, Control Knowledge

Symbolic Reasoning with Uncertainty
Non-monotonic Reasoning, Dependency-Directed Backtracking TMS.
Statistical Reasoning with Bayes Theorem, certainty Factors & Rule Based System, DS-Theory.

Weak & Strong Slot Filler Structures
Semantic nets, Frames, Conceptual Dependencies, Scripts

Planning
Block world, Component of a Planning System, Goal State Planning, Non Linear Planning, Hierarchical Planning.

Natural Language Processing
Syntactic Analysis, Semantic Analysis, Discuss and Pragmatic Processing.

Expert Systems
Representing and Using Domain Knowledge, Expert System Shells, Explanation

TextBooks:
2. Introduction to Artificial Intelligence & Expert Systems, Paterson. PHI

2. **Conditions of different Market Structures** - Perfect Competition, Monopolistic Competition, Monopoly, Oligopoly and Duopoly.

3. **Forms of Business Management** - Sole Proprietorship, Partnership, Joint Stock Company- Private limited and public limited companies, Public enterprises and their types.


5. **Production Management**- Production Planning and Control, Plant Location, Break-Even Analysis, assumptions and applications.


7. **Entrepreneurship**- Entrepreneurial Functions, Entrepreneurial Development: Objectives, Training, Benefits; Phases of Installing a Project.

**Text Books:**

**References:**
CSE 4.1.5  ELECTIVE-III(1) EMBEDDED SYSTEMS  Credits:4

Instruction:3 Periods&1Tut/Week  SessionalMarks:30
Univ.-Exam:3Hours  Univ. Exam. Marks:70

Introduction to embedded systems hardware needs; typical and advanced, timing diagrams, memories (RAM, ROM, EPROM), Tristate devices, Buses, DMA, UART and PLD’s. Built-ins on the microprocessor.

Interrupts basics, ISR; Context saving, shared data problem. Atomic and critical section, Interrupt latency. Survey of software architectures, Round Robin, Function queues scheduling architecture, Use of real time operating system.

RTOS, Tasks, Scheduler, Shared data reentrancy, priority inversion, Mutex binary semaphore and counting semaphore.

Inter task communication, message queue, mailboxes and pipes, timer functions, events. Interrupt routines in anRTOS environment.

Embedded system software design using anRTOS. Hard real time and soft real time system principles, Task division, need of interrupt routines, shared data.

Embedded Software development tools, Host and target systems, cross compilers, linkers, locators for embedded systems. Getting embedded software into the target system.

Debugging techniques. Testing on host machine, Instruction set emulators, logic analysers. In-circuit emulators and monitors.

Text Books:
2. Sriram V Iyer and Pankaj Gupta, Embedded Real Time Systems programming, TMH, 2004

Reference Books:
CSE 4.1.5  ELECTIVE-III (2) NEUTRAL NETWORKS & FUZZY LOGIC  Credits:4

Instruction:3Periods & 1Tut/Week  SessionalMarks:30
Univ.Exam:3Hours  Univ. Exam-Marks:70

1. Neural Networks and Fuzzy Systems

2. Neural Dynamics I: Activations and Signals
   Neurons as Functions, Signal Monotonicity, Biological Activations and Signals, Neuron Fields, Neuronal Dynamical Systems, Common Signal Functions, Pulse-Coded Signal Functions.

3. Neuronal Dynamics II: Activation Models


5. Synaptic Dynamics II: Supervised Learning
   Supervised Function Estimation, Supervised Learning as Operant Conditioning, Supervised Learning as Stochastic Pattern Learning with known Class Memberships, Supervised Learning as stochastic Approximation, The Back propagation Algorithm.

6. Fuzziness versus Probability

7. Fuzzy Associative Memories
   Fuzzy Systems as Between-Cube Mappings, Fuzzy and Neural Function Estimators, Fuzzy Hebb FAMs, Adaptive FAMs: Product-Space Clustering in FAM Cells.

TEXT BOOK:
Neural Networks & Fuzzy Systems, Bark Kosko, PHI Published in 1994

REFERENCE BOOKS:
1. Fundamentals of Artificial Neural Networks, Mohamad H Hassoum. PHI
3. Fuzzy Set Theory & its Application, J. Zimmerman Allied Published Ltd.
CSE 4.1.5      ELECTIVE-III (3) RANDOMPROCESSESIN ENGINEERING      Credits:4

Instruction:3Periods&1Tut/week      SessionalMarks:30
Univ.Exam:3 Hours      Univ. Exam Marks:70

1. STOCHASTIC PROCESSES:- Notion of Stochastic Process, Classification of Stochastic Process according to Time and StateSpace; Discrete time Markov chains, nth step transition probabilities, stationary distribution of Markov chains, Poisson process, Properties of Poisson; Birth and Death Process, Time dependent Birth and Death process, Renewal theory, Applications of elementary renewal theorem and key renewal theorem.


3. QUEUEING THEORY: Non Markovian queues, Phase type Technique, Embedded Markov chains Technique, GI/G/I Queues model, Polzak. Kintchins formula, queues with bulk arrivals queues with bulk services.

4. PRIORITY QUEUEING MODELS: Queues in Series, Queues in Parallel, Scheduling algorithms, throughput analysis and waiting time distributions, Applications of Queuing theory in Communication Networks.

5. RELIABILITY ANALYSIS: Concept of Reliability, Failure Time distributions, Hazard rate functions, Reliability of a component, Bath-tub curve, System reliability, Series systems, Parallel systems, Standby redundancy, Availability, Maintainability, Fault tree constructions, Fault analysis.

REFERENCES:

2. Probability and Statistics with Reliability, Queueing & Computer Science Applications – By Kishore S. Trivedi (Prentice Hall)
HTML Common tags- List, Tables, images, forms, Frames; Cascading Style sheets;

Java Script: Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script


Java Beans: Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API, Introduction to EJB’s


JSP Application Development: Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations


TEXT BOOKS:

1. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
2. Advanced Java™ 2 Platform How to Program, Deitel/Deitel/Santry
3. Java Server Pages – Hans Bergsten, SPD O’Reilly

REFERENCE:

1. HTML Black Book: The Programmer's Complete HTML Reference Book by Steven Holzner
2. Core SERVLETS AND JAVASERVER PAGES VOLUME 2: CORE TECHNOLOGIES by Marty Hall and Larry Brown Pearson

1. Drawing various types of lines and curves.
2. Creating various type text and fonts.
3. Creating two dimensional objects using the lines and curves.
4. Animating the two dimensional pictures using transformations.
5. Coloring the pictures and Zooming.
6. Creating an object and applying animation of keyframing.
7. Creating three dimensional objects using wireframe modeling.
8. Rotation, scaling and translating the 3D objects.
9. Coloring the 3D objects.
10. Shading the 3D objects.
11. Rendering the objects.
13. Creating rugged surfaces based on fractal geometry.

Multimedia:

1. Preproduction & Presentation: Graphics: Create a 7-10 slide presentation in your favorite presentation graphics application. (Powerpoint is suggested; CorelPresentations is free and is acceptable.)
2. Typefaces and Graphics: Create 1 vector and 1 bitmap graphic; they must be your original work created in any of the acceptable tools.
4. Production Planning and Design: Create a proposal of project. Include summary, flowchart, elements and resource lists.
5. User Interface Design & Graphics II: Create a user interface for your final project. Include backgrounds and button sets. Aim for a cohesive look.
6. Multimedia Sound: Create 2 soundtracks and 2 EFX sounds for a previous project.
7. Digital Video: Use video capture to digitize your video shoot to another video source to create a short production (15-45 seconds)
8. Create three basic Web pages using Dreamweaver / Flash or other authoring packages or write bare HTML if you are able; pages must be linked and must include at least one graphic per page.

Books:

Lab: 3 Periods/week  SessionalMarks:50
Univ.-Exam: 3Hours  Univ. Exam. Marks:50

Computing Platform:
Each studentgroup choosesits own platform,subjectto approvalby the instructor
Course Objectives:
1. They can design and implement complex softwaresolutions using state of the art softwareengineeringtechniques.
2. They haveworking knowledge of UML, sourcecontrol, and projectmanagement.
3. They have deep knowledge of the technologies they used for implementing their project.
4. They know how to test and document software.
5. They are capable of working as part of a software team and developing significant projects under tight deadlines.
6. They are able to present their work in an professional manner.

Topics to be covered:
4. Object-oriented design.
5. Debugging.

Syllabus Flexibility:
High. The students are free to choose a project based on the instructor's approval.

Assessment Methods:
1. Group meetings with faculty: initial proposal, code review, tracer-bullet implementation demo, final demo.
2. Design documents. Write-up.
3. Codedocumentation.
4. Presentations.

The students give theirfinal presentations and demos.
Also, each project team meets individually with the instructor at least four times during the semester.
The agenda for each of the four meetings is as follows:

1. Team presents project idea and has it approved by the instructor. (First month)
2. Design/code review. Instructor goes over design/code with the team to point out problems and finalize requirements. Instructor determines requirements for tracer-bullet implementation. (Second month)
3. Tracer-bullet implementation demo. Team shows what has been achieved full vertical integration functionality. Instructor notices missed requirements and reminds students of requirements for final project. (Beginning of third month).

Final meeting. Verify requirements, design, documentation, testing, write-up, division of labor, etc. (Last month).

Sessional Marks Allotment:
- Monthly Meeting Participation: 10%
- Monthly Progress Reports: 15%
- Design/Code Document: 15%
- Presentation: 10%
- Prototype Demonstration: 10%
- Final Project Demonstration: 30%
- Final Project Report: 10%
**General Software Engineering Tips:**
Be careful when making major modifications and keep backups! A good motto: There is no such thing as a safe software change.
One of the biggest mistakes that even professional software teams make is modifying code at the last minute. Either resist the urge to make last-minute changes, or keep them isolated and well-marked so that they can be backed out easily if necessary.
Test, test, test!!! You must test your system thoroughly after making any change, no matter how small. Else you will not know if a bug was introduced! You will get no sympathy if you break your system at the last minute.

**Regression Testing:**
A good habit is to frequently run your program on an extensive test set.

Once you have a prototype, create a set of example tests that your program handles correctly. Generate files of the input and the correct output as a test set.

When you make significant changes, run your program on the test set. If the output is different, then you will know that you've introduced a bug. (Or if the output is improved, you should update the test set.)

Put together an extensive test set! If it alerts you to a major bug (and it always does), then it is time well spent.

After verifying that a new change is “safe”, save an version of your entire system! Never, EVER make changes to the saved version – it is a reliable version that you can recover in an emergency.

**Documentation:**
Get in the habit of documenting your code quickly as you go. If you think you’ll remember why you did something, you are probably wrong.

Computers scientists typically hate to do documentation. One reason is that they leave it all for the end!

Get in the habit of writing small comments as you go. A few comments explaining what’s happening and why can make a world of difference.

When you make a change, mark it with your initials, the date, a brief explanation, and an example. This will help enormously if the change needs to be removed or modified, and will prevent thrashing.

**Working as a Team:**
Be honest and realistic with your teammates when setting goals. If you fail to meet a promised deadline, it affects the whole team, not just you.

Communication is crucial! Don’t make major decisions by yourself, and let people know when you are behind or ahead of schedule.

Try to exploit each other’s strengths.
The industrial training will be for three weeks during the summer after third year second semester and assessment will be done in the 4\textsuperscript{th} year first semester with a seminar on the training he/she got.
<table>
<thead>
<tr>
<th>Sub. Ref. No.</th>
<th>Name of the Subject</th>
<th>Periods</th>
<th>Maximum Marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Theory</td>
<td></td>
<td></td>
</tr>
<tr>
<td>CSE 4.2.1</td>
<td>DISTRIBUTED OPERATING SYSTEMS</td>
<td>3</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.2.2</td>
<td>CRYPTOGRAPHY AND NETWORK SECURITY</td>
<td>3</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.2.3</td>
<td>ELECTIVE-IV</td>
<td>3</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>FE02</td>
<td>FREE ELECTIVE-II</td>
<td>3</td>
<td></td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>70</td>
<td>4</td>
</tr>
<tr>
<td>CSE 4.2.4</td>
<td>DATA COMMUNICATIONS &amp; NETWORK PROGRAMMING LAB</td>
<td>--</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>2</td>
</tr>
<tr>
<td>CSE 4.2.5</td>
<td>PROJECT</td>
<td>--</td>
<td>3</td>
<td>100</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>50</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>TOTAL CREDITS</td>
<td></td>
<td></td>
<td>26</td>
</tr>
</tbody>
</table>

**ELECTIVE-IV:**

[1] DATA WARE HOUSING & DATA MINING

[2] SERVICE ORIENTED ARCHITECTURE
CSE 4.2.1 DISTRIBUTED OPERATING SYSTEMS Credits:4

Instruction: 3 Periods & 1 Tut/Week
Univ. Exam: 3 Hours

Sessional Marks: 30
Univ. Exam-Marks: 70

Introduction to Distributed Systems, What is a Distributed System? Hardware concepts, Software concepts, Design issues.


