GOVERNMENT COLLEGE OF TECHNOLOGY
(An Autonomous Institution Affiliated to Anna University)
Coimbatore - 641 013

Regulations, Curriculum And Syllabi For
B.E. (ELECTRONICS AND COMMUNICATION ENGINEERING)
(Full Time)

2012
Regulations

OFFICE OF THE CONTROLLER OF EXAMINATIONS
GOVERNMENT COLLEGE OF TECHNOLOGY
THADAGAM ROAD, COIMBATORE - 641 013

PHONE 0422 - 2433355  FAX : +91 0422 - 2433355
email : coegct@gmail.com
VISION AND MISSION OF THE INSTITUTION

Vision
To emerge as a center of excellence and eminence by imparting futuristic technical education in keeping with global standards, making our students technologically competent and ethically strong so that they can readily contribute to the rapid advancement of society and mankind.

Mission

1. To achieve Academic excellence through innovative teaching and learning practices
2. To enhance employability and entrepreneurship
3. To improve the research competence to address Societal needs
4. To inculcate a culture that supports and reinforces ethical, professional behaviours for a harmonious and prosperous society.

VISION AND MISSION OF THE DEPARTMENT

Vision
The vision of ECE department is to become pioneer in higher learning and research and to produce creative solution to societal needs.

Mission

1. To provide excellence in education, research and public service.
2. To provide quality education and to make the students entrepreneur and employable.
3. Continuous upgradation of techniques for reaching heights of excellence in a global perspective.

PROGRAMME EDUCATIONAL OBJECTIVES
The Programme Educational Objectives of UG in Electronics and Communication Engineering are

1. Graduates apply their knowledge of mathematics and science to identify, analyze and solve problems in the field of Electronics and develop sophisticated communication systems.
2. Graduates exhibit their innovative ideas and management skills to meet the day to day technical challenges.
3. Graduates embody a commitment to professional ethics, diversity and social awareness in their professional career.
4. Graduates exhibit a desire for life-long learning through technical training and professional activities.
PROGRAMME OUTCOMES

The Programme Outcomes of UG in Electronics and Communication Engineering are:

1. An ability to apply knowledge of mathematics, science and engineering fundamental concepts appropriate to the discipline of Electronics and Communication Engineering
2. An ability to analyze the complex Engineering problems, identify and formulate the solutions appropriate to it.
3. An ability to design, implement and evaluate electronics and communication systems for public health and safety, cultural, societal and environmental considerations
4. An ability to design electronic circuits and conduct investigations, as well as to analyze and interpret data
5. An ability to use current techniques, skills, and modern tools necessary for practice.
6. An ability to apply the professional engineering practice to the local and global issues in the society
7. An ability to apply the knowledge of professional engineering solutions for the sustainable development in changing environments
8. An ability to apply the knowledge of learnt professional ethics to social issues and responsibilities
9. An ability to function effectively as an individual and as a team leader in diverse and multidisciplinary settings to accomplish a common goal
10. An ability to communicate effectively through presentations and clear instructions with the engineering community and society
11. An ability to apply the engineering and management principles to manage project as an employee and as an employer
12. An ability to develop life-long learning for the changing technological environment
# B.E Electronics and Communication Engineering [Full Time]
## Curriculum for Candidates Admitted during 2012-2013 and Onwards

## First Semester

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</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>12L1Z1</td>
<td>COMMUNICATION SKILLS IN ENGLISH I</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>2</td>
<td>12L1Z2</td>
<td>ENGINEERING MATHEMATICS I</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>3</td>
<td>12L103</td>
<td>FUNDAMENTALS OF CIVIL AND MECHANICAL ENGINEERING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>4 0 0 4</td>
</tr>
<tr>
<td>4</td>
<td>12L104</td>
<td>MATERIALS SCIENCE</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>5</td>
<td>12L105</td>
<td>APPLIED CHEMISTRY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>6</td>
<td>12L106</td>
<td>PROGRAMMING IN C</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</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>12L107</td>
<td>WORKSHOP</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td>8</td>
<td>12L108</td>
<td>CHEMISTRY LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td>9</td>
<td>12L109</td>
<td>C PROGRAMMING LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>900</td>
<td>28</td>
</tr>
</tbody>
</table>

## Second Semester

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</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>12L2Z1</td>
<td>COMMUNICATION SKILLS IN ENGLISH II</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>2</td>
<td>12L2Z2</td>
<td>ENGINEERING MATHEMATICS II</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>3</td>
<td>12L203</td>
<td>ENGINEERING PHYSICS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>4</td>
<td>12L204</td>
<td>OBJECT ORIENTED PROGRAMMING USING C++</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>5</td>
<td>12L205</td>
<td>ELECTRICAL ENGINEERING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>6</td>
<td>12L206</td>
<td>SEMICONDUCTOR DEVICES</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 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>12L207</td>
<td>PHYSICS LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td>8</td>
<td>12L208</td>
<td>ENGINEERING GRAPHICS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>2 0 3 4</td>
</tr>
<tr>
<td>9</td>
<td>12L209</td>
<td>ELECTRICAL ENGINEERING LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>900</td>
<td>28</td>
</tr>
</tbody>
</table>
### THIRD SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>12L321</td>
<td>ENGINEERING MATHEMATICS III</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>2</td>
<td>12L302</td>
<td>CIRCUIT THEORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>3</td>
<td>12L303</td>
<td>ELECTRONIC CIRