NATIONAL ENGINEERING COLLEGE, K.R.NAGAR, KOVILPATTI
(An Autonomous Institution, Affiliated to Anna University, Chennai)

COLLEGE VISION

• Transforming lives through quality Education and research with human values

COLLEGE MISSION

• To maintain excellent infrastructure and highly qualified and dedicated faculty

• To provide a conducive learning environment with an ambience of humanity, wisdom, creativity and team spirit

• To promote the values of ethical behavior and commitment to the society

• To partner with academic, industrial and government entities to attain collaborative research
VISION

• To produce highly competent and value based IT professionals

MISSION

• Updating curriculum with innovative components in Teaching - Learning process.

• Conducting student centric programme to enhance communication, team spirit, leadership skills and self learning.

• Motivating the students to realize the need of ethics and human values.

• Developing a conducive environment for collaborative research.

Program Educational Objectives (PEO)

Programme educational objectives are broad statements that describe the career and professional accomplishments that the program is preparing graduates to achieve.

1. Incorporate the basic principles and practices of computing to shine in IT field and/or in higher education

2. Maintain professionalism, effective communication skills, team spirit, learning attitude and adapt to emerging technologies
Program Outcomes (PO)

At the time of graduation graduates of our IT programme are expected to have

1. An ability to apply knowledge of mathematics, science and computing fundamentals to information technology.
2. An ability to analyze a problem, identify and define the computing and technology requirements appropriate to its solution.
3. An ability to design, develop and evaluate a computer-based system, process, component, or program to meet desired needs.
4. An ability to use research based knowledge to analyze and interpret data to provide valid conclusions.
5. An ability to use the techniques, skills and modern software engineering tools necessary for IT practice.
6. An understanding of professional, ethical, legal, security, social issues and responsibilities
7. An ability to understand the impact of engineering solutions in a global, economic, environmental and societal context.
8. An ability to apply ethical principles and commit to professional ethics and responsibilities.
9. An ability to work independently and cooperatively to deliver reports, programs, projects, and other deliverables.
10. An ability to communicate effectively with a range of audiences using various modalities including written, oral and graphical.
11. An ability to apply the engineering and management principles to manage projects as a member and a leader in a team.
12. An ability to acquire new knowledge in the computing discipline and to engage in life-long learning
## REGULATIONS 2013 – CURRICULUM AND SYLLABI

### B.Tech. – INFORMATION TECHNOLOGY

#### SEMESTER - I (Common to all B.E. / B.Tech., Degree Programmes)

<table>
<thead>
<tr>
<th>S. NO.</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>SH100</td>
<td>Technical English – I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>SH101</td>
<td>Matrices and Differential Calculus</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>SH102</td>
<td>Applied Physics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>SH103</td>
<td>Engineering Chemistry</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>SH104</td>
<td>Fundamentals of Computing and Programming in C</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>SH105</td>
<td>Engineering Graphics</td>
<td>2</td>
<td>3</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>SH106</td>
<td>C Programming Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>SH107</td>
<td>Physics and Chemistry Laboratory – I</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part A – Physics Laboratory – I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part B – Chemistry Laboratory – I</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>9.</td>
<td>SH108</td>
<td>Engineering Practices Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part A – Mechanical and Civil Engineering Practices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>Part B – Electrical and Electronics Engineering Practices</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

**Total Number of Credits:** 27
### SEMESTER – II

<table>
<thead>
<tr>
<th>S.NO.</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>13G20</td>
<td>Technical English – II <em>(Common to all)</em></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13G21</td>
<td>Integral Calculus and Transforms <em>(Common to all)</em></td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>13G22</td>
<td>Solid State Physics <em>(Common to ECE, CSE, EEE, EIE, and IT)</em></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13G23</td>
<td>Chemistry of Electrical and Electronic Materials <em>(Common to ECE, CSE, EEE, EIE and IT)</em></td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>13G24</td>
<td>Electric Circuits and Electron Devices <em>(Common to CSE and IT)</em></td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>13G25</td>
<td>Basic Civil and Mechanical Engineering <em>(Common to ECE, CSE, EEE, EIE and IT)</em></td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>13G26</td>
<td>Computer Programming Laboratory <em>(Common to all)</em></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
</tbody>
</table>
| 8. | 13G27 | Physics and Chemistry Laboratory – II *(Common to all)*  
Part A – Physics Laboratory – II  
Part B – Chemistry Laboratory – II | 0 | 0 | 3 | 2 |
| 9. | 13G28 | Electronic Devices and Circuits Laboratory *(Common to CSE and IT)* | 0 | 0 | 3 | 2 |
| 10. | 13G29 | English Language Skill Laboratory *(Common to all)* | 0 | 0 | 3 | 2 |

**Total Number of Credits:** 29
### SEMESTER – III

<table>
<thead>
<tr>
<th>S. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>13IT31</td>
<td>Fourier Transforms and Complex Analysis</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>13IT32</td>
<td>Environmental Science and Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>13IT33</td>
<td>Data Structures</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>4</td>
<td>13IT34</td>
<td>Object Oriented Programming using C++</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>13IT35</td>
<td>Digital System Design</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>13IT36</td>
<td>Analog and Digital Communication</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Practical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>13IT37</td>
<td>Data Structures Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>13IT38</td>
<td>Object Oriented Programming using C++ Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>18</strong></td>
<td><strong>4</strong></td>
<td><strong>6</strong></td>
<td><strong>26</strong></td>
</tr>
</tbody>
</table>

Total Number of Credits : 26

### SEMESTER – IV

<table>
<thead>
<tr>
<th>S. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Theory</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>13IT41</td>
<td>Probability and Queueing Theory</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2</td>
<td>13IT42</td>
<td>Algorithm Analysis and Design</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>3</td>
<td>13IT43</td>
<td>Computer Architecture</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>13IT44</td>
<td>C# and .NET Framework</td>
<td>3</td>
<td>0</td>
<td>2</td>
<td>4</td>
</tr>
<tr>
<td>5</td>
<td>13IT45</td>
<td>Relational Database Management Systems</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6</td>
<td>13IT46</td>
<td>Microprocessors and Interfacing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td><strong>Practical</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>13IT47</td>
<td>Relational Database Management Systems Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8</td>
<td>13IT48</td>
<td>Microprocessors Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9</td>
<td>13IT49</td>
<td>Communication Skills and Technical Seminar</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td><strong>18</strong></td>
<td><strong>2</strong></td>
<td><strong>13</strong></td>
<td><strong>28</strong></td>
</tr>
</tbody>
</table>

Total Number of Credits : 28
### SEMESTER – V

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>13IT51</td>
<td>System Programming and Operating Systems</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>13IT52</td>
<td>Computer Networks</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>13IT53</td>
<td>Software Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13IT54</td>
<td>Java Programming</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>13IT55</td>
<td>Professional Ethics and Human Values (Common to All)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>E1</td>
<td>Elective – I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>13IT57</td>
<td>Networking Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>13IT58</td>
<td>Java Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>3</td>
<td>6</td>
<td>25</td>
</tr>
</tbody>
</table>

### SEMESTER – VI

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>13IT61</td>
<td>Fundamentals of Wireless Communication</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13IT62</td>
<td>Internet and Web Technology (Common to CSE, ECE and IT)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13IT63</td>
<td>Principles of Digital Signal Processing</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>13IT64</td>
<td>Compiler Design</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>E2</td>
<td>Elective – II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>13IT67</td>
<td>Internet and Web Technology Laboratory (Common to CSE and IT)</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>7.</td>
<td>13IT68</td>
<td>CASE Tools Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>E3</td>
<td>Elective Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>13IT69</td>
<td>Comprehension</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>15</td>
<td>2</td>
<td>12</td>
<td>24</td>
</tr>
</tbody>
</table>
## CORE ELECTIVES

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>13ITAA</td>
<td>TCP/IP Design and Implementation</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13ITAB</td>
<td>Network programming and Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13ITAC</td>
<td>Distributed Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13ITAD</td>
<td>Next Generation Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>13ITAE</td>
<td>High Speed Networks (Common to ECE, CSE and IT)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>13ITAF</td>
<td>Cyber Forensics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>13ITAG</td>
<td>Game Programming</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

### SOFTWARE DEVELOPMENT AND TESTING

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>13ITBA</td>
<td>Advanced Java</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13ITBB</td>
<td>Service Oriented Architecture (Common to IT and CSE)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13ITBC</td>
<td>Mobility Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13ITBD</td>
<td>Software Testing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>13ITBE</td>
<td>Software Quality Assurance</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

### COMPUTING TECHNOLOGIES

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>13ITCA</td>
<td>Cloud Computing (Common to IT, ECE, CSE and EEE)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13ITCB</td>
<td>Green Computing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13ITCC</td>
<td>Analytic Computing (Common to IT, ECE and CSE)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13ITCD</td>
<td>Social Computing (Common to IT, ECE and CSE)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>13ITCE</td>
<td>Parallel Computing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

### DATA MANAGEMENT AND ANALYTICS

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>13ITDA</td>
<td>Advanced Database Technology (Common to CSE and IT)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13ITDB</td>
<td>Data Warehousing and Data Mining</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13ITDC</td>
<td>Information Storage and Management</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13ITDD</td>
<td>Information Theory and Coding</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

### ELECTIVE LAB

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>13ITEB</td>
<td>Mobility with Android Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>2.</td>
<td>13ITEC</td>
<td>Software Testing Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>
## INTERDISCIPLINARY SUBJECTS
(Maximum of 2 Electives to be opted)

<table>
<thead>
<tr>
<th></th>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13ITFA</td>
<td>Total Quality Management</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>13ITFB</td>
<td>Intellectual Property Rights</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>13ITFC</td>
<td>Business Intelligence and its Applications</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Common to CSE, ECE, IT)</td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>13ITFD</td>
<td>Knowledge Management</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>13ITFE</td>
<td>M-Commerce</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>(Common to CSE and IT)</td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>13ITFF</td>
<td>Natural Language Processing</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>13ITFG</td>
<td>Embedded Systems</td>
<td>3</td>
</tr>
</tbody>
</table>

## TRANS DISCIPLINARY SUBJECTS (Self Study)
(Maximum of 1 Elective to be opted)

<table>
<thead>
<tr>
<th></th>
<th>Code</th>
<th>Title</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13ITGA</td>
<td>Challenges in 2030: Global Uncertainty</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>13ITGB</td>
<td>Indian Culture and Heritage</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>13ITGC</td>
<td>Indian History</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>13ITGD</td>
<td>Sustainable Development and Practices</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>13ITGE</td>
<td>Leadership Skills</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>13ITGF</td>
<td>Psychology</td>
<td>3</td>
</tr>
</tbody>
</table>
SH100  TECHNICAL ENGLISH – I  
(Common to all B.E. / B.Tech., Degree Programmes)  

COURSE OUTCOMES

The Student will
• apply basic grammar in Writing and Speaking.
• prepare formal Letter Writings.
• come out with proper pronunciation.
• speak confidently in interactions.
• develop interest to read any article.

UNIT I

Language Focus: Technical Vocabulary, Word Formation, Concord, Tense (Present).
Writing: Leave Application Letter, Paragraph writing.
Listening: Listening to correct pronunciation of words.

UNIT II

Language Focus: Words often misspelled, Articles, Tense (Past)
Writing: Permission letters (In-plant training/Seminar/Workshop), Chart description.
Listening: Listening to the Sentences with correct stress and Intonation.
Speaking: Situational Conversations.

UNIT III

Language Focus: Compound nouns, Tense (Future), Preposition, Comparative Adjectives.
Listening: Listening to the conversations.
Speaking: One minute speech.

UNIT IV

Language Focus: Modal verbs, Gerund, Infinitives, Voice.
Writing: Writing Instructions, Letters to Editor.
Listening: Listening to the different Tonal Expressions.
Speaking: Giving Opinions.

UNIT V

Language Focus: ‘If’ Conditionals, ‘Wh’ questions, Question Tags.
Writing: Reading and Note - taking
Speaking: Group Discussion.
Reading: ERC, one word questions from the suggested book.

SUGGESTED ACTIVITIES

2. Exercises on gap filling and correction of errors on Concord (Subject – Verb Agreement).
3. Gap filling exercises using the appropriate Tense forms.
4. Exercises on transferring information from Graph to Text – Bar charts, Flow charts.
5. Making sentences using Modal verbs to express probability, compulsion, etc.
6. Exercises on Writing Instructions.
7. Exercises on framing Questions.
8. Other relevant classroom activities.

L: 45  T: 15  TOTAL: 60 PERIODS
BOOK SUGGESTED FOR READING

REFERENCES
SH101 MATRICES AND DIFFERENTIAL CALCULUS
(Common to all B.E. / B.Tech., Degree Programmes)

COURSE OUTCOMES
• Ability to find inverse and integral powers of matrices and to perform transformations of matrices.
• Ability to find the evolutes of various curves.
• Ability to solve ordinary and partial differential equations.
• Ability to obtain constrained maxima and minima.

UNIT I MATRICES 12
Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties (excluding proofs); Cayley – Hamilton theorem (excluding proof) – Inverse and integral powers of a matrix using Cayley – Hamilton theorem; Diagonalisation of a matrix by orthogonal transformation; Quadratic form – Reduction of quadratic form to canonical form by orthogonal transformation.

UNIT II DIFFERENTIAL CALCULUS 12
Curvature in cartesian, parametric and polar forms; Centre, radius and circle of curvature; Evolutes.

UNIT III FUNCTIONS OF SEVERAL VARIABLES 12
Partial derivatives; Total derivatives; Differentiation of implicit functions; Jacobians; Maxima and Minima - Method of Lagrangian multipliers.

UNIT IV ORDINARY DIFFERENTIAL EQUATIONS 12
Higher order linear differential equations with constant coefficients; Method of variation of parameters; Cauchy’s and Legendre’s linear equations; Simultaneous first order linear equations with constant coefficients.

UNIT V PARTIAL DIFFERENTIAL EQUATIONS 12
Formation of partial differential equations; Lagrange’s linear equations; Solutions of standard types of first order partial differential equations; Linear partial differential equations of second and higher order with constant coefficients.

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
SH102  APPLIED PHYSICS
(Common to all B.E. / B.Tech., Degree Programmes)

COURSE OUTCOMES
The students will be able to

- gain knowledge on the properties of matter and hydrodynamics.
- study and apply the ultrasonic methods for industrial and medical field.
- understand Lasers and to identify the appropriate Laser technique for industrial and medical field.
- understand the different types, fabrication, losses of optical fibers and the applications of fiber optics in communication and instrumentation.
- understand the physical properties of photons and electrons and to study the different Electron Microscopes.

UNIT I PROPERTIES OF MATTER AND HYDRODYNAMICS 9
Properties of Matter
Stress, Strain, Hooke’s law; Types of moduli of elasticity; Torsional pendulum – Determination of Rigidity modulus of a wire; Bending of beams – Expression for bending moment – Measurement of Young’s modulus by uniform and Non-uniform bending – I Shaped girders.

Hydrodynamics
Stream line flow, Turbulent flow, Poiseuille’s formula for flow of liquid through a capillary tube, Determination of coefficient of viscosity of a liquid.

UNIT II ULTRASONICS 9

UNIT III LASERS 9
Principle of spontaneous emission and stimulated emission, Population inversion, Pumping, Einstein’s A and B coefficients – derivation; Types of Lasers - CO₂ Laser, Nd-YAG Laser, Semiconductor Laser (Homojunction); Determination of wavelength of Laser using grating and Particle size; Applications of Lasers: Industrial applications – Welding, Cutting and Heat treatment; Medical applications; Holography (construction and reconstruction).

UNIT IV FIBER OPTICS AND ITS APPLICATIONS 9
Principle and propagation of light in optical fibers; Numerical aperture and Acceptance angle; Types of optical fibers – material, refractive index and mode; Double crucible technique of fiber drawing; Splicing – fusion splicing; Loss in optical fiber – attenuation, dispersion and bending; Fiber optical communication system (Block diagram); Advantages and Applications of optical fiber; Fiber optic sensors – temperature and displacement; Endoscope.

UNIT V QUANTUM PHYSICS AND MICROSCOPY 9
Black body radiation – Planck’s theory (derivation) – Deduction of Wien’s displacement law and Rayleigh Jean’s Law from Planck’s theory; Photoelectric effect – Law of Photoelectric effect – Photoelectric equation; Matter Waves – De Broglie wavelength - Schrodinger’s wave equation – time independent and time dependent equations – Particle in one dimensional box; Heisenberg’s Uncertainty principle; Linear Harmonic oscillator; Electron microscope – scanning electron microscope – transmission electron microscope.

TOTAL: 45 PERIODS
TEXT BOOKS

REFERENCES
SH103  ENGINEERING CHEMISTRY  
(Common to all B.E. / B.Tech., Degree Programmes)  

COURSE OUTCOMES  
The students will be able to  
• select suitable water treatment techniques for industrial and domestic purpose.  
• acquire knowledge of electrochemistry.  
• apply the contextual knowledge of adsorption techniques for industrial applications.  
• synthesize polymers for domestic and industrial applications.  
• understand the knowledge of nano materials for their applications in Science and Engineering.  

UNIT I  WATER TREATMENT  

UNIT II  ELECTRO ANALYTICAL TECHNIQUES  
Electrode potential: definition, measurement of electrode potential, Nernst equation – problems; EMF: definition, measurement of EMF – Poggendorff’s method; reference electrode: standard hydrogen electrode, calomel electrode, glass electrode – measurement of pH using glass electrode; CO₂ sensing electrode; conductometric titrations: acid-base titration (HCl vs NaOH); potentiometric titrations: redox titration (Fe²⁺ vs K₂Cr₂O₇), precipitation titration (Ag⁺ vs NaCl).  

UNIT III  CATALYSIS AND SURFACE PHENOMENA  
Types of catalysis – homogeneous catalysis – heterogeneous catalysis, mechanism of catalytic action - contact theory, catalytic promoters, catalytic poison; enzyme catalysis: Michaelis-Menten equation; adsorption: definition, types – physical adsorption – chemical adsorption – differences between physical and chemical adsorption; adsorption isotherms: definition, Freundlich and Langmuir adsorption isotherms, applications of adsorption.  

UNIT IV  ENGINEERING POLYMERS  

UNIT V  NANO MATERIALS  
Nanoparticles: definition, carbon nanotubes (CNT), types of carbon nano tubes – single walled and multi walled carbon nanotubes – fullerene; synthesis of carbon nanotubes: chemical vapour deposition – laser ablation – arc-discharge method; properties of CNT: mechanical, electrical, thermal and optical properties; applications of carbon nanotubes in chemical field, medicinal field, mechanical field and current applications.  

TOTAL: 45 PERIODS  

TEXT BOOKS  
REFERENCES
SH104  FUNDAMENTALS OF COMPUTING AND PROGRAMMING IN C  
(Common to all B.E. / B.Tech., Degree Programmes)  

L T P C  
3 0 0 3  

COURSE OUTCOMES  
- Learn the major components of a computer system.  
- Formulate the algorithms and analyze their complexity.  
- Identify the correct and efficient ways of solving problems.  
- Acquire knowledge about dynamic memory allocation, modular programming and data organization.  
- Develop real time applications using the power of C language features.  

UNIT I      COMPUTER FUNDAMENTALS  

UNIT II     BASIC C PROGRAMMING  
Structure of C Program – Keywords, Constants, Variables and Data Types – Operators and Expressions – Managing Input and Output operators – Decision Making – Branching and Looping.  

UNIT III    FUNCTIONS, ARRAYS AND POINTERS  
Functions: User-defined functions – Definitions – Declarations - Call by reference – Call by value.  
Arrays: Declaration – Definition – Multidimensional Arrays – Functions with array as arguments.  
Pointers: Initialization – Pointers as Arguments – Pointers to Pointers – Dynamic Memory Management Functions.  

UNIT IV     STRUCTURES AND UNIONS  

UNIT V      FILE HANDLING  

TOTAL: 45 PERIODS 

TEXT BOOKS  

REFERENCES  
SH105            ENGINEERING GRAPHICS
(Common to all B.E. / B.Tech., Degree Programmes)

COURSE OUTCOMES

- Students will be able to use the drawing instruments effectively.
- An ability to draw the basic engineering curves and problems related to projections of points, straight lines, planes and solids.
- Able to apply the knowledge acquired on practical applications of sectioning and development of solids.
- Able to draw simple solids and its sections in isometric view and projections and also to draw its perspective views.

Drawing Instruments – IS specifications on lines – drawing sheets – Printing letters and dimensioning – scales (not for examination) – First angle projection should be followed.

UNIT I  PLANE CURVES  12
Conies – Construction of ellipse, Parabola and hyperbola by eccentricity method – Construction of cycloids – Epi and Hypo cycloids - construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

UNIT II  PROJECTION OF POINTS, LINES AND PLANE SURFACES  12
Projection of points and straight lines located in the first quadrant – Traces – Determination of true lengths and true inclinations.
Projection of regular polygonal surfaces and circular lamina inclined to any one reference plane.

UNIT III  PROJECTION OF SOLIDS  12
Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one reference plane by change of position method.

UNIT IV  SECTION OF SOLIDS AND DEVELOPMENT OF SURFACES  12
Sectioning of above solids in simple vertical position by cutting planes inclined to one reference plane and perpendicular to the other – obtaining true shape of section.
Development of lateral surfaces of simple and truncated solids – Prisms, pyramids, cylinder and cone – Development of lateral surfaces of solids with cylindrical cutouts, perpendicular to the axis.

UNIT V  ISOMETRIC AND PERSPECTIVE PROJECTIONS  12
Perspective projection of prisms, pyramids and cylinders by visual ray method and vanishing point method.

TOTAL: 60 PERIODS

Note: In end semester examination from each unit one question with either or pattern may be asked. No short questions.

TEXT BOOK
REFERENCES
SH106                                      C PROGRAMMING LABORATORY
(Common to all B.E. / B.Tech., Degree Programmes)                              L T P C    0 0 3 2

COURSE OUTCOMES
• Acquire logical thinking and problem solving skills.
• Implement the algorithms and analyze their complexity.
• Identify the correct and efficient ways of solving problems.
• Acquire hands on practice in dynamic memory allocation, modular programming and data organization.
• Implement real time applications using the power of C language features.

LIST OF EXPERIMENTS
1. Solve problems such as temperature conversion, student grading, interest calculation.
2. Finding the 2’s complement of a binary number.
3. Generation of the first ‘n’ terms of the Fibonacci sequence and prime sequence.
5. Given distance traveled by a vehicle as \( d = ut + \frac{1}{2}at^2 \), where ‘u’ and ‘a’ are the initial velocity and acceleration. Calculate the distance traveled for different time intervals.
6. Solving the roots of a quadratic equation.
7. Designing a simple arithmetic calculator. (Use switch statement)
8. Performing the following operations: (Use loop statement)
   i. Generate Pascal’s triangle.
   ii. Construct a Pyramid of numbers.
9. Performing the following operations to a string:
   i. To insert a sub-string into main string at a given position.
   ii. To delete ‘n’ characters from a given position in a string.
   iii. To replace a character of string either from beginning or ending or at a specified location.
10. Performing the following operations: (Use arrays)
    i. Matrix addition.
    ii. Transpose of a matrix.
    iii. Matrix multiplication by checking compatibility.
11. Performing the following operations: (Use recursive functions)
    i. To find the factorial of a given integer.
    ii. To find the GCD (Greatest Common Divisor) of two given integers.
    iii. To solve Towers of Hanoi problem.
12. Performing the Student Information Processing using File Handling concepts.

TOTAL: 45 PERIODS

SOFTWARE REQUIREMENTS
• Turbo C/ ANSI C Compiler
• Gcc compiler
SH107 PHYSICS AND CHEMISTRY LABORATORY – I
(Common to all B.E. / B.Tech., Degree Programmes)

PART A – PHYSICS LABORATORY – I

COURSE OUTCOMES
At the end of the Laboratory classes, the students are able to

- develop collaborative learning skills and to add some of their own ideas to the experiments and their explanations.
- understand the optical properties, mechanical properties and electrical properties.

LIST OF EXPERIMENTS
1. (a) Particle size determination using Diode Laser.
   (b) Determination of Laser parameters – Wavelength, and angle of divergence.
   (c) Determination of Numerical aperture and acceptance angle of an optical fiber.
2. Determination of thickness of a thin wire – Air wedge method.
3. Determination of velocity of sound and compressibility of the liquid – Ultrasonic Interferometer.
5. Determination of Young’s modulus – Non-uniform bending method.
7. Determination of specific resistance of a given coil of wire – Carey Foster’s Bridge.
   • A minimum of FIVE experiments shall be offered.

PART B - CHEMISTRY LABORATORY – I

COURSE OUTCOMES
The student

- can estimate the amount of hardness and acidity present in the water sample.
- gain knowledge about the estimation of nickel in an alloy.
- quantify the electrolyte by measuring the conductance and pH.

LIST OF EXPERIMENTS
1. Estimation of hardness of Water sample by EDTA method.
2. Estimation of acidity of Water sample.
3. Estimation of Nickel by EDTA method.
4. Conductometric titration (HCl Vs NaOH).
5. Conductometric titration (BaCl₂ Vs Na₂SO₄).
6. pH metric titration (HCl Vs NaOH).
7. Determination of molecular weight and degree of polymerization using Viscometry.
   • A minimum of FIVE experiments shall be offered.
   • Laboratory classes on alternate weeks for Physics and Chemistry.

TOTAL: 45 PERIODS
SH108                                ENGINEERING PRACTICES LABORATORY
(Canmon to all B.E. / B.Tech., Degree Programmes)       L T P C
                                                                 0 0 3 2

COURSE OUTCOMES
• Students will be able to prepare the pipe connections and identify the various components used in plumbing.
• An ability to prepare simple wooden joints using wood working tools.
• An ability to prepare simple lap, butt and tee joints using arc welding equipments.
• An ability to prepare simple components using lathe and drilling machine.

PART A – MECHANICAL AND CIVIL ENGINEERING PRACTICES

I PLUMBING WORKS:                                      5
Study of components related to plumbing.
Hands-on-exercise:
Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.

II CARPENTRY PRACTICES:                                6
Study of the joints in roofs, doors, windows and furniture.
Hands-on-exercise:
Wood work, joints by sawing, planning and cutting.

III WELDING:                                           5
Study of the tools used in welding Gas welding practice.
Preparation of butt joints, lap joints and tee joints using arc welding.

IV BASIC MACHINING:                                    7
(a) Simple Turning and Taper turning.
(b) Drilling Practice.

REFERENCES
PART B – ELECTRICAL AND ELECTRONICS ENGINEERING PRACTICES

COURSE OUTCOMES

• An ability to develop familiarity with rudimentary measurement equipment – signal generators, oscilloscopes, multimeters and power supplies.
• Ability to demonstrate and evaluate the parameters of basic electronic components (wires, resistors, capacitors, diodes etc.) based on their physical parameters and dimensions.
• Define, describe, and analyze fundamentals of Boolean algebra and digital logic gates.
• An ability to predict qualitatively and quantitatively compute the steady state AC responses of basic circuits using the phasor method.
• Gain experience in the documentation of measurements and procedures as well as the preparation of formal reports.

I ELECTRICAL ENGINEERING PRACTICE

1. Residential house wiring using switches, fuse, indicator, lamp and energy meter.
2. Fluorescent lamp wiring.
5. Measurement of energy using single phase energy meter.

II ELECTRONICS ENGINEERING PRACTICE

1. Study of Electronic components and equipments – Resistor, colour coding, measurement of AC signal parameters (peak-peak, rms period, frequency) using CRO
2. Study of logic gates AND, OR, XOR and NOT.
4. Soldering practice – Components, Devices and Circuits – Using general purpose PCB.
5. Measurement of ripple factor of HWR and FWR.

TOTAL: 45 PERIODS

REFERENCES

COURSE OUTCOMES
The student will be able to
• apply correct form of language while Speaking and Writing.
• prepare his own Professional letter writings.
• interpret any passage after listening.
• interact at different situations fluently.

UNIT I
Language Focus: Homonyms, Different grammatical forms of the same word, correct usage of words / phrases.
Writing: Recommendation writing.
Listening: Interpreting Poetic lines.
Speaking: Telephone English.

UNIT II
Language Focus: Cause and Effect, Phrasal Verbs.
Listening: Conversations.
Speaking: Asking questions.

UNIT III
Language Focus: Idioms and Phrases with animal names.
Writing: Checklist, Process Description.
Speaking: Presentations.

UNIT IV
Language Focus: Technical Definitions, Transformation of Sentences.
Writing: Job Application Letter, Curriculum Vitae, Bio-data, Resume.
Speaking: Mock Interview.

UNIT V
Language Focus: British and American Vocabulary, Numerical Expressions.
Writing: E-mail Writing, Report Writing.
Speaking: Group Discussion.

SUGGESTED ACTIVITIES
1. Making sentences using different grammatical forms of the same word.
2. Exercises on combining sentences using Cause and Effect expressions.
4. Writing exercises on Recommendations.
5. Exercises on Idioms and Phrases.
7. Exercises on British and American English words with meanings.

TOTAL: 45 PERIODS

BOOK SUGGESTED FOR READING
REFERENCES
13G21 INTEGRAL CALCULUS AND TRANSFORMS
(Common to all B.E. / B.Tech., Degree Programmes) L T P C 3 1 0 4

COURSE OUTCOMES
• Ability to find area and volume of objects using double and triple integrals.
• Ability to analyze the concepts related to vector calculus and to apply them in engineering field.
• Ability to perform the ideas of Laplace transform and Z-transform in their respective engineering subjects.

UNIT I MULTIPLE INTEGRALS 12
Double integration – Cartesian and polar coordinates; Change of order of integration; Change of variables between cartesian and polar coordinates; Triple integration in cartesian coordinates; Area as double integral; Volume as triple integral.

UNIT II VECTOR CALCULUS 12
Gradient, Divergence and Curl – Directional derivative – Irrotational and solenoidal vector fields; Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stoke’s theorem (excluding proofs) – Simple applications involving cubes and rectangular parallelopipeds.

UNIT III LAPLACE TRANSFORM 12

UNIT IV INVERSE LAPLACE TRANSFORM 12
Definition of Inverse Laplace transform – Convolution theorem – Solution of linear ordinary differential equations of second order with constant coefficients using Laplace transformation techniques and solution of simultaneous differential equations of first order with constant coefficients using Laplace transformation techniques.

UNIT V Z – TRANSFORM 12

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13G22          SOLID STATE PHYSICS
(Common to ECE, CSE, EEE, EIE and IT)  
L T P C       3 0 0 3

COURSE OUTCOMES
The Student will be able to

- identify the crystal lattices, their structures and how the structure influences its major properties at different levels.
- choose the major functional and structural properties required for specific applications.
- check the parameter that satisfies superconducting behaviour.
- relate technology to the physics of semiconductor devices.
- classify the magnetic materials and their storage applications.
- design optical materials that are able to be manufactured and measured using the state of art optical fabrication technologies.

UNIT I       CRYSTAL PHYSICS                              9
Lattice, Unit cell, Bravais lattice, Lattice planes; Miller indices – d-spacing in cubic lattice; Calculation of number of atoms per unit cell, Atomic radius, Coordination number and Packing factor for SC, BCC, FCC and HCP structures; Crystal defects – point, line and surface defects; Burger vector.

UNIT II      CONDUCTING MATERIALS AND SUPERCONDUCTORS  9
Conductors
Superconductors
Superconductivity: Properties – Meissner effect – Isotopic effect; Types of superconductors – Type I and Type II superconductors; Applications of superconductors – Magnetic levitation.

UNIT III     SEMICONDUCTORS                             9
Intrinsic semiconductor – carrier concentration derivation – Fermi level – variation of Fermi level with temperature – electrical conductivity – bandgap determination; Extrinsic semiconductors – carrier concentration derivation in n-type and p-type semiconductor – variation of Fermi level – with temperature and impurity concentration; Hall effect – Determination of Hall coefficient – Applications.

UNIT IV      MAGNETIC MATERIALS AND STORAGE DEVICES     9
Origin of magnetic moment, Bohr magneton, Dia and Para magnetism, Ferro magnetism – Domain theory – Hysteresis – soft and hard magnetic materials; Anti-ferromagnetic materials; Ferrites – structure and applications; magnetic recording and readout – storage of magnetic data – tapes, floppy, Hard disk and CD ROM.

UNIT V       OPTICAL MATERIALS                          9
Optical properties of metals, insulators and semiconductors; Phosphorescence and fluorescence; Excitons traps and color centre and their importance; Different phosphors used in CRO screens, liquid crystal display, LED – working of LED; Thermography and its applications; Solar cell – PN junction solar cell – Conversion efficiency and solar concentration – Hetero junction solar cell.

TOTAL: 45 PERIODS
TEXT BOOKS

REFERENCES
13G23  CHEMISTRY OF ELECTRICAL AND ELECTRONIC MATERIALS
(Common to ECE, CSE, EEE, EIE and IT)

COURSE OUTCOMES
The students can
• apply the knowledge in designing new energy storing devices.
• identify the types of corrosion and to design a method to control the corrosion.
• apply the knowledge of photochemistry in designing the various electronic materials.
• choose proper analytical technique for analyzing the synthesized electronic materials.

UNIT I  ENERGY SOURCES AND STORAGE DEVICES

UNIT II  CORROSION AND ITS CONTROL

UNIT III  PHOTOCHEMICAL PROCESSES

UNIT IV  ELECTRONIC MATERIALS

UNIT V  ANALYTICAL INSTRUMENTATION

TOTAL: 45 PERIODS
TEXT BOOKS


REFERENCES

13G24 ELECTRIC CIRCUITS AND ELECTRON DEVICES
(Common to CSE and IT)

COURSE OUTCOMES
Upon successful completion of this course, students will be able to

- Analyze the circuits using various network theorems.
- Compute the transient response of RL, RC and RLC circuits for AC and DC inputs.
- Determine the resonance condition for series and parallel circuits.
- Describe the operation and characteristics of different types of semiconductor diodes.
- Compare the operation and characteristics of various transistors like BJT, JFET and MOSFET.

UNIT I CIRCUIT ANALYSIS TECHNIQUES
Ohm’s law, Kirchhoff’s laws – Resistors in series and parallel circuits – Mesh current and node
voltage method of analysis – Voltage and current division – Source transformation – Star-delta
conversion. Network Theorems: Thevenin’s theorem, Superposition theorem, Norton’s theorem,
Maximum power transfer theorem (only for resistive network).

UNIT II TRANSIENT RESPONSE FOR CIRCUITS
Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and AC with
sinusoidal input.

UNIT III RESONANT CIRCUITS
Voltage and current relation in pure Resistor, Inductor, Capacitor, RL, RC and RLC circuits – Series
and parallel circuits – Parallel and series resonances – their frequency response – Quality factor and
bandwidth.

UNIT IV SEMICONDUCTOR DIODES
Review of intrinsic and extrinsic semiconductors – Theory of PN junction diode – Energy band
structure – current equation – space charge and diffusion capacitances – effect of temperature and
breakdown mechanism – Zener diode and its characteristics – Tunnel diode – PIN diode – Varactor
diode – Photodiode.

UNIT V TRANSISTORS
Principle of operation of PNP and NPN transistors – study of CE, CB and CC configurations and
comparison of their characteristics – Breakdown in transistors – operation and comparison of N-
Channel and P-Channel JFET - drain current equation – MOSFET – Enhancement and depletion types
– structure and operation – comparison of BJT with MOSFET – thermal effect on MOSFET.

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS
1. A.Sudhakar, Shyammohan S.Palli, “Circuits and Networks - Analysis and Synthesis”, Tata
3. S.Salivahanan, N.Suresh kumar and A.Vallavaraj, “Electronic Devices and Circuits”, Tata

REFERENCES
13G25   BASIC CIVIL AND MECHANICAL ENGINEERING  
(Common to ECE, CSE, EEE, EIE and IT) 

COURSE OUTCOMES 
- An ability to identify the various systems and its components of various power plants.  
- An ability to state and differentiate the working principles of IC engines.  
- Students will be able to identify the various systems and components of refrigeration and air conditioning systems.  

A – CIVIL ENGINEERING  

UNIT I   SURVEYING AND CIVIL ENGINEERING MATERIALS   15 

UNIT II   BUILDING COMPONENTS AND STRUCTURES   15 
Foundations: Types, Bearing capacity – Requirement of good foundations.  

B – MECHANICAL ENGINEERING  

UNIT III   POWER PLANT ENGINEERING   10 

UNIT IV   IC ENGINES   10 
Internal combustion engines as automobile power plant – Working principle of Petrol and Diesel Engines – Four stroke and two stroke cycles – Comparison of four stroke and two stroke engines – Boiler as a power plant.  

UNIT V   REFRIGERATION AND AIR CONDITIONING SYSTEM   10 
Terminology of refrigeration and air conditioning – Principle of vapour compression and absorption system – Layout of typical domestic refrigerator – Window and Split type room air conditioner.  

TOTAL: 60 PERIODS  

REFERENCES  
COURSE OUTCOMES
Upon successful completion of this course, the students will be able to:

• Demonstrate how to use the UNIX Shell commands.
• Use the Shell programming constructs.
• Learn tracing mechanisms (for debugging), user variables, Shell variables, read-only variables, positional parameters, reading input to a Shell script.
• Test on numeric values, test on file type, and test on character strings using shell scripts.
• Write moderately complex Shell scripts and make them executable.

Execute programs written in C under UNIX environment.

LIST OF EXPERIMENTS

1. Study of UNIX OS, vi Editor.

2. Use of Basic UNIX Shell Commands:
   ls, mkdir, rmdir, cd, cat, banner, touch, file, wc, sort, cut, grep, dd, dfspace, du, ulimit.

3. Shell Programming:
   i. Interactive shell scripts
   ii. Positional parameters
   iii. Arithmetic Operators
   iv. if-then-fi, if-then-else-fi, nested if-else
   v. Logical operators
   vi. if - elif, case structure
   vii. while, until, for loops, use of break
   viii. Metacharacters

4. Shell scripts for the following:
   i. Showing the count of users logged in
   ii. Printing column wise list of files in your home directory
   iii. To count lines, words and characters in its input (do not use wc)

5. C Programming on UNIX:
   i. Dynamic Storage Allocation
   ii. Pointers
   iii. Functions
   iv. File Handling

SOFTWARE REQUIREMENTS
• UNIX/LINUX OS
• Gcc compiler

TOTAL: 45 PERIODS
13G27 PHYSICS AND CHEMISTRY LABORATORY – II
(Common to all B.E. / B.Tech., Degree Programmes)

PART A - PHYSICS LABORATORY – II

COURSE OUTCOMES
At the end of the Laboratory classes, the students are able to
• understand the role of direct observation in Physics and to distinguish between inferences based on theory and the outcomes of the experiments.
• experience with experimental processes, including some experience designing investigation.

LIST OF EXPERIMENTS
1. Determination of Young’s modulus – Uniform bending method.
2. Determination of Band Gap of a semiconductor material.
3. Determination of Hall Co-efficient.
7. Torsional pendulum – Determination of Moment of Inertia of the disc and Rigidity modulus of the material of the wire.

• A minimum of FIVE experiments shall be offered.

PART B - CHEMISTRY LABORATORY – II

COURSE OUTCOMES
The student
• can estimate the amount of alkalinity and Dissolved Oxygen (DO) present in the water sample.
• gain the knowledge in the estimation of copper in an alloy and iron in rust.
• quantify electrolyte and ion by measuring the conductance and emf.

LIST OF EXPERIMENTS
1. Estimation of copper in brass by EDTA method.
2. Determination of Dissolved Oxygen (DO) in water (Winkler’s method)
3. Estimation of alkalinity of Water sample
4. Estimation of Fe^{II} ion in rust by Dichrometry
5. Conductometric titration (Mixture of acids vs NaOH)
6. Potentiometric Titration (Fe^{III} vs K_{2}Cr_{2}O_{7})
7. Estimation of Fe^{III} ion by spectrophotometry.

TOTAL: 45 PERIODS

• A minimum of FIVE experiments shall be offered.
• Laboratory classes on alternate weeks for Physics and Chemistry.
COURSE OUTCOMES
Upon successful completion of this course, students will be able to
- Analyze the circuits using various network theorems and laws.
- Determine the parameters from the characteristics of diodes and transistors.

LIST OF EXPERIMENTS
1. Verification of Ohm’s laws
2. Verification of Mesh and Nodal analysis
3. Verification of KVL and KCL
4. Verification of Thevenin’s Theorem
5. Verification of Norton’s Theorem
6. Verification of superposition Theorem
7. Verification of Maximum power transfer Theorem
11. Characteristics of CE configuration
12. Characteristics of CB configuration
8. Characteristics of PN diode
9. Characteristics of Zener diode
10. Characteristics of Photodiode

TOTAL: 45 PERIODS
13G29          ENGLISH LANGUAGE SKILL LABORATORY
(Common to all B.E. / B.Tech., Degree Programmes)

L T P C  
0 0 3 2

COURSE OUTCOMES
The Student will
• improve their pronunciation skill.
• gather information from any speech.
• imbibe the stress and intonation of the native speakers’ accent.

1. Micro Skills
   • Spotting the Homonyms / Silent letter words / mispronounced words
   • Identifying the missing words in native speech
   • Finding the cluster words
   • Marking correct punctuation
   • Marking word chunks
   • Identification of sentences

2. Content Comprehension and making inferences
   • Listening to audio files of Speech, Poetry, Recent Issues, News clippings, etc
     a. True / False
     b. Multiple Choice Questions
     c. Filling the blanks
     d. Filling the charts

3. Listen and Act
   • Drawing the map using audio
   • Picture completing task
   • Transferring data to Graph

4. Interpreting the video clippings

5. Listening to Conversations

TOTAL: 30 PERIODS
13IT31    FOURIER TRANSFORMS AND COMPLEX ANALYSIS      L T P C
                        3 1 0 4

COURSE OUTCOMES
On successful completion of the course, the students should be able to
• Perform Fourier series analysis of the functions.
• Implement the properties of Fourier transforms and Compute the Fourier transforms of various functions.
• Calculate the Fourier series solution of Wave and Heat equations.
• Grasp analytic functions and their properties and be introduced to the host of conformal mappings with suitable examples that have direct application.
• Understand the basics of complex integration and the concept of contour integration encountered in practice.

UNIT I    FOURIER SERIES                                    12

UNIT II    FOURIER TRANSFORMS                                12

UNIT III   APPLICATIONS OF PARTIAL DIFFERENTIAL EQUATIONS    12
Solutions of one dimensional wave equation – One dimensional equation of heat conduction– Steady state solution of two-dimensional equation of heat conduction (Insulated edges excluded) – Fourier series solutions in Cartesian coordinates.

UNIT IV    ANALYTIC FUNCTIONS                                 12
Functions of a complex variable – Analytic functions – Necessary and Sufficient conditions excluding proofs) – Harmonic and orthogonal properties of analytic functions – Harmonic conjugate – Construction of analytic functions – Conformal mapping: w= z+c, cz, 1/z and bilinear transformation.

UNIT V     COMPLEX INTEGRATION                                12
Complex integration – Statement and applications of Cauchy’s integral theorem and Cauchy’s integral formula (excluding proofs) – Taylor’s and Laurent’s expansions – Singular points – Residues – Residue theorem (excluding proof) – Application of residue theorem to evaluate real integrals – Unit circle and semi-circular contour(excluding poles on boundaries).

L: 45 T:15, TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13IT32 ENVIRONMENTAL SCIENCE AND ENGINEERING
(Common to all B.E./B.Tech. Degree Programmes)

L T P C 3 0 0 3

COURSE OUTCOMES
Upon successful completion of course the student will be able to

• Understand the various ecosystem and biodiversity
• Classify the different types of natural resources and identify the role of individual in conservation of resources
• Identify and analyse the causes, effects and control measures of environmental pollution
• Identify the different types of environmental hazards and their management
• Analyse the social issues related to the environment and how human population affect the environment

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY
Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers– energy flow in the ecosystem – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) aquatic (pond) ecosystems. Field study of simple ecosystems –pond and forest. Introduction to biodiversity: definition - genetic, species and ecosystem diversity – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values –India as a mega-diversity nation – hot spots of biodiversity –threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation. Field study of common plants, insects, birds.

UNIT II NATURAL RESOURCES
Forest resources: Use and over-exploitation, deforestation, case studies- dams and their effects on forests and tribal people – Water resources: Use and overutilization of surface and ground water – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide Problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, case studies – role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles. Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT III ENVIRONMENTAL POLLUTION
Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Noise pollution (e) Nuclear hazards – solid waste management: causes, effects and control measures of municipal solid wastes – e-Waste: Definition-dimension of the problem - source-toxic Substances in e-waste - risks related to toxic substances–environmental problems-role of an individual in prevention of pollution.

UNIT IV ENVIRONMENTAL HAZARDS
Environmental hazards: Definition – Hazard- Types-Natural and man-made hazards – Natural hazards: Causes, effect and management of Earthquake, Flood, Landslide, Cyclones and Tsunami; Man-made Hazards: Hazards due to dams and reservoirs, hazards due to nuclear power plant, Industrial hazards. Case study: Chernobyl disaster, Bhopal gas tragedy.

UNIT V SOCIAL ISSUES, HUMAN POPULATION AND THE ENVIRONMENT

TOTAL: 45 PERIODS
TEXT BOOKS

REFERENCES
13IT33 DATA STRUCTURES L T P C
3 1 0 4

COURSE OUTCOMES
On Successful completion of this course, Students will be able to
• Understand the basic concepts of different linear data structures and apply appropriate data structure for solving computing problems.
• Understand the design concepts of Non-Linear data structure and apply appropriate method for solving the problems.
• Design simple algorithms for solving computing problems and recognize the associated algorithm’s operations and complexity.

UNIT I FUNDAMENTALS OF ALGORITHMS 12

UNIT II LINEAR STRUCTURES 12
Abstract Data Types (ADT) – Array implementation – linked list implementation – singly linked lists – doubly-linked lists – applications of lists – Stack ADT – Queue ADT – Applications of stacks and queues.

UNIT III SORTING AND SEARCHING 12

UNIT IV TREE STRUCTURES 12

UNIT V GRAPHS 12

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
OBJECT ORIENTED PROGRAMMING USING C++

COURSE OUTCOMES
On Successful completion of this course, Students will be able to

- Discuss the basic concepts of Object Oriented Programming.
- Illustrate class, objects, constructors and destructor.
- Employ templates and exception handling.
- Apply the concept of inheritance and polymorphism.
- Explain the concept of file handling, namespaces, ANSI string objects and STL.

UNIT I  INTRODUCTION TO OBJECT-ORIENTED PROGRAMMING PARADIGM AND CONCEPTS  12

UNIT II  CLASSES, OBJECTS AND MEMBER FUNCTIONS IN C++  12
Class Specification – Class objects – Accessing class members – Defining member functions – Outside member functions – Accessing member function – Pointers within a class – passing objects as arguments – Returning objects from functions – friend functions and classes – static data and member functions – nested classes – object initialization and clean up.

UNIT III  TEMPLATES AND EXCEPTION HANDLING  12
Function and class templates - Exception handling – try-catch-throw paradigm – exception specification – terminate and Unexpected functions – Uncaught exception.

UNIT IV  INHERITANCE AND POLYMORPHISM  12

UNIT V  FILE HANDLING, STRINGS NAMESPACE AND STL  12

L: 45  T: 15  TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
On Successful completion of this course, Students will be able to
• Represent numerical values in various number systems and perform number conversions between different number systems.
• Analyze and design digital combinational circuits including arithmetic circuits (half adder, full adder, multiplier).
• Analyze Sequential and Logic Circuits.

UNIT I NUMBER SYSTEM AND LOGIC GATES 12
Review of binary number systems - Binary arithmetic – Binary codes – Boolean algebra and theorems- Boolean functions – Simplifications of Boolean functions using Karnaugh map- AND, OR, NOT, NAND, NOR, Exclusive-OR and Exclusive-NOR, Implementations of Logic Functions using gates.

UNIT II COMBINATIONAL CIRCUITS 12

UNIT III SEQUENTIAL CIRCUITS 12

UNIT IV SYNCHRONOUS SEQUENTIAL LOGIC 12

UNIT V ASYNCHRONOUS SEQUENTIAL LOGIC 12
Design of fundamental mode and pulse mode circuits, incompletely specified State Machines, Problems in Asynchronous Circuits, Design of Hazard Free Switching circuits. Design of Combinational and Sequential circuits using VERILOG.

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES

On successful completion of this course, students will be able to:

- Understand basic communications systems, particularly with application to noise-free analog and digital communications.
- Develop the ability to compare and contrast the strengths and weaknesses of various communication systems.
- Describe how information is put into electronic devices for storage and delivery.

UNIT I  FUNDAMENTALS OF ANALOG COMMUNICATION  9
Principles of amplitude modulation, AM envelope, frequency spectrum and bandwidth, modulation index and percent modulation, AM Voltage distribution, AM power distribution, Angle modulation - FM and PM waveforms, phase deviation and modulation index, frequency deviation and percent modulation, Frequency analysis of angle modulated waves. Bandwidth requirements for Angle modulated waves.

UNIT II  DIGITAL COMMUNICATION  9
Introduction, Shannon limit for information capacity, digital amplitude modulation, frequency shift keying, FSK bit rate and baud, FSK transmitter, BW consideration of FSK, FSK receiver, phase shift keying - binary phase shift keying - QPSK, Quadrature Amplitude modulation, bandwidth efficiency, carrier recovery - squaring loop, Costas loop, DPSK.

UNIT III  DIGITAL TRANSMISSION  9
Introduction, Pulse modulation, PCM - PCM sampling, sampling rate, signal to quantization noise rate, companding - analog and digital - percentage error, delta modulation, adaptive delta modulation, differential pulse code modulation, pulse transmission - Intersymbol interference, eye patterns.

UNIT IV  SPREAD SPECTRUM AND MULTIPLE ACCESS TECHNIQUES  9
Introduction, Pseudo-noise sequence, DS spread spectrum with coherent binary PSK, processing gain, FH spread spectrum, multiple access techniques – wireless communication, TDMA and CDMA in wireless communication systems, source coding of speech for wireless communications.

UNIT V  DATA AND OPTICAL COMMUNICATION  9

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
13IT37 DATA STRUCTURES LABORATORY  L T P C
0 0 3 2

COURSE OUTCOMES

On Successful completion of this course, Students will be able to
- Apply and implement learned algorithm design techniques and data structures to solve problems.
- Analyze and compare the efficiency of algorithm for a given problem.
- Design and analyze the time and space efficiency of the data structure

LIST OF EXPERIMENTS

1. Array Implementation of List ADT
2. Implementation of Singly Linked List
3. Implementation of Doubly Linked List
4. Represent a polynomial as a linked list and write functions for polynomial addition.
5. Write programs to implement the following using an array.
   a) Stack ADT   b) Queue ADT
6. Write programs to implement the following using a singly linked list.
   a) Stack ADT   b) Queue ADT
7. Implement Stack and use it to convert a given infix expression into postfix form.
8. Implement a double-ended queue (dequeue) when insertion and deletion operations are possible at both the ends.
9. Write programs that traverse the given binary tree in
   a) Preorder   b) inorder and c) postorder.
10. Write programs for implementing the following sorting methods with complexity analysis
    a) Merge sort   b) Quick sort   c) Heap sort
11. Write a program to perform the following operations:
    a) Insert an element into a binary search tree.
    b) Delete an element from a binary search tree.
    c) Search for a key element in a binary search tree.
12. Write a program to perform the following operations
    a) Insertion into an AVL-tree   b) Deletion from an AVL-tree
13. Implement priority queue using binary heaps.
15. Write programs for the implementation of BFS and DFS for a given graph.
16. Write a program for generating Minimum cost spanning tree using Prims’ algorithm.

TOTAL: 45 PERIODS

List of Equipments and components for A Batch of 30 students (1 per batch)

1. Software Required – TURBOC version 3 or GCC version 3.3.4.
2. Operating System – WINDOWS 2000 / XP / NT OR LINUX
3. Computers Required – 30 Nos. (Min. Requirement: Pentium III or Pentium IV with 256 RAM and 40 GB harddisk)
**13IT38 OBJECT ORIENTED PROGRAMMING USING C++ LABORATORY**

**COURSE OUTCOMES**

On Successful completion of this course, Students will be able to

- Impart their knowledge related to classes and objects
- Manipulate objects using friend functions
- Implement various features of object oriented programming
- Develop applications using file handling concepts

**LIST OF EXPERIMENTS**

1. Define a STUDENT class with Reg. No., Name and Marks in 3 tests of subject. Declare an array of 10 STUDENT objects. Using appropriate functions, find the average of two better marks for each student. Print the Reg. No., Name and average marks of all the students.

2. Create two classes DM and DB which stores the value of distances. DM stores distances in meters and centimeters and DB in feet and inches. Write a program that can read values for the class objects and add object of DM with another object of DB. Use friend function to carry out the addition operation. The object that stores the result may be a DM object depending on the units in which the results are required. The display should be in the format of feet and inches or meters and centimeters depending on the object of display.

3. Declare friend function in two classes. Calculate the sum of integers of both the classes using friend sum() function.

4. Create a class called MATRIX using a two-dimensional array of integers. Implement the following operations by overloading the operator == which checks the compatibility of two matrices to be added and subtracted. Perform the addition and subtraction by overloading the operators + and -. Display the result by overloading the operator <<.

5. Implement complex number class with necessary operator overloading and type Conversions such as integer to complex, double to complex, complex to double etc.

6. Implement Matrix class with dynamic memory allocation and necessary methods. Give proper constructor, destructor, copy constructor, and overloading of assignment operator.

7. Overload the new and delete operators to provide custom dynamic allocation of memory.

8. Develop a template of linked-list class and its methods.

9. Develop templates of standard sorting algorithms such as bubble sort, insertion sort, merge sort, and quick sort.

10. Create a class called STUD with data members Reg. No., Name and Age. Using inheritance, create the classes UGSTUD and PGSTUD having fields a semester, fees and stipend. Enter the data for at least 5 students. Find the average age for all UG and PG students separately.
11. Design stack and queue classes with necessary exception handling.

12. Define Point class and an Arc class. Define a Graph class which represents graph as a collection of Point objects and Arc objects. Write a method to find a minimum cost spanning tree in a graph.

13. Develop with suitable hierarchy, classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism and RTTI.

14. Write a C++ program that randomly generates complex numbers (use previously designed Complex class) and writes them two per line in a file along with an operator (+, -, *, or /). The numbers are written to file in the format (a + ib). Write another program to read one line at a time from this file, perform the corresponding operation on the two complex numbers read and write the result to another file (one per line).

MINI Projects:
  Employee payroll calculation, Hospital Management, Bank Management, Library Management, Attendance Calculation, Grade sheet Calculation, Railway Reservation System, Electricity Bill generation, Time table generation System, Inventory Control System

TOTAL: 45 PERIODS

LIST OF EQUIPMENTS AND SOFTWARE FOR A BATCH OF 35 STUDENTS

HARDWARE:
  • 35 Personal Computers
  • Processor – 2.0 GHz or higher
  • RAM – 256 MB or higher
  • Hard disk – 20 GB or higher

SOFTWARE:
  • Microsoft Visual C++ 6.0 – to be installed in all PC’s.
  • OS - Windows 2000/ Windows XP/ NT
13IT41 PROBABILITY AND QUEUEING THEORY  

COURSE OUTCOMES
On successful completion of this course, the student should be able to
- Have a fundamental knowledge of the basic probability concepts.
- Have a well-founded knowledge of standard distributions which can describe real life phenomena.
- Acquire skills in handling situations involving more than one random variable and functions of random variables.
- Understand and characterize phenomena which evolve with respect to time in a probabilistic manner.
- Be exposed to basic characteristic features of a queuing system and acquire skills in analyzing queuing models.

UNIT I RANDOM VARIABLES 12
Discrete and continuous random variables - Moments - Moment generating functions and their properties; Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions.

UNIT II TWO DIMENSIONAL RANDOM VARIABLES 12
Joint distributions - Marginal and conditional distributions – Covariance - Correlation and regression - Transformation of random variables.

UNIT III MARKOV PROCESSES AND MARKOV CHAINS 12

UNIT IV QUEUEING THEORY 12
Markovian models – Birth and Death Queuing models - Steady state results: Single and multiple server queuing models - queues with finite waiting rooms - Finite source models - Little’s Formula.

UNIT V NON-MARKOVIAN QUEUES AND QUEUE NETWORKS 12
M/G/1 queue – Pollaczek - Khintchine formula, series queues - open and closed networks.

L: 45  T: 15  TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13IT42     ALGORITHM ANALYSIS AND DESIGN     L  T  P  C
                      3  0  2  4

COURSE OUTCOMES
On Successful completion of this course, Students will be able to
  • Demonstrate a familiarity with algorithm, asymptotic performance of algorithms and data structures.
  • Master different algorithm design techniques (brute-force, decrease and conquer, divide and conquer)
  • Master different algorithm design techniques (transform and conquer, dynamic programming)
  • Master different algorithm design techniques (greedy, Iterative methods)
  • Acquire basic knowledge of computational complexity algorithms.

UNIT I     BASIC CONCEPTS AND MATHEMATICAL ASPECTS OF ALGORITHMS      12
Introduction – What is Algorithm - Fundamentals of Algorithmic Problem Solving - Important Problem Types -
Fundamental Data Structures- Fundamentals of the Analysis of Algorithm Efficiency : Analysis Framework -
Mathematical Analysis of Non recursive Algorithms - Mathematical Analysis of Recursive Algorithms -
Example: Fibonacci Numbers.

UNIT II    SORTING AND SEARCHING ALGORITHMS      12
Brute Force and Exhaustive search: Selection Sort and Bubble Sort - Sequential Search and Brute-force string
matching – Exhaustive search - Depth first Search and Breadth First Search - Decrease and Conquer: Insertion
Sort – Topological sorting – Divide and conquer: Merge sort - Quick Sort - Binary tree Traversal and Related
Properties – Multiplication of large integers and strassen’s matrix multiplication.

UNIT III   ALGORITHMIC SEARCH TECHNIQUES        12
Transform and Conquer: Balanced Search Trees - Heaps and Heap sort - Space and Time Trade offs: Hashing -
B-Trees - Dynamic Programming: The Knapsack Problem and Memory Functions - Optimal Binary Search
Trees - Warshall's and Floyd's Algorithms.

UNIT IV    GREEDY AND ITERATIVE ALGORITHMS       12
Greedy Technique: Prim's Algorithm - Kruskal's Algorithm - Dijkstra's Algorithm - Huffman Trees and codes -
Iterative Improvement: The Simplex Method - The Maximum-Flow Problem.

UNIT V     ALGORITHM DESIGN METHODS             12
Limitations of Algorithm Power: Lower-Bound Arguments - Decision Trees - P, NP, and NP-complete
Problems - Coping with the Limitations of Algorithm Power: Backtracking - Branch-and-Bound -

L: 45  P: 15 TOTAL: 60 PERIODS

TEXT BOOK

REFERENCES
13IT43 COMPUTER ARCHITECTURE L T P C 3 0 0 3

COURSE OUTCOMES
On Successful completion of this course, Students will be able to
- Discuss the basic structure and operation of a digital computer.
- Illustrate the sequence of micro-operations required to complete the execution of an instruction level machine language.
- Employ some of the techniques used to improve the performance of computer at the architectural point of view.
- Discuss several types of memory used in a computer their hierarchy and functions as part of the system.
- Explain the communication process with input and output devices and different mechanisms for interfacing with the peripheral units.

UNIT I BASIC STRUCTURE OF COMPUTERS 9

UNIT II BASIC PROCESSING AND ARITHMETIC UNIT 9

UNIT III PIPELINING 9
Basic concepts – Data hazards – Instruction hazards – Influence on instruction sets – Data path and control considerations – Performance considerations – Exception handling.

UNIT IV MEMORY SYSTEM 9

UNIT V I/O ORGANIZATION 9

TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
13IT44 C# AND .NET FRAMEWORK  L  T  P  C
3  0  2  4

COURSE OUTCOMES
On Successful completion of this course, Students will be able to
• Gain programming skills in C# both in basic and various elements of OOPs.
• Build Web based Applications and Accessing Data with ADO.NET.
• Design in the concepts of the web Application development by using various web based GUI tools like web forms.
• Develop Web Applications with Web Services
• Build sample applications and large-scale projects.

UNIT I INTRODUCTION TO C#  12
C# and the .NET framework - Basics programming with C#, - Arrays, Strings, Structures, Enumerations, Classes, Objects.

UNIT II OBJECT ORIENTED ASPECTS OF C#  12

UNIT III WEB BASED APPLICATION DEVELOPMENT ON .NET  12
ASP.NET Introduction - Programming Web applications with Web Forms- Validation controls- ASP.NET Development - Custom Controls – Master Pages- ASP.NET AJAX.

UNIT IV ADO.NET  12

UNIT V WEB SERVICE AND .NET COMPACT FRAMEWORK  12

L: 45 P: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13IT45 RELATIONAL DATABASE MANAGEMENT SYSTEMS L T P C
3 1 0 4

COURSE OUTCOMES
On Successful completion of this course, Students will be able to
- Develop an appreciation of the role of data, files and databases in information systems.
- Understand the data modeling concepts (E-R and Class diagrams) used in database development.
- Create databases and pose complex SQL queries of relational databases.
- Familiar with a broad range of data management issues including data integrity and security.
- Gain a working knowledge of developing and maintaining a small-scale database project.
- Formulate a working definition of database development and administration.

UNIT I INTRODUCTION
Purpose of Database System - Views of data - Data Models - Database Languages - Database Architecture - Database users and Administrator – Entity Relationship model (E-R model) - E-R Diagrams - Introduction to relational databases.

UNIT II RELATIONAL MODEL

UNIT III RELATIONAL DATABASE DESIGN
Features of Good Relational Designs - Functional Dependencies - First, Second, Third Normal Forms, Dependency Preservation - Boyce/Codd Normal Form- Multi-valued Dependencies and Fourth Normal Form - Join Dependencies and Fifth Normal Form

UNIT IV TRANSACTION MANAGEMENT

UNIT V DATA STORAGE AND QUERYING

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES

On Successful completion of this course, Students will be able to
- Solve basic binary math operations using the microprocessor.
- Understand the programming proficiency using various addressing modes and data transfer instructions of the microprocessor.
- Apply knowledge of the microprocessor’s internal registers and operations by use of a PC based microprocessor simulator.

UNIT I 8085 MICROPROCESSORS 9
8085 Microprocessor architecture-Addressing modes- Instruction set-Programming the 8085.

UNIT II 8086 SOFTWARE ASPECTS 9

UNIT III MULTIPROCESSOR CONFIGURATIONS 9
Coprocessor Configuration - Closely Coupled Configuration - Loosely Coupled Configuration - 8087 Numeric Data Processor - Data Types - Architecture - 8089 I/O Processor -Architecture - Communication between CPU and IOP.

UNIT IV ADVANCED MICROPROCESSOR 9

UNIT V I/O INTERFACING 9
Memory interfaces and I/O interfacing with 8085 - parallel communication interface - serial communication interface - timer-keyboard/display controller - interrupt controller - applications - stepper motor - temperature control.

TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
13IT47 RELATIONAL DATABASE MANAGEMENT SYSTEMS LABORATORY

COURSE OUTCOMES
On Successful completion of this course, Students will be able to

• Create databases and pose complex SQL queries of relational databases.
• Gain experience developing a set of queries to handle a specified set of typical user inquiries for information extraction from the database.
• Familiar with a broad range of data management issues including data integrity and security.
• Demonstrate principles of design, development, and administration relevant to Oracle database technology.
• Gain a working knowledge of developing and maintaining a small-scale database project.

LIST OF EXPERIMENTS
1. Creation and Modification of relations
2. Integrity constraint enforcement
3. Nested Queries & Join Queries
4. Creation and Updation of Views
5. Exercises using PL/SQL
6. High level programming language extensions (Control structures, Procedures and Functions).
7. Creation of Triggers
8. Cursor management
9. Menu Design
10. Database Design and implementation (Mini Project).

TOTAL: 45 PERIODS

REFERENCE

LAB EQUIPMENTS
Hardware and Software required for a batch of 30 students:

Hardware:
• 30 Personal Computers

Software:
• Front end: VB/VC ++/JAVA
• Back end: Oracle 11g, my SQL, DB2
• Platform: Windows 2000 Professional/XP
  Oracle server could be loaded and can be connected from individual PCs.
COURSE OUTCOMES
On Successful completion of this course, Students will be able to

- Work with 8085 and 8086 microprocessors.
- Work with standard microprocessor interfaces.

LIST OF EXPERIMENTS

1. Programming with 8085
2. Programming with 8086-experiments including BIOS/DOS calls:
4. Interfacing with 8085/8086-8255,8253
5. Interfacing with 8085/8086-8279,8251

List of equipments/components for 30 students (two per batch) 

1. 8085 Trainer Kit with onboard 8255, 8253, 8279 and 8251 - 15 nos.
2. TASM/MASM simulator in PC (8086 programs) - 30 nos.
3. Interfacing with 8086 - PC add-on cards with 8255, 8253, 8279 and 8251 - 15 nos.
4. Stepper motor interfacing module - 5 nos.
5. Traffic light controller interfacing module - 5 nos.
6. ADC, DAC interfacing module - 5 nos.
7. CRO's - 5 nos.

TOTAL: 45 PERIODS
13IT49 COMMUNICATION SKILLS AND TECHNICAL SEMINAR
(Common to all B.E. / B.Tech. Degree Programmes)

COURSE OUTCOMES
Upon successful completion of this course, the students will be able to
• Express themselves fluently and appropriately in social and professional contexts.
• Develop the sub-skills required for paper presentations and group discussions.
• Acquire the soft skills and interpersonal skills which will help them to excel in their workplace.

A) LANGUAGE FUNCTIONS (15 hrs)
1. Compare and contrast
2. Giving reasons
3. Reporting
4. Expressing agreement and disagreement
5. Evaluating different standpoints
6. Analyzing a problem and giving solution
7. Describing daily routines, events, and weather
8. Describing Objects
9. Defending a point of view
10. Talking about future plans and intentions

Language Functions:
The teacher should build micro activities to develop the use of language required to handle these. Subfunctions of communication. In the process, the learners should get used to the linguistic. Elements needed for these functions.

B) SPEECH PRACTICE (15 hrs)
The themes are:
1. Cloning
2. Artificial satellites
3. Renewable sources
4. Telecommunication
5. Cyber Revolution
6. Space research
7. Polythene pollution
8. Fossil fuels
9. Safety measures in Automobiles
10. Ecological threats
11. Water resources
12. Nuclear technology
13. Scientific farming
14. Thermal power plants
15. Nano Technology
16. Robotics
17. Artificial intelligence
18. Role of Fibre Optics
19. Exploration of Mars
20. Gas turbines
21. Indian space missions
22. Converting agricultural wastes for useful purposes
23. Developments in transportation
24. Scientific Farming
25. Impact of global warming
26. Desalination of water
27. Technology for national security
28. Industrial development and ecological issues
29. Recent trends in Automobiles
30. Hazards of E-waste
31. Mobile Jammer
32. Touch Screen Technology
33. Tidal Power
34. 3G Technology
35. Tsunami Warning System
36. Blue Tooth Technology

Seminar presentation on the themes allotted:
Each student should collect materials from Books, Internet, Journals and Newspapers for his/her theme and prepare a short Seminar Paper for 4 to 5 Pages. The presentation should be for 10 minutes using power point frames. It should be followed by a Viva Voce during which others should come forward to question, clarify, supplement or evaluate.

C) GROUP DISCUSSION / DEBATE (10hrs)
Grouping (each group consisting of 12 members)
Topics (12 topics – 3 topics to be selected by each group - to be practiced in cycles)

Group Discussion / Debate Topics:
1. Advertising is a legalized form of lying- Discuss.
2. Communicative competency in English is the golden key for success in the Global arena.
3. Is it just to force people to retire?
4. Attitude decides one’s altitude in life.
5. Should an aspiring student go for a course which is in demand or for a course which he/she likes?
6. Is westernization a cultural degradation or enrichment?
7. Is Brain drain a threat to India?
9. Do Mobile phones spoil the youth?
10. No two generations see eye to eye- Discuss.
11. Is scientific advancement a boon or a bane?
12. Does ragging develop friendship?

D) SPEAKING ON THE GIVEN PICTURE/DIAGRAM/CHART/TABLE (5 hrs)

RECORD LAYOUT:
Every student has to maintain a record in which he/she has to incorporate the following details.
- First page containing learner details and the topic of specialization
- Use of appropriate Language used in Language Function should be listed.
- Three newspaper cuttings or journal or internet sources related to the specialized theme. (To be pasted on the pages)
- 10 Quiz questions of the specialized topic with expected answers.
- The seminar paper presented by the learner (to be pasted).
- Notes of observation - Lab. (Details about Interview skills – GD – Soft skills)
- The record should be duly signed by the course teacher and submitted to the External Examiner for verification during the semester practical.

TOTAL: 45 PERIODS

REFERENCES
13IT51 SYSTEM PROGRAMMING AND OPERATING SYSTEMS L T P C
3 1 0 4

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Summarize the concrete view on the theoretical and practical aspects of machine architectures and identify what makes a computer system function and features of assembler and its working.
CO 2: Explain the working progress of linkers and loaders and describe the various features of macro processors.
CO 3: Solve process scheduling and synchronization problems.
CO 4: Describe various memory management techniques.
CO 5: Describe the various file access methods and disk scheduling techniques.

UNIT I ASSEMBLERS 12

UNIT II LOADERS AND MACRO PROCESSORS 12

UNIT III PROCESS SCHEDULING AND SYNCHRONIZATION 12

UNIT IV MEMORY MANAGEMENT 12

UNIT V FILE SYSTEM INTERFACE 12

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13IT52  COMPUTER NETWORKS  L  T  P  C

3  1  0  4

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Describe the functions of computer networks and various layered architectures.
CO 2: Analyze the principles of data link layer concepts and apply suitable techniques to solve data link layer issues.
CO 3: Identify, compare and contrast different techniques and design issues of network layer.
CO 4: Implement simple client-server applications using TCP and UDP.
CO 5: Analyze the functions of various application layer protocols and use suitable application.

UNIT I  DATA COMMUNICATION AND NETWORKING  12

UNIT II  DATA LINK CONTROL PROTOCOLS  12

UNIT III  NETWORK LAYER  12

UNIT IV  TRANSPORT AND APPLICATION LAYER  12

UNIT V  ADVANCED TECHNOLOGY  12
Traditional wireless technology: GSM, GPRS, UMTS, CDMA – Modern wireless technology: WiMax, Wi-Fi, IMS, and LTE.

L: 45  T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13IT53 SOFTWARE ENGINEERING L T P C
3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Describe the various phases involved in software development.
CO 2: Apply the prototyping model during software requirement gathering.
CO 3: Explain the design principles involved in various design models.
CO 4: Compare the functionalities used in various software testing techniques.
CO 5: Analyze the metrics used for measuring the software quality and understand the scheduling process.

UNIT I SOFTWARE PRODUCT AND PROCESS

UNIT II SOFTWARE REQUIREMENTS

UNIT III ANALYSIS, DESIGN CONCEPTS AND PRINCIPLES

UNIT IV SOFTWARE TESTING STRATEGIES
Strategic approach to software testing – Test strategies for conventional software – Test strategies for object oriented software – Validation testing – System Testing – White box testing – Black box testing.

UNIT V SOFTWARE PROJECT MANAGEMENT
Metrics in the process and project domain – Software measurement – Metrics for software quality – Integrating metrics within the software process – Empirical estimation models – Project scheduling – Defining the task set for the software project- Scheduling – Earned value analysis.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Explain the features of object-oriented programming and Java.
CO 2: Apply the concepts of generic classes and collections
CO 3: Implement the applications using Network programming
CO 4: Describe exception handling and java framework.

UNIT I JAVA FUNDAMENTALS 12
C++ versus Java – Defining Java classes – Methods – Access specifiers – Static members – Constructors –

UNIT II FEATURES 12

UNIT III GENERIC PROGRAMMING 12

UNIT IV NETWORK PROGRAMMING 12

UNIT V EXCEPTION AND JAVA FRAME WORK 12
Exception handling – exception hierarchy – Throwing and catching exceptions -MVC pattern- Persistent API- Spring framework – Hibernate.

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
13IT55 PROFESSIONAL ETHICS AND HUMAN VALUES (Common to All Branches)

COURSE OUTCOMES
Upon completion of this course, the students will be able to

CO1: recognize the core values that shape the ethical behavior of an engineer

CO2: expose awareness on professional ethics and human values.

CO3: distinguish their role in technological development

UNIT I HUMAN VALUES

UNIT II ENGINEERING ETHICS

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION
Engineering as experimentation - engineers as responsible experimenters - codes of ethics - a balanced outlook on law - the challenger case study

UNIT IV SAFETY, RESPONSIBILITIES AND RIGHTS

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

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCES:
13IT57  NETWORKING LABORATORY  L  T  P  C
0  0  3  2

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Implement simple client-server applications using socket programming.
CO 2: Design and simulate a simple network to experiment with network behavior using Cisco Packet
Tracer.

LIST OF EXPERIMENTS
1. Study of Socket Programming and Client – Server model
2. Implementation of Simple TCP client server (Date time server)
8. Implementation of Stop and Wait protocol
9. Implementation of Sliding Window Protocol
10. Implementation of ARP and RARP
11. Create a socket for HTTP for web page upload and download.
12. Write a program to implement RPC (Remote Procedure Call)
13. Perform different routing algorithms to select the network path with its optimum and economical
during data transfer using CISCO Packet Tracer.
   i. Distance vector
   ii. LinkState routing

P: 45 TOTAL: 45 PERIODS
COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Implement object oriented programming features using java.
CO 2: Develop application using Applet / Swing and database.

LIST OF EXPERIMENTS

Pre-requisite Programs
1. Develop a java program using different data types and operators
2. Develop a java program using control flow statements

Lab Experiments
1. Develop a Java Program to implement constructor overloading and provide a method to return the number of active objects created. Use Java-Doc comments for documentation.
2. Develop a Java Program to implement Single inheritance, multi level and hybrid inheritance
3. Develop a Java package with simple Stack and Queue classes
4. Develop with suitable hierarchy classes for Point, Shape, Rectangle, Square, Circle, Ellipse, Triangle, Polygon, etc. Design a simple test application to demonstrate dynamic polymorphism.
5. Design a Java interface named as Text which contains two methods such as Encryption() and Decryption(). Develop two different classes that implement this interface for communication.
6. Write a Program using Generic classes
   • Write a simple generics class example.
   • Write a simple generics class example with two type parameters.
   • Implement bounded types (extend superclass) with generics
   • Implement bounded types (implements an interface) with generics
7. Write a Program using Generics Wildcards
   • Generic Upper Bounded Wildcard
   • Generic Unbounded Wildcard
   • Generic Lower bounded Wildcard
8. Write a client program that connects to a server by using a socket and sends a greeting, and then waits for a response
9. Write a chat application using socket program
10. Write a simple example using spring framework
11. Write a simple example using hibernate

P: 45 TOTAL: 45 PERIODS
13IT61    FUNDAMENTALS OF WIRELESS COMMUNICATION    L T P C
                    3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Excel in the basic concepts of Wireless channel and channel capacity.
CO 2: Acquire the knowledge about diversity and multicarrier modulation techniques.
CO 3: Discuss the various spread spectrum techniques.

UNIT I    OVERVIEW OF WIRELESS COMMUNICATIONS    9

UNIT II    CAPACITY OF WIRELESS CHANNELS    9
Introduction - Capacity of Flat Fading Channels – Channel Distribution Information known – Channel Side Information at Receiver – Channel Side Information at the Transmitter and Receiver – Capacity with Receiver diversity – Capacity comparisons – Capacity of Frequency Selective Fading channels.

UNIT III    DIVERSITY    9

UNIT IV    MULTICARRIER MODULATION    9

UNIT V    SPREAD SPECTRUM    9

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
13IT62 INTERNET AND WEB TECHNOLOGY  L T P C
(In Collaboration with InfoSys)  3 0 0 3
(Common to CSE, ECE and IT)

COURSE OUTCOMES
Upon successful completion of this course, the student will be able to
CO 1: Understand the complexity of the real world objects
CO 2: Learn the best practices for designing Web forms and Usability Reviews
CO 3: Understand the Principles behind the design and construction of Web applications
CO 4: Develop and Deploy an Enterprise Application

UNIT I REVIEW OF OBJECT ORIENTED CONCEPTS  7
Objected oriented concepts – object oriented programming (review only) — advanced concept in OOP –
relationship – inheritance – abstract classes – polymorphism – Object Oriented design methodology –
approach – best practices. UML class diagrams – interface – common base class.

UNIT II INTERNETWORKING  9
firewalls – Client/Server concepts - World Wide Web – components of web application – MIME types,
browsers and web servers – types of web content – URL – HTML – HTTP protocol – Web applications –
performance – Application servers – Web security. User Experience Design – Basic UX terminology –
UXD in SDLC – Rapid prototyping in Requirements.

UNIT III CLIENT BASED TECHNOLOGIES  9
Client Tier using HTML – Basic HTML tags – Look and feel using CSS – Client side scripting using Java
Script and Validations - Document Object Model (DOM).

UNIT IV WEB DATABASE PROGRAMMING  10
Business tier using POJO (Plain Old Java Objects) – Introduction to Frameworks – Introduction to POJO –

UNIT V SERVER BASED TECHNOLOGIES  10
Presentation tier using JSP – Role of Java EE in Enterprise applications – Basics of Servlets - To introduce
server side programming with JSP - Standard Tag Library.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
2. http://www.w3.org/
7. Developing Web Applications with JavaServer Faces found online at
8. Short introduction to log4j found online at http://logging.apache.org/log4j/1.2/manual.html
11. http://www.junit.org/
12. Marty Hall and Larry Brown, Core Servlets and JavaServer Pages Vol.1: Core Technologies 2nd
14. The Complete reference - JSP
15. Servlet Tutorial can be found online at http://java.sun.com/docs/books/tutorial
17. JSF Tutorial can be found online at http://java.sun.com/j2ee/1.4/docs/tutorial/doc/JSFIntro.html
13IT63 PRINCIPLES OF DIGITAL SIGNAL PROCESSING  L  T  P  C
3  1  0  4

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Define the basics of Signals, Systems, and Signal Processing
CO 2: Summarize the concepts of Frequency Analysis of Signals and Systems.
CO 3: Apply the concepts of Discrete Time Signal and System techniques in Signal processing
CO 4: Illustrate the Design of Digital Filters such as FIR and IIR
CO 5: Design computation methods for DFT, Fast Fourier Transforms (FFTs)
CO 6: Express the various signal processing applications.

UNIT I SIGNALS AND SYSTEMS 12

UNIT II FREQUENCY TRANSFORMATIONS 12

UNIT III IIR FILTER DESIGN 12
Structures of IIR systems – Analog filter design – IIR filter design by Impulse Invariance, Bilinear transformation, Approximation of derivatives – Discrete time IIR filter from analog filter - filter design using frequency translation.

UNIT IV FIR FILTER DESIGN 12

UNIT V MULTIRATE SIGNAL PROCESSING 12

L: 45 T: 15 TOTAL: 60 PERIODS

TEXT BOOKS

REFERENCES
## COMPARATOR DESIGN

### COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to

- **CO 1**: Describe the theory and practice of compilation.
- **CO 2**: Explain lexical rules and grammars for a programming language.
- **CO 3**: Implement a parser in compiler-generation tools.
- **CO 4**: Implement semantic rules into a parser.

### UNIT I  OVERVIEW OF COMPUTER HARDWARE, SYSTEM SOFTWARE AND COMPILER  12

### UNIT II  LEXICAL ANALYSIS  12

### UNIT III  SYNTAX ANALYSIS  12

### UNIT IV  RUN-TIME STORAGE ORGANIZATION AND INTERMEDIATE CODE GENERATION  12


### UNIT V  OPTIMIZATION AND CODE GENERATION  12
**Optimization**: Introduction – Hints on writing optimized code at user level – Construction of basic blocks and processing – Data-flow analysis using flow graph – Data-flow equations for blocks with backward flow control – Principal sources of optimization and transformations – Alias – procedural optimization – Loops in flow graph – Loop optimization


L: 45  T: 15  TOTAL: 60 PERIODS

### TEXT BOOK

### REFERENCES
COURSE OUTCOMES
Upon Successful completion of this course, the student will be able to
CO 1: Understand, analyze and apply the role of languages HTML, Javascript, JSP in the workings of the web and web applications
CO 2: Analyze a web page and identify its elements and attributes.
CO 3: Able to develop web pages using JDBC
CO 4: Able to build web applications using JSP.
CO 5: Develop and Deploy an Enterprise Application.

LIST OF EXERCISES
1. Develop a java application for Bank Transaction with different constraints.
2. Develop a java program to get employees details with given constraints.
3. Analyze and design the java code for given problems.
5. Implement Body Mass Index Calculator.
6. Simpsons Database: There is a database for Springfield Elementary School with the following tables:
   a. Courses(id, name, teacher_id)
   b. Grades(student_id, course_id, grade)
   c. Students(id, name, email, password)
   d. Teachers(id, name)
7. World Database: There is a world database with the following tables:
   Countries(code, name, continent, surface_area, population, life_expectancy, gnp, ...)
   Cities(id, name, country_code, district, population)
   CountriesLanguages(country_code, language, official, percentage)
8. Design a web page for an Online voting Form with various HTML components.
9. Design a web page for an Email Registration Form with various HTML components. Develop a Servlet application to receive the email registration information and store the details into a table.
10. Design a web page for integrating the RMI server program to find minimum and maximum of three numbers send by the client program. Design a GUI Form for the RMI client to collect three numbers and display the result of minimum, maximum using Text Field.
11. Mini Project.

P: 45 TOTAL: 45 PERIODS

LIST OF EQUIPMENTS AND COMPONENTS

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Course</th>
<th>S/W on Students Machine</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>OOC (Java)</td>
<td>Eclipse 3.2</td>
</tr>
<tr>
<td>2.</td>
<td>Client tier (HTML/JS) &amp; Business tier (JDBC)</td>
<td>Eclipse 3.2</td>
</tr>
<tr>
<td>3.</td>
<td>Presentation tier (JSP)</td>
<td>Tomcat server in Eclipse 3.2</td>
</tr>
</tbody>
</table>

An alternate Software requirement can be WAMPP (Windows, Apache, MySQL, Perl / PHP) combination. WAMPP is an open source package, hence free too.
13IT68 CASE TOOLS LABORATORY L T P C 0 0 3 2

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

CO 1: Design the suitable UML diagram for a given problem and develop the User Interface Design

LIST OF EXPERIMENTS

Develop a mini-project for any one problem of your choice using the following guidelines

1. Develop a problem statement.
2. Develop an IEEE standard SRS document. Also develop risk management and project plan.
3. Identify Use Cases and develop the Use Case model.
4. Identify the business activities and develop an UML Activity diagram.
5. Identify the conceptual classes and develop a domain model with UML Class diagram.
6. Using the identified scenarios find the interaction between objects and represent them using UML Interaction diagrams.
7. Draw the State Chart diagram.
8. Identify the User Interface, Domain objects, and Technical services. Draw the partial layered, logical architecture diagram with UML package diagram notation.
9. Implement the Technical services layer.
10. Implement the Domain objects layer.
11. Implement the User Interface layer.
12. Draw Component and Deployment diagrams.

Suggested domains for Mini-project

1. Passport automation system.
2. Book bank
3. Exam Registration
4. Stock maintenance system.
5. Online course reservation system
6. E-ticketing
7. Credit card processing
8. E-book management system
9. Recruitment system
10. Library management system
11. Conference management system
12. BPO management system

P: 45 TOTAL: 45 PERIODS
13IT69  COMPREHENSION  L  T  P  C  
0   0   3   1

COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to
CO 1: Recall and Debug various programming languages.
CO 2: Describe about various hardware and software components of computer.

Evaluation Procedure

<table>
<thead>
<tr>
<th>S. No</th>
<th>Subject Area</th>
<th>Responsible</th>
<th>Assessment Methods</th>
<th>Internal (50 Marks)</th>
<th>External (50 Marks)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Object Oriented Programming using C++</td>
<td>DE-1</td>
<td>Objective Tests</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td>Java Programming</td>
<td>CC-2</td>
<td></td>
<td></td>
<td>A panel of two members (one internal and one external) will be evaluating the Students.</td>
</tr>
<tr>
<td>3</td>
<td>C# and .NET Framework</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>4</td>
<td>Relational Database Management Systems</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>5</td>
<td>Computer Architecture</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6</td>
<td>Digital System Design</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>Data Structures</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>8</td>
<td>System Programming and Operating Systems</td>
<td>DE-1</td>
<td>Objective Tests</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>9</td>
<td>Algorithm Analysis and Design</td>
<td>CC-2</td>
<td>Tests Assignments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>Computer Networks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>11</td>
<td>Software Engineering Methodologies</td>
<td>DE-1</td>
<td>Objective Tests</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>12</td>
<td>Principles of Compiler Design</td>
<td>CC-2</td>
<td>Tests Assignments</td>
<td></td>
<td></td>
</tr>
<tr>
<td>13</td>
<td>Internet and Web Technology</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

[DE – Domain Expert  CC – Course Coordinator VV – Viva-voce]

P: 30 TOTAL: 30 PERIODS
COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Explain the functions of Internetworking and create subnets from given IP address.
CO 2: Describe the key features and functions of TCP.
CO 3: Describe the key features and functions of IP.
CO 4: Analyze the various routing algorithms and apply suitable algorithm in given problem.
CO 5: Analyze and Describe the design concepts of Internetworking.

UNIT I INTRODUCTION-INTERNETWORKING  9

UNIT II TCP  9

UNIT III IP  9

UNIT IV IP ROUTING  9

UNIT V APPLICATIONS  9

TEXT BOOKS

REFERENCE
COURSE OUTCOMES
Upon successful completion of this course, the students will be able to:

CO 1: Describe the basics of socket programming using TCP Sockets.
CO 2: Describe about Socket Options.
CO 3: Explain the importance of SNMPv1, v2 and v3 protocols in network management.

UNIT I INTRODUCTION TO NETWORKING

UNIT II SOCKETS AND APPLICATION DEVELOPMENT

UNIT III SOCKET OPTIONS AND NAMING CONVERSIONS
Socket options - getsockopt and setsockopt functions - Generic socket options - IP socket options - TCP socket options - Multiplexing TCP and UDP sockets - Domain Name System - gethostbyname, gethostbyaddr, getservbyname and getservbyport functions.

UNIT IV ADVANCED SOCKETS
IPv4 and IPv6 interoperability - Threaded servers - Thread creation and termination - TCP echo server using threads - Raw sockets - Raw socket creation - Raw socket output - Raw socket input - ping program - traceroute program.

UNIT V NETWORK MANAGEMENT

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCE
13ITAC DISTRIBUTED SYSTEMS

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Gain knowledge about various paradigms of communication in distributed environment.
CO 2: Familiar with various concepts of distributed operating systems.
CO 3: Acquire information about different models of distributed resource management.
CO 4: Recognize the different ideas of fault tolerance system.
CO 5: Study about Object and Coordination Based System.

UNIT I COMMUNICATION IN DISTRIBUTED ENVIRONMENT 9

UNIT II DISTRIBUTED OPERATING SYSTEMS 9

UNIT III DISTRIBUTED RESOURCE MANAGEMENT 9
Distributed Shared Memory – Data-Centric Consistency Models – Client-Centric Consistency Models– Ivy – Munin– Distributed Scheduling – Distributed File Systems – Sun NFS.

UNIT IV FAULT TOLERANCE 9

UNIT V DISTRIBUTED OBJECT BASED SYSTEM 9

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Discuss the various technologies of Next generation networks
CO 2: Illustrate the principles of IMS and Convergent Management in Next generation networks
CO 3: Explain the functions of IP Networks and its technologies
CO 4: Explain the principles of multi service networks with MPLS technologies
CO 5: Describe various applications of Next generation networks

UNIT I NEXT GENERATION TECHNOLOGIES 9
Introduction - Motivations for IP based services - Changes, Opportunities and Challenges – HFC Network –
Digital TV - Next Generation Technologies - Next Generation Networks - Next Generation Services –
Management of NG Services - Next Generation Society.

UNIT II IP NETWORKS 9
IP Networks: IP past, present and future - IP influence and confluence - IP versions - IP Network
convergence - LAN Technologies - IP Routing - LAN Switching –Wide Area Technologies and Topologies -
Wireless IP LANS - Mobility Networks - Global IP Networks: Global capacity - Globally Resilient IP -
Internet – A Network of Networks.

UNIT III MULTI SERVICE NETWORKS 9
Origin of multi service ATM - Next Generation Multi service Networks - Next Generation Multi service
ATM switching - Multi protocol Label switching Networks: Frame Based MPLS - Cell based MPLS - MPLS
services and their benefits - multi service provisioning platforms (MSPP) & Multi service switching platform
(MSSP).

UNIT IV IMS AND CONVERGENT MANAGEMENT 9
IMS Architecture - IMS services - QoS Control and Authentication - Network and Service management for
NGN - IMS advantages - Next Generation OOS Architecture: Importance to OSS Architecture - OSS

UNIT V SERVICES AND APPLICATIONS 9
Introduction – Intelligent Network Services: Voice based services – Internet based services - RAN
architecture: Radio Access Network Architecture for GSM, GPRS and UMTS - QoS definition and
management in GPRS and UMTS – Applications: Internet connectivity - e-commerce - call centres - third
party application service provision – WAP – WiMAX - integrated billing - security and directory enable
networks.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS
1. Thomas Plavyk, “Next generation Telecommunication Networks, Services and Management”,

REFERENCES
2. Next Generation Telecoms Networks, Parliament office of Science and Technology (postnote).
   83, Jan-March 2004.
4. J.C. Crimi, “Next Generation Network (NGN) Service”, A Telcordia Technologies white paper,
13ITAE  HIGH SPEED NETWORKS  
(Common to ECE, CSE and IT)  
<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

COURSE OUTCOMES
Upon successful completion of this course students will be able to
- CO 1: Develop an in-depth understanding, in terms of architecture, protocols and applications, of major high-speed networking technologies.
- CO 2: Apply queueing analysis to control the effect of the congestion in high speed networks.
- CO 3: Compare the various approaches of the Integrated and Differentiated Services.
- CO 4: Discuss the protocols which provide QoS support for Real Time Applications.

UNIT I  HIGH SPEED NETWORKS  
9

UNIT II  QUEUING ANALYSIS AND CONGESTION CONTROL  
9

UNIT III  ATM CONGESTION CONTROL  
9

UNIT IV  INTEGRATED AND DIFFERENTIATED SERVICES  
9

UNIT V  PROTOCOLS FOR QOS SUPPORT  
9

L:45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
13ITAF  CYBER FORENSICS  L T P C
3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Explain the information on cyber forensics.
CO 2: Explain the various types of forensics systems.
CO 3: Analyze and validate the forensics data.
CO 4: Work with various forensics tools.
CO 5: Identify and authenticate an evidence of various forensics data.

UNIT I  OVERVIEW OF COMPUTER FORENSICS TECHNOLOGY  9
Forensics Specialist – Types of Computer Forensics Technology: Military – Law Enforcement – Business –
Specialized technologies – Spyware and Adware – Internet Tracing Methods – Security and wireless
Technologies – Biometric Security Systems.

UNIT II  COMPUTER FORENSICS SYSTEMS AND EVIDENCE  9
Types of Forensics systems: Internet Security, Intrusion Detection, Firewall Security, Network Disaster
– Data Recovery – Evidence Collection and Data Seizure.

UNIT III  ANALYSIS AND VALIDATION  9
Validating Forensics Data – Data Hiding Techniques – Performing Remote Acquisition – Network Forensics:
Collecting Network Based Evidence - Investigating Routers - Network Protocols – Processing crime and
incident scenes : Identifying, collecting and processing digital evidence – prepare for a search – securing

UNIT IV  VERIFICATION AND AUTHENTICATION  9
Special needs of Evidential authentication – practical considerations – Practical implementation – Electronic
document discovery : A powerful new litigation tool - Identification of Data: Timekeeping, Forensic
Identification and Analysis of Technical Surveillance Devices - Reconstructing Past Events: Digital
Detective, Useable File Formats, Unusable File Formats, Converting Files.

UNIT V  FORENSICS TOOLS  9
Current Computer Forensic tools: evaluating computer forensic tool needs, computer Forensics software
tools,computer forensics hardware tools, validating and testing forensics software - E-Mail Investigations:
role of e-mail in investigation, roles of the client and server in email, investigating e-mail crimes and
violations, e-mail servers specialized e-mail forensic tools.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS
   Learning 2005.

REFERENCE
   Hall, 2013.
13ITAG  GAME PROGRAMMING  L  T  P  C
3  0  0  3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Discuss the concepts of Game design and development.
CO 2: Explain the processes, and use mechanics for game development.
CO 3: Explain the Core architectures of Game Programming.
CO 4: Use Game programming platforms, frame works and engines.

UNIT I  3D GRAPHICS FOR GAME PROGRAMMING  9
3D Transformations, Quaternions, 3D Modeling and Rendering, Ray Tracing, Shader Models, Lighting,
Color, Texturing, Camera and Projections, Culling and Clipping, Character Animation, Physics-based
Simulation, Scene Graphs.

UNIT II  GAME ENGINE DESIGN  9
Game engine architecture, Engine support systems, Resources and File systems, Game loop and real-time
simulation, Human Interface devices, Collision and rigid body dynamics, Game profiling.

UNIT III  GAME PROGRAMMING  9
Application layer, Game logic, Game views, managing memory, controlling the main loop, loading and
caching game data, User Interface management, Game event management.

UNIT IV  GAMING PLATFORMS AND FRAMEWORKS  9
2D and 3D Game development using Flash, DirectX, Java, Python, Game engines - DX Studio, Unity.

UNIT V  GAME DEVELOPMENT  9
Developing 2D and 3D interactive games using DirectX or Python – Isometric and Tile Based Games, Puzzle
games, Single Player games, Multi Player games.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS
1. Mike Mc Shaffrey and David Graham, “Game Coding Complete”, 4th Edition, Cengage Learning,
   PTR, 2012.

REFERENCES
   Course Technology PTR, 2011.
COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Describe the Swing Components
CO 2: Write socket programming using java
CO 3: Familiar with the application development using Servlets
CO 4: Gain knowledge about server side programming languages using JSP
CO 5: Explain about concepts of Enterprise Java Beans.

UNIT I INTRODUCING SWING

UNIT II NETWORK PROGRAMMING IN JAVA

UNIT III SERVLETS

UNIT IV JAVA SERVER PAGES (JSP)

UNIT V ENTERPRISE JAVA BEANS

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
1. H. M.Deitel, P. J. Deitel, S. E. Santry ,“Advanced Java 2 Platform HOW TO PROGRAM”, Prentice Hall
COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Explain about principles of Service Orientation
CO 2: Describe about service oriented analysis techniques
CO 3: Describe the Service Oriented Design concepts
CO 4: Explain the parts of the development and runtime ends of a distributed technology platform for SOA.
CO 5: Describe about various Web service specification standards

UNIT I PRINCIPLES OF SERVICE ORIENTATION

UNIT II SERVICE ORIENTED ANALYSIS TECHNIQUES

UNIT III SERVICE ORIENTED DESIGN

UNIT IV SOA PLATFORM BASICS
SOA platform basics – SOA support in J2EE – Java API for XML based web services (JAX-WS) - Java architecture for XML binding (JAXB) – Java API for XML Registries (JAXR) - Java API for XML based RPC (JAX-RPC) - Web Services Interoperability Technologies (WSIT) – SOA support in .NET – Common Language Runtime - ASP.NET web forms – ASP.NET web services – Web Services Enhancements (WSE).

UNIT V WEB SERVICE SPECIFICATION STANDARDS

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
13ITBC MOBILITY ENGINEERING

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Acquire knowledge on various mobile technologies available and their future trends
CO 2: Learn about the devices, platform, various layers involved in Mobile Architecture
CO 3: Learn about Enterprise mobility Solution layers and Architecture
CO 4: Develop mobile apps using Android OS
CO 5: Describe about the mobile testing and its applications in various industries

UNIT I INTRODUCTION TO MOBILITY
Emergence of Enterprise Mobility: Development in Web Standards – Advance in Wireless Technology –
Innovations in Mobile Device platforms – Enterprise Mobility Landscape: Mobile solution Types – Key
players in the Mobility Landscape – Mobile Handsets – Challenges in Enterprise Mobility.

UNIT II ENTERPRISE MOBILITY ADAPTATION AND MARKETING CHANNEL
Enterprise Mobility Adaptation: Introduction – Key decision factors in defining a Mobility Adaptation
strategy – Steps in defining a Mobility Adaptation strategy – Feature of mobile in Marketing – Types of
Marketing – Integrated Mobile Marketing – New elements in HTML5

UNIT III ENTERPRISE MOBILITY LAYERS AND SOLUTION ARCHITECTURE
Enterprise mobility layers: Device layer – Access layer-Adaptation layer – Management Layer – Services
Layer – Application layer – Enterprise mobility Solution Architecture: Thin client Solution Architecture –
Thick client Solution Architecture – Mobility significance and Solution life cycle – Cross platform
development.

UNIT IV MOBILE APPLICATION DEVELOPMENT ENVIRONMENT
Mobile platforms in the market: Android- iOS – Symbian - Windows Mobile – Black Berry Mobile
Application Design: Mobile application technology – Architecture and design consideration – Mobile
programming: Android – iPhone – Windows mobile.

UNIT V MOBILITY TESTING AND APPLICATIONS
Mobile application Testing Life Cycle – Simulator testing- Real Time Testing – Functional testing –
Performance testing – Stability and Usability testing.
Mobility Solution for the Healthcare Industry – Mobility in Education – Mobility in Financial service
Industry – Mobile Social Networking – Location Based Services – Bring your own device (BYOD).

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
1. Carsten Srensen,”Enterprise Mobility: Tiny Technology with Global Impact on Work
2. Greg Shackles, “Mobile Development with C#: Building Native IOS, Android, and Windows
Phone Applications (Paperback)”, O'Reilly Media Publishers, 2012.
COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Recognize the roles and responsibilities in the testing area.
CO 2: Design the test cases using various testing strategies
CO 3: Analyze various levels of testing methodologies
CO 4: Acquire knowledge on various test procedures and learn set of necessary skills needed for
monitoring and controlling.

UNIT I TESTING FUNDAMENTALS
Testing as a Process – Software Testing Principles – The Tester’s Role in a Software Development
Developer/Tester Support for Developing a Defect Repository.

UNIT II TEST CASE DESIGN
Class Partitioning - Boundary Value Analysis – cause-effect graphing – state transition testing – error
guessing – Using White Box Approach to Test design – Test Adequacy Criteria – Coverage and Control
Flow Graphs – Covering Code Logic – Paths and their Role in White box Based Test Design – Additional
White box test design approaches – Evaluating Test Adequacy Criteria.

UNIT III LEVELS OF TESTING
The Need for Levels of Testing – Unit Test: Functions, Procedures, Classes and Methods – Unit Test
Planning – Designing the Unit Tests – The Test Harness – Running the Unit tests and Recording results –
Regression Testing – Ad-hoc testing – Alpha , Beta Tests – Acceptance Testing.

UNIT IV TESTING PROCEDURES AND ORGANIZATION
Test Planning – Test Plan Components – Test Plan Attachments –Locating Test Items - Reporting Test
Results – The role of three groups in Test Planning and Policy Development – Introducing the test specialist

UNIT V TEST CONTROLLING AND MONITORING
Measurements and Milestones for Controlling and Monitoring: Testing Status-Tester Productivity – Testing
Costs – Error, Faults and Failures – Test Effectiveness – Status Meetings, Reports and Control issues –
Criteria for Test Completion – Software Configuration Management – Controlling and Monitoring: Three
Critical Views.

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
### COURSE OUTCOMES

Upon Successful completion of this course, the students will be able to

- **CO 1**: Analyze various software engineering design models and its process.
- **CO 2**: Define various parameters which are associated with the software project development.
- **CO 3**: Analyze different models for software quality management.
- **CO 4**: Analyze the various software testing functionalities under different conditions.
- **CO 5**: Define the software quality assurance measurements.

### UNIT I \( \text{FUNDAMENTALS OF MEASUREMENT THEORY} \)

- Definition - Operational definition and measurement – Level of measurement – Some basic measures - Reliability and validity – Measurement errors.

### UNIT II \( \text{SOFTWARE DEVELOPMENT MODELS} \)


### UNIT III \( \text{SOFTWARE QUALITY MANAGEMENT} \)


### UNIT IV \( \text{SOFTWARE TESTING} \)

- Software Testing fundamentals - Test case design – White box testing – Basic path testing – Control structure testing – Black box testing - Unit testing – Integration testing – Validation testing - System testing – Debugging.

### UNIT V \( \text{APPLYING QUALITY TOOLS} \)

- Ishikawas Seven basic tools – Check list – Pareto diagram – Histogram – Run charts – Scatter diagram – Control chart – Cause and effect diagram.

### TEXT BOOKS


### REFERENCES

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Explain the fundamentals of cloud computing
CO 2: Distinguish the various cloud services
CO 3: Explore some important cloud computing driven commercial systems such as GoogleApps, Microsoft Azure and Amazon Web Services and other businesses cloud applications.

UNIT I UNDERSTANDING CLOUD COMPUTING

UNIT II DEVELOPING CLOUD SERVICES

UNIT III CLOUD COMPUTING FOR EVERYONE
Centralizing Email Communications – Collaborating on Schedules – Collaborating on To-Do Lists – Collaborating Contact Lists – Cloud Computing for the Community – Collaborating on Group Projects and Events – Cloud Computing for the Corporation.

UNIT IV USING CLOUD SERVICES

UNIT V OTHER WAYS TO COLLABORATE ONLINE

TEXT BOOK

REFERENCE
13ITCB  GREEN COMPUTING  L T P C
3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
  CO 1: Explain various issues in Green Computing
  CO 2: Realize the importance of technologies that conform to low-power computation
  CO 3: Use a range of tools to help monitor and design green systems
  CO 4: Acquire knowledge on the ways to make computing greener and more efficient
  CO 5: Familiar with different real time models of Green Computing

UNIT I  OVERVIEW AND INITIATIVES  9

UNIT II  CONSUMPTION ISSUES  9

UNIT III  GREEN COMPUTING PLATFORMS  9
Greening process – Datacenter design and redesign – Virtualization.

UNIT IV  GREEN COMPUTING ARCHITECTURE  9
Rethinking of behavior – paperless communication – Recycling.

UNIT V  CASE STUDIES AND APPLICATION  9
Google green datacenter - IBM green technology - Microsoft – Case Studies – Applying Green IT Strategies and Applications to a Home – Hospital - Packaging Industry and Telecom Sector.

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
13ITCC ANALYTIC COMPUTING
(Common to IT, ECE and CSE)

L T P C
3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Apply statistical analysis methods in Big Data Platform.
CO 2: An ability to analyze a problems appropriate to mining data streams.
CO 3: Apply the knowledge of clustering techniques in data mining.
CO 4: Explain about social networking data analytics.
CO 5: Use Visualization techniques for Distributed file systems

UNIT I INTRODUCTION TO BIG DATA

UNIT II MINING DATA STREAMS

UNIT III FREQUENT ITEMSETS AND CLUSTERING

UNIT IV SOCIAL NETWORKING DATA ANALYTICS

UNIT V FRAMEWORKS AND VISUALIZATION
MapReduce – Hadoop, Hive, MapR – Sharding – NoSQL Databases - S3 - Hadoop Distributed file systems – Visualizations - Visual data analysis techniques, interaction techniques; Systems and applications.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
COURSE OUTCOMES
Upon successful completion of this course, the students will be able to
CO 1: Describe the key concepts of analysis and design of social computing systems.
CO 2: Discuss the range of social computing applications.
CO 3: Apply the knowledge of social interaction technologies like blogs, wikis, podcasts, etc.,
CO 4: Show proficiency in the general social network research process from data collection to mining.

UNIT I  FUNDAMENTAL CONCEPTS AND THEORIES  9

UNIT II  DESIGN METHODOLOGIES  9

UNIT III  DEVELOPMENT  9

UNIT IV  TOOLS AND TECHNOLOGIES  9

UNIT V  SOCIAL COMPUTING AND COMMUNITY DETECTION  9
Basic Concepts - social computing task. Nodes, ties and Influence - Importance of Nodes - Strengths of Ties - Influence Modeling. Node-Centric Community Detection - Group-Centric Community Detection. Social Media Mining - Classification with Network Data.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
13ITCE PARALLEL COMPUTING L T P C 3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to

CO 1: Discuss and employ the fundamental concepts and mechanisms which form the basis of the design of parallel computation models and algorithms.

CO 2: Recognize problems and limitations to parallel systems, as well as possible solutions.

CO 3: Familiar with some of the relevant papers in the area of parallel algorithms and systems.

CO 4: Analyze applications that benefit from parallelism

CO 5: Analyze and measure performance of parallel computing systems.

UNIT I  SCALABILITY AND CLUSTERING  9

UNIT II  ENABLING TECHNOLOGIES  9

UNIT III  SYSTEM INTERCONNECTS  9
Basics of Interconnection Networks – Network Topologies and Properties – Buses, Crossbar and Multistage Switches, Software Multithreading – Synchronization Mechanisms.

UNIT IV  PARALLEL PROGRAMMING  9
Paradigms And Programmability – Parallel Programming Models – Shared Memory Programming.

UNIT V  MESSAGE PASSING PROGRAMMING  9

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
13ITDA    ADVANCED DATABASE TECHNOLOGY       L T P C
                  (Common to CSE and IT )          3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the student will be able to
   CO 1: Understand about different database system architectures.
   CO 2: Identify the various databases such as distributed, parallel and object oriented databases.
   CO 3: Develop in-depth knowledge about web and intelligent database.
   CO 4: Understand the data storage structure in emerging information systems.

UNIT I  INTRODUCTION                                8
Database System Architectures: Centralized and Client-Server Architectures - Parallel Systems –
Distributed Systems – Network Types.

UNIT II DISTRIBUTED AND PARALLEL DATABASES             9
Distributed Database Concepts: Homogeneous and Heterogeneous Databases- Distributed Data
Storage - Distributed Query Processing - Distributed Transactions – Commit Protocols – Concurrency
Control - Recovery.
Parallel Databases: Inter and Intra Query Parallelism – Inter and Intra operation Parallelism – Design
of Parallel Systems.

UNIT III  OBJECT ORIENTED DATABASES                  8
Concepts of Object Oriented Databases - ODMG Model – Object Definition Language- Object Query
Language – Conceptual Design - Object Relational features in SQL, Oracle.

UNIT IV  INTELLIGENT DATABASES                     10
Active Databases Concepts and Triggers- Deductive Databases- Temporal Database - Spatial
Databases - Data Mining:Overview.

UNIT V  EMERGING DATABASE TECHNOLOGIES AND APPLICATIONS  10
Mobile Database. Multimedia Databases. Geographic Information Systems. Genome Data
Management.

L: 45 TOTAL:45 PERIODS

TEXT BOOKS
   Education/Addison Wesley, 2010. (Unit – III, IV & V)

REFERENCE
1. Thomas Connolly and Carlolyn Begg, “Database Systems, A Practical Approach to Design,
13ITDB DATA WAREHOUSING AND DATA MINING L T P C 3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Explain the data warehouse architecture and necessity for data mining.
CO 2: Describe the concepts of data warehousing and OLAP.
CO 3: Discuss data mining techniques and their applications.

UNIT I DATA WAREHOUSE AND OLAP TECHNOLOGY 9
Introduction to Data Warehousing - Data warehousing Components - Building a Data warehouse - Mapping the Data Warehouse to a Multiprocessor Architecture - DBMS Schemas for Decision Support - Data Extraction, Clean up, and Transformation Tools - Metadata – Business analysis reporting, Query tools and Applications - Online Analytical Processing (OLAP) - OLAP and Multidimensional Data model.

UNIT II DATA PREPROCESSING 9
Data Mining - Data Mining Functionalities - Data Preprocessing - Data Cleaning - Data Integration and Transformation - Data Reduction - Data Discretization and Concept Hierarchy Generation.