Synchronization in Distributed System, Clock Synchronization, Mutual Exclusion, Election algorithms, Atomic transactions, Deadlocks in Distributed Systems.

Process and processors in Distributed System threads, System Models, Processors allocation, Scheduling in Distributed System, Fault tolerance, Real time Distributed System.


Distributed Shared Memory, Introduction, What is Shared memory? Consistency models, Page based Distributed Shared memory, Shared – variable Distributed Shared memory, Object based Distributed Shared Memory.

TEXT BOOK:
Distributed Operating Systems, Andrew S. Tanenbanm

REFERENCE BOOK:
INTRODUCTION: The need for security – principles of security – Plain Text and Cipher Text 
substitution and Transposition Techniques – Encryption and Decryption – Symmetric and Asymmetric Cryptography 
– Stenography – key range and keysize – types of attacks


PUBLIC KEY INFRASTRUCTURE: Introduction – Digital certificates – Private Key management – The PKIX model 
– PublicKey Cryptography Standards – XML, PKI and Security


PRACTICAL IMPLEMENTATIONS OF CRYPTOGRAPHY/SECURITY: Cryptographic solutions using Java-Cryptographic solutions using Microsoft – cryptographic toolkits – security and operating systems


TEXT BOOK:

REFERENCE BOOKS:
3) Network Security: The Complete Reference by Roberta Bragg, Mark Phodes-Ousley, Keith Strassberg 
Tata McGraw-Hill
1. **Introduction to Data Mining:**
   Motivation and importance, What is Data Mining, Relational Databases, Data Warehouses, Transactional Databases, Advanced Database Systems and Advanced Database Applications, Data Mining Functionalities, Interestingness of a pattern Classification of Data Mining Systems, Major issues in Data Mining.

2. **Data Warehouse and OLAP Technology for Data Mining**
   What is a Data Warehouse? Multi-Dimensional Data Model, Data Warehouse Architecture, Data Warehouse Implementation, Development of DataCube Technology, Data Warehousing to Data Mining

3. **Data Preprocessing**
   Why Pre-process the Data? Data Cleaning, Data Integration and Transformation, Data Reduction, Discretization and Concept Hierarchy Generation

4. **Data Mining Primitives, Languages and system Architectures, Data Mining Primitives:**
   What defines a Data Mining Task? A Data Mining query language, Designing Graphical Use Interfaces Based on a Data Mining query language, Architectures of Data Mining Systems

5. **Concept Description:**
   Characterization and comparison, what is Concept Description? Data Generalization and summarization-based Characterization, Analytical Characterization: Analysis of Attribute Relevance, Mining Class Comparisons: Discriminating between different Classes, Mining Descriptive Statistical Measures in large Databases

6. **Mining Association rule in large Databases, Association Rule Mining,** Mining Single Dimensional Boolean Association Rules from Transactional Databases, Mining Multilevel Association Rules from Transaction Databases, Mining Multidimensional Association Rules from Relational Databases and Data Warehouses, From Association Mining to Correlation Analysis, Constraint-Based Association Mining

7. **Classification and prediction, Concepts and Issues regarding Classification and Prediction,** Classification by Decision Tree Induction, Bayesian Classification, Classification by Back-propagation, Classification Based on Concepts from Association Rule Mining, Other Classification Methods like k-Nearest Neighbor Classifiers, Case-Based Reasoning, Generic Algorithms, Rough Set Approach, Fuzzy Set Approaches, Prediction, Classifier Accuracy

8. **Cluster Analysis:**
   What is Cluster Analysis? Types of Data in Cluster Analysis, ACategorization of Major Clustering Methods

**Text Book:**
Data Mining Concepts and Techniques, Jiawei Han and Micheline Kamber, Morgan Kaufman Publications

**Reference Books:**
1. Introduction to Data Mining, Adriaan, Addison Wesley Publication
2. Data Mining Techniques, A.K. Pujari, University Press
1. **INTRODUCTION TO SOA**

   **EVOLUTION OF SOA:** Fundamental SOA; Common Characteristics of contemporary SOA; Benefits of SOA; A SOA timeline (from XML to Web Services to SOA); The continuing evolution of SOA (Standards organizations and Contributing vendors); The roots of SOA (comparing SOA to Past architectures).

2. **PRINCIPLES OF SERVICE – ORIENTATION**

   Services-orientation and the enterprise; Anatomy of a service-oriented architecture; Common Principles of Service-orientation; Service orientation and Object-orientation; Service layer abstraction; Business service layer; Orchestration service layer;

3. **WEB SERVICES AND SOA:** The Web services framework; Services (as WebServices); Service Registry; Service descriptions (with WSDL); Messaging (with SOAP), Transactions, Coordination, Business Activity, Orchestration, Choreography; Addressing, Reliable Messaging, Policies, Metadata, Security, Notification and Events; Semantic Web Services; RESTful Services;

4. **BUSINESS PROCESS DESIGN:** Business Process Management basics; WS-BPEL language basics; WS-Coordination overview; Service oriented business process design; WS-addressing language basics; WS-Reliable Messaging language basics; Service Component Architecture basics;

5. **ENTERPRISE PLATFORMS AND SOA:** SOA platform basics; Enterprise Service Bus basics (including basic and complex patterns); SOA support in J2EE; SOA support in .NET; SOA Reference Architecture;

**Text Books:**


**References:**

**SUGGESTED READING:** *IT Architecture and Middleware, Strategies for Building Large Integrated Systems*, Chris Britton, ISBN 0-201-70907-4
Introduction to internet - Internet history, IP address, DNS, e-mail.

**HTML Common tags** - List, Tables, images, forms, Frames; Cascading Style sheets;

**Java Script** - Introduction to Java Scripts, Objects in Java Script, Dynamic HTML with Java Script

**XML** - Document type definition, XML Schemas, Document Object model, Presenting XML, Using XML Processors: DOM and SAX

**Java Beans** - Introduction to Java Beans, Advantages of Java Beans, BDK, Introspection, Using Bound properties, Bean Info Interface, Constrained properties Persistence, Customizes, Java Beans API, Introduction to EJB’s


**JSP Application Development** - Generating Dynamic Content, Using Scripting Elements Implicit JSP Objects, Conditional Processing – Displaying Values Using an Expression to Set an Attribute, Declaring Variables and Methods Error Handling and Debugging Sharing Data Between JSP pages, Requests, and Users Passing Control and Date between Pages – Sharing Session and Application Data – Memory Usage Considerations


**TEXT BOOKS:**

1. Internet and World Wide Web – How to program by Dietel and Nieto PHI/Pearson Education Asia.
2. Advanced Java™ 2 Platform How to Program, Deitel/Deitel/Santry
3. Java Server Pages – Hans Bergsten, SPD O’Reilly

**REFERENCE:**

1. HTML Black Book: The Programmer's Complete HTML Reference Book-by Steven Holzner
2. Core SERVLETS AND JAVA SERVER PAGES VOLUME 2: CORE TECHNOLOGIES by Marty Hall and Larry Brown Pearson
FIRST CYCLE OF EXPERIMENTS

1.1 PC-to-PC COMMUNICATIONS UNDER DOS WITH NULLMODEM
   a) Using SerialPorts and RS-232 C Cable Connection b) Using ParallelPorts and Parallel Cable Connection

1.2 PC-to-PC COMMUNICATIONS UNDER DOS WITH MODEM and 4-LINE EXCHANGE Using Communication Software: COMITorXTALK

1.3 PC-to-PC COMMUNICATIONS UNDER WIN98's DIRECT CABLE CONNECTION with NULL MODEM
   a) Using SerialPorts and RS-232 C Cable Connection b) Using ParallelPorts and Parallel Cable Connection

1.4 PC-to-PC COMMUNICATIONS UNDER WIN98’s DIAL-UP NETWORKING WITH MODEM and 4-LINE EXCHANGE

1.5 PC – to-PC COMMUNICATIONS UNDER WIN98’s HYPER TERMINAL WITH MODEM and 4-LINE EXCHANGE

1.6 a) LAN WITH BUSTOPOLOGY with a minimum of two systems
   i) Windows Peer-to-Peer Network ii) Windows NT Client-Server Network
   b) LAN WITH STARTOPOLOGY with a minimum of two systems

1.7 a) LAN WITH BUSTOPOLOGY with a minimum of two systems using NOVELL Netware
   b) LAN WITH STARTOPOLOGY with a minimum of two systems using NOVELL Netware