UNIT III ASSOCIATION RULES 9

UNIT IV CLASSIFICATION AND CLUSTERING 9
Classification and Prediction, Issues - Decision Tree Induction - Bayesian Classification - Rule based classification - Other Classification Methods - Prediction - Accuracy and Error Measures - Cluster Analysis - Types of data - Categorization of Clustering methods - Partitioning methods - Hierarchical Methods - Outlier Analysis.

UNIT V MINING MULTIMODAL DATA 9
Multidimensional Analysis and Descriptive Mining of Complex Data Objects - Spatial Data mining - Multimedia Data mining - Text Mining – Mining the WWW - Applications and Trends in Data Mining.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
### 13ITDC INFORMATION STORAGE AND MANAGEMENT

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

#### COURSE OUTCOMES
- CO 1: Explain various storage technologies and their architecture
- CO 2: Demonstrate different RAID levels
- CO 3: Explain the fundamentals of cloud computing and virtualization technologies
- CO 4: Explain the concepts of backup and replication
- CO 5: Describe security solutions for FC-SAN, IP-SAN and NAS environments

#### UNIT I STORAGE SYSTEM
9
- Introduction to information storage, virtualization and cloud computing
- Key data center elements
- Compute, application, and storage virtualization
- Disk drive & flash drive components and performance
- RAID - Intelligent storage system and storage provisioning (including virtual provisioning)

#### UNIT II STORAGE NETWORKING TECHNOLOGIES AND VIRTUALIZATION
9
- Fibre Channel SAN components, FC protocol and operations
- Block level storage virtualization - iSCSI and FCIP as an IP-SAN solutions
- Converged networking option – FCoE
- Network Attached Storage (NAS) - components, protocol and operations
- File level storage virtualization
- Object based storage and unified storage platform

#### UNIT III BACKUP, ARCHIVE, AND REPLICATION
9
- Business continuity terminologies, planning and solutions
- Clustering and multi-pathing architecture to avoid single points of failure
- Backup and recovery - methods, targets and topologies
- Data deduplication and backup in virtualized environment
- Fixed content and data archive
- Local replication in classic and virtual environments
- Remote replication in classic and virtual environments
- Three-site remote replication and continuous data protection

#### UNIT IV CLOUD COMPUTING CHARACTERISTICS AND BENEFITS
9
- Cloud Enabling technologies – Characteristics and benefits of cloud computing
- Services and deployment models
- Cloud computing infrastructure – cloud challenges
- Cloud migration considerations

#### UNIT V SECURING AND MANAGING STORAGE INFRASTRUCTURE
9
- Security threats, and counter measures in various domains
- Security solutions for FC-SAN, IP-SAN and NAS environments
- Security in virtualized and cloud environments
- Monitoring and managing various information infrastructure components in classic and virtual environments
- Information lifecycle management (ILM) and storage tiering

#### TEXT BOOK

#### REFERENCES
13ITDD INFORMATION THEORY AND CODING  

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to

CO 1: Excel in the basic concepts of information theory, Source coding, Channel coding and relations among them.

CO 2: Obtain the knowledge about the Source coding methods on Text, Audio, Speech, image and video formats.

CO 3: Design the encoder and decoder for the error control coding methods.

UNIT I INFORMATION THEORY  

UNIT II SOURCE CODING: TEXT, AUDIO AND SPEECH  

UNIT III SOURCE CODING: IMAGE AND VIDEO  

UNIT IV ERROR CONTROL CODING: BLOCK CODES  

UNIT V ERROR CONTROL CODING: CONVOLUTIONAL CODES  

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
13ITEB MOBILITY WITH ANDROID LABORATORY  L  T  P  C
0  0  3  2

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Describe the components and structure of mobile application development frameworks for
   Android OS based mobiles.
CO 2: Design and Implement various mobile applications using emulators.
CO 3: Deploy applications to hand-held devices

LIST OF EXPERIMENTS
1. Develop an application that uses GUI components, font and colors.
2. Develop an application that uses layout manager and event listeners.
3. Creating navigation App using Intent filter
4. Develop a native calculator application
5. Develop an Email app using Android.
6. Develop a SMS app using Android.
7. Develop an Android App to display the Video
8. Implement an application that implements multithreading
9. Develop a native application that use GPS location information
10. Implement an application that writes data to SD card
11. Implement an application that creates an alert upon receiving message
12. Develop a SQLITE App to store and retrieve the student data from SQLITE database.
13. Develop a ServerHit App to store and retrieve the student data from MySQL database.

P:45 TOTAL: 45 PERIODS
13ITEC SOFTWARE TESTING LABORATORY L T P C

0 0 3 2

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Test a process of executing a program with the intent of finding an error.
CO 2: Test the programs with various applications.
CO 3: Analyze about various testing tool and write a test suite.

LIST OF EXPERIMENTS

1. Write programs in C++ Language to demonstrate the working of the following
   a. constructs: i) do…while ii) while….do iii) if…else iv) switch v) for
2. A program written in C++ language for Matrix Multiplication fails Introspect the causes for its failure and write down the possible reasons for its failure.
3. Take any real time system and study its system specifications and report the various bugs.
4. Write and test a program to update 10 student records into table into Excel file.
5. Write and test a program to select the number of students who have scored more than 60 in any one subject (or all subjects).
6. Write and test a program to provide total number of objects present available on the page.
7. Write and test a program to get the number of list items in a list combo box.
8. Study of any testing tool (e.g. Win runner)
9. Study of any web testing tool (e.g. Selenium)
10. Using Selenium IDE, Write a test suite containing minimum 4 test cases.

P:45 TOTAL: 45 PERIODS
COURSE OUTCOMES

Upon completion of this course the students will be able to,

CO1: Recognize the need for total quality management and areas of application of this management concept.
CO2: Predict the need for customer expectations and employee involvement.
CO3: Estimate six-sigma and perform benchmarking.
CO4: Devise methods to use Quality Function Deployment (QFD), failure Mode Effect Analysis (FMEA) and Taguchi’s loss functions.
CO5: Describe ISO 9000 and Environmental Management System (EMS) standards.

UNIT I  INTRODUCTION  9
Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of manufacturing and service quality - Basic concepts of TQM - Definition of TQM - Contributions of Deming, Juran and Crosby – Cost of Quality, Analysis Techniques for Quality Costs - Barriers to TQM.

UNIT II  TQM PRINCIPLES  9

UNIT III  TQM TOOLS & TECHNIQUES I  9
The seven traditional tools of quality – New management tools – Deviation and Standard Deviation; Phases and Defective Units of Six Sigma; Its Importance; Overview of Master Black and Green Belt–Bench marking– Reason to bench mark, Bench marking process – FMEA – Stages, Types.

UNIT IV  TQM TOOLS & TECHNIQUES II  9

UNIT V  QUALITY SYSTEMS  9

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS


REFERENCES

FEW HYPERLINKS FOR REFERENCES

- http://nptel.ac.in/courses/110101010/16
13ITFB INTELLECTUAL PROPERTY RIGHTS L T P C

3 0 0 3

COURSE OUTCOMES
Upon successful completion of this course, the students will be able to

CO 1: understand the principles, functions and basic legal rules of IP law

CO 2: Recognize the relevant criteria for generating and protecting intellectual work.

UNIT I TYPES OF PROPERTY

UNIT II PATENTS AND APPLICATION PROCEDURES

UNIT III INTERNATIONAL PARTICES

UNIT IV LEGISLATIONS AND POLICY

UNIT V CASE STUDIES
Case Studies on – Patents (Basumati rice, turmeric, Neem, etc.) – Copyright and related rights – Trade Marks – Industrial design and Integrated circuits – Geographic indications – Protection against unfair competition.

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
13ITFC BUSINESS INTELLIGENCE AND ITS APPLICATIONS (Common to CSE, ECE and IT) 3 0 0 3

COURSE OUTCOMES
Upon successful completion of this course, the student will be able to,
- CO 1: Develop a foundation in Business Intelligence (BI) for Business Analysis.
- CO 2: Understand the different aspects of the BI environment, and key success factors.
- CO 3: Understand Technology enabling process in an organization.
- CO 4: Identify and analyze the new Techniques in BI.
- CO 5: Be able to apply the techniques in the context of a business problem.

UNIT I INTRODUCTION TO BUSINESS INTELLIGENCE 9
Business intelligence and its impact - Factors driving Business Intelligence – Business Intelligence and Related Technologies – Case Study - Obstacles to Business Intelligence.

UNIT II BUSINESS INTELLIGENCE CAPABILITIES 9

UNIT III TECHNOLOGY ENABLING BUSINESS INTELLIGENCE 9
Technology enabling Organizational Memory – Information Integration – Enabling Insights and Decision – Enabling Presentation - OLAP Cube, Data Slice and Dice - BI in Practice - Performance Dashboards - Balanced Scorecards - IT Governance - Case Study.

UNIT IV BUSINESS INTELLIGENCE IMPLEMENTATION: INTEGRATION AND EMERGING TRENDS 9

UNIT V MANAGEMENT AND FUTURE OF BUSINESS INTELLIGENCE 9
Development of BI - Business Intelligence System - Reporting system - Data Warehouse - Data Mart - Knowledge Management Systems - Discussion and Case Study – The Future of Business Intelligence.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
13ITFD KNOWLEDGE MANAGEMENT L T P C
3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Describe the cognitive thinking approaches of Knowledge
CO 2: Discuss the Knowledge creation and Knowledge Architecture
CO 3: Describe the Knowledge Capturing Techniques
CO 4: Analyze and define Data Management and testing approaches.

UNIT I BASICS OF KNOWLEDGE MANAGEMENT 9
Expert Knowledge – Human Thinking and Learning.

UNIT II KNOWLEDGE MANAGEMENT SYSTEM LIFECYCLE 9
Challenges in Building KM Systems – Conventional Vs KM System Life Cycle (KMSLS) – Knowledge
Creation and Knowledge Architecture – Nonaka’s Model of Knowledge Creation and Transformation -
Knowledge Architecture.

UNIT III CAPTURING THE TACIT KNOWLEDGE 9
Evaluating the Expert – Developing Relationship with Experts – Fuzzy Reasoning and the Quality of
Knowledge – Knowledge Capturing Techniques, Brain Storming – Protocol Analysis – Consensus Decision

UNIT IV KNOWLEDGE CODIFICATION 9
Modes of Knowledge Conversion – Codification Tools and Procedures – Knowledge Developer’s Skill Sets –
System Testing and Deployment – Knowledge Testing –Approaches to Logical Testing, User Acceptance

UNIT V KNOWLEDGE SHARING AND TRANSFER 9
Transfer Methods – Role of the Internet – Knowledge Transfer in e-world – KM System Tools – Neural
Network – Association Rules – Classification Trees – Data Mining and Business Intelligence – Decision
Workers.

L: 45 TOTAL: 45 PERIODS

TEXT BOOK

REFERENCES
1. Guus Schreiber, Hans Akkermans, AnjoAnjewierden, Robert de Hoog, Nigelhadbolt, Walter Van
de Velde and Bob Wielinga, “Knowledge Engineering and Management”, Universities Press,
2. C.W. Holsapple, “Handbooks on Knowledge Management”, International Handbooks on
COURSE OUTCOMES
Upon successful completion of this course, the student will be able to
CO 1: Comprehend the underlying economic mechanisms and driving forces of E-Commerce
CO 2: Understand the critical building blocks and network infrastructure of E-Commerce
CO 3: Realize the infrastructure and types of M-Commerce Services
CO 4: Recognize the availability of latest technologies of M-commerce in various domains.
CO 5: Show Competency in business application services of M-Commerce.

UNIT I  E-COMMERCE                                      9
Electronic Commerce Framework – Electronic Commerce and Media Convergence– Anatomy of
E-Commerce Applications – Consumer Application -Electronic Commerce organization application.

UNIT II  NETWORK INFRASTRUCTURE                                    9
Introduction - Market forces influencing the I-Way - Components of the I-Way - Network access
equipment - The Last Mile: Local Roads and Access Ramps - Global information distribution
networks - Public policy issues shaping the i-way.

UNIT III  M-COMMERCE: BASICS                                     9
Introduction, Infrastructure of M–Commerce, Types of Mobile Commerce Services, Technologies of
Wireless Business, Benefits and Limitations, Support, Mobile Marketing & Advertisement, Non–
Internet Applications in M–Commerce, Wireless/Wired Commerce Comparisons

UNIT IV  TECHNOLOGIES                               9
Mobile Communications: A Quick Primer - Historical perspective – Basic Architecture –
Multiplexing Schemes, 2G Landscape, Closer look at GSM, Roaming and Billing, Transition Toward
3G-GSM,TDMA, PDC Migration and CdmaOne Migration.

UNIT V  BUSINESS APPLICATIONS AND SERVICES                            9
Mobile Information Services, Directory Services, Banking and Trading, E-Tailing and  E-Ticketing,
Entertainment, Business Applications and Services, Next Generation M-commerce Scenarios,
Personalization, Location - Based Services.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS
   Sons, 2002.

REFERENCES
2. P.Candace Deans, “E-Commerce and M-Commerce Technologies”, Idea Group Inc (IGI),
   2005.
13ITFF  NATURAL LANGUAGE PROCESSING  L  T  P  C
3  0  0  3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Explain natural language processing and apply basic algorithms.
CO 2: Describe the concepts of information retrieval.
CO 3: Apply NLP in text processing.
CO 4: Design an application that uses different aspects of language processing

UNIT I  INTRODUCTION

UNIT II  INFORMATION RETRIEVAL

UNIT III  TEXT MINING
Categorization – Extraction based Categorization- Clustering- Hierarchical Clustering - Document Classification and routing- finding and organizing answers from Text search – use of categories and clusters for organizing retrieval results – Text Categorization and efficient Summarization using Lexical Chains – Pattern Extraction.

UNIT IV  GENERIC ISSUES

UNIT V  APPLICATIONS

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES
13ITFG  EMBEDDED SYSTEMS  L T P C  3 0 0 3

COURSE OUTCOMES
Upon Successful completion of this course, the students will be able to
CO 1: Explain how microprocessor, memory, peripheral components and buses interact in an embedded system
CO 2: Evaluate how architectural and implementation decisions influence performance and power dissipation
CO 3: Use the implementation of Embedded networks
CO 4: Describe the performance issues of multiprocessors
CO 5: Sketch a design of an embedded system around a microprocessor or DSP

UNIT I  EMBEDDED COMPUTING AND INSTRUCTION SETS  9
Complex Systems and Microprocessor – Embedded system design process – Formalism for Design process - Model Train controller- ARM processor – Architecture, Instruction sets and programming - T1 C55X DSP processor.

UNIT II  MEMORY MANAGEMENT, PROGRAM DESIGN AND ANALYSIS  9
Programming Input and Output – Memory system mechanisms – CPU performance-design example - Memory and I/O devices with interfacing – Development debugging – system level performance analysis – Assembly, Linking and Loading- Program optimization and validation.

UNIT III  OPERATING SYSTEMS AND MULTIPROCESSORS  9
Scheduling policies – Interprocess Communication mechanisms – Performance issues-CPUs and Accelerators-Multiprocessors - Design examples.

UNIT IV  EMBEDDED NETWORKS  9
Distributed Embedded Architectures- I2C Protocol basics - serial communication using I2C bus- Ethernet communication - Vehicles as networks – Sensor Networks.

UNIT V  EMBEDDED SYSTEM DEVELOPMENT  9
Design issues and techniques – System Analysis and Architecture Design- Quality Assurance-Case studies – Complete design of example embedded systems.

L: 45 TOTAL: 45 PERIODS

TEXT BOOKS

REFERENCES