SECOND CYCLE OF EXPERIMENTS

2.1 INTERNET CONNECTION SET-UP USING DIAL-UP NETWORKING

2.2 TERMINAL NETWORK WITH UNIX/Linux Server and one or two Terminals

2.3 TERMINAL NETWORK WITH UNIX/Linux Server, Terminal Server, and one or two terminals

2.4 NETWORK PROGRAMMING EXERCISE-I USING A SIMPLIFIED API
   Echo software Develop echo client and echo server programs and run both programs on separate computers and verify that they can communicate Chat software (Develop client and chat server programs and test to ensure they can communicate). Build a simple file transferservicethat consists of client and server

2.5 NETWORK PROGRAMMING EXERCISE-II USING THE SOCKET API
   Write an echo client and server using sockets Build a web server using sockets

2.6 CONCURRENT NETWORK PROGRAMMING EXERCISE – III
   Build a Concurrent server (threads) – Create a server capable of handling connections from multiple clients concurrently Build a Concurrent file transferserver (processes) – Create separate processes to allow a server to handle multiple clients concurrently

2.7 NETWORK PROGRAMMING EXERCISE – IV USING PROTOCOL DESIGN
   Design a reliable data transfer protocol (Devise, implement and test a protocol that provides reliable data transfer across an network that drops, delays or corrupts packets) Design stop and wait flow control protocol Design a sliding window protocol

2.7.1 NETWORK PROGRAMMING EXERCISE – V WITH PROTOCOLS FROM TCP/IP SUITE
   Build a domain names system client program
GUIDELINES for preparing the report of the Project Work

FORMAT FOR PREPARATION OF PROJECT REPORT
FOR
B. TECH (CSE)

1. ARRANGEMENT OF CONTENTS:
The sequence in which the project report material should be arranged and bound should be as follows:
1. Cover Page & Title Page
2. Bonafide Certificate
3. Abstract
4. Table of Contents
5. List of Tables
6. List of Figures
7. List of Symbols, Abbreviations and Nomenclature
8. Chapters
9. Appendices
10. References

The table and figures shall be introduced in the appropriate places.

2. PAGE DIMENSION AND BINDING SPECIFICATIONS:
The dimension of the project report should be in A4 size. The project report should be bound using flexible cover of the thick white art paper. The cover should be printed in black letters and the text for printing should be identical.

3. PREPARATION FORMAT:

3.1 Cover Page & Title Page – A specimen copy of the Cover page & Title page of the project report are given in Appendix 1.

3.2 Bonafide Certificate – The Bonafide Certificates shall be indoublelinespacing using Font Style Times New Roman and Font Size 14, as per the format in Appendix 2.

The certificate shall carry the supervisor’s signature and shall be followed by the supervisor’s name, academic designation (not any other responsibilities of administrative nature), Department and full address of the institution where the supervisor has guided the student. The term 'SUPERVISOR' must be typed in capital letters between the supervisor’s name and academic designation.
3.3 **Abstract** – Abstract should be one page synopsis of the project report typed double line spacing, Font Style Times New Roman and Font Size 14.

3.4 **Table of Contents** – The table of contents should list all material following it as well as any material which precedes it. The title page and Bonafide Certificate will not find a place among the items listed in the Table of Contents but the page numbers of which are in lower case Roman letters. One and a half spacing should be adopted for typing the matter under this head. A specimen copy of the Table of Contents of the project report is given in Appendix 3.

3.5 **List of Tables** – The list should use exactly the same captions as they appear above the tables in the text. One and a half spacings should be adopted for typing the matter under this head.

3.6 **List of Figures** – The list should use exactly the same captions as they appear below the figures in the text. One and a half spacings should be adopted for typing the matter under this head.

3.7 **List of Symbols, Abbreviations and Nomenclature** – One and a half spacing should be adopted for typing the matter under this head. Standards, symbols, abbreviations etc. should be used.

3.8 **Chapters** – The chapters may be broadly divided into 3 parts (i) Introductory chapter, (ii) Chapters developing the main theme of the project work (iii) and Conclusion.

The main text will be divided into several chapters and each chapter may be further divided into several divisions and sub-divisions.

- Each chapter should be given an appropriate title.
- Tables and figures in a chapter should be placed in the immediate vicinity of the reference where they are cited.
- Footnotes should be used sparingly. They should be typed single space and placed directly underneath in the very same page, which refers to the material they annotate.

3.9 **Appendices** – Appendices are provided to give supplementary information, which is included in the main text may serve as a distraction and cloud the central theme.

- Appendices should be numbered using Arabic numerals, e.g. Appendix 1, Appendix 2, etc.
- Appendices, Tables and References appearing in appendices should be numbered and referred to at appropriate places just as in the case of chapters.
- Appendices shall carry the title of the work reported and the same title shall be made in the contents page also.

3.10 **List of References** – The listing of references should be typed in single spacing left – justified. The reference material should be listed in the alphabetical order of the first author. The name of the author/authors should be immediately followed by the year and other details.

A typical illustrative list given below relates to the citation example quoted above.

**REFERENCES**

3.10.1 **Table and figures** - By the word Table, is meant tabulated numerical data in the body of the project report as well as in the appendices. All other non-verbal materials used in the body of the project work and appendices such as charts, graphs, maps, photographs and diagrams may be designated as figures.

4. **Typing Instructions:**

The impression on the typed copies should be black in colour. One and a half spacings should be used for typing the general text. The general text shall be typed in the Font style ‘Times New Roman’ and Font size 14.

****
TITLE OF PROJECT REPORT

A PROJECT REPORT

Submitted by

NAME OF THE CANDIDATE(S)

in partial fulfillment for the award of the degree

of

BACHELOR OF TECHNOLOGY

IN

COMPUTER SCIENCE AND ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND SYSTEMS ENGINEERING

ANDHRA UNIVERSITY AUTONOMOUS COLLEGE OF ENGINEERING

ANDHRA UNIVERSITY: VISAKHAPATNAM - 530003

MONTH & YEAR
SPECIMEN

SOME PERFORMANCE ASPECTS CONSIDERATIONS OF A CLASS OF ARTIFICIAL NEURAL NETWORK

A PROJECT REPORT

Submitted by

SANDHY. A GAYATHRI R

in partial fulfillment for the award of the degree

of

BACHELOR OF TECHNOLOGY

in

COMPUTER SCIENCE AND ENGINEERING

DEPARTMENT OF COMPUTER SCIENCE AND SYSTEMS ENGINEERING
ANDHRA UNIVERSITY AUTONOMOUS COLLEGE OF ENGINEERING
ANDHRA UNIVERSITY:: VISAKHAPATNAM-530 003

MAY 2005
(A typical specimen of Bonafide Certificate)

ANDHRA UNIVERSITY: VISAKHAPATNAM-530 003

BONAFIDE CERTIFICATE

Certified that this project report “…………TITLE OF THE PROJECT…………”

isthebonafideworkof“…………NAMEOF THECANDIDATE(S)…………” who carried out the project work

under my supervision.

<<Signature of the Head of the Department>>  <<Signature of the Supervisor>>

SIGNATURE  SIGNATURE

<<Name>>  <<Name>>

HEAD OF THE DEPARTMENT  SUPERVISOR

<<Academic Designation>>

<<Department>>  <<Department>>

<<Full address of the Dept & College >>  <<Full address of the Dept & College >>
(A typical specimen of table of contents)

<Font Style Times New Roman>

TABLE OF CONTENTS

<table>
<thead>
<tr>
<th>CHAPTER NO.</th>
<th>TITLE</th>
<th>PAGE NO.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>ABSTRACT</td>
<td>iii</td>
</tr>
<tr>
<td></td>
<td>LIST OF TABLE</td>
<td>xvi</td>
</tr>
<tr>
<td></td>
<td>LIST OF FIGURES</td>
<td>xviii</td>
</tr>
<tr>
<td></td>
<td>LIST OF SYMBOLS</td>
<td>xxvii</td>
</tr>
</tbody>
</table>

1. INTRODUCTION

| 1.1  | GENERAL         | 1 |
| 1.2  |                 | 2 |
| 1.2.1| General         | 5 |
| 1.2.2|                 | 12|
| 1.2.2.1| General    | 19|
| 1.2.2.2|           | 25|
| 1.2.2.3|           | 29|
| 1.3  |                 | 30|
| 1.4  |                 | 45|
| 1.4  |                 | 58|

2. LITERATURE REVIEW

| 2.1  | GENERAL         | 75|
| 2.2  |                 | 99|
| 2.2  |                 | 100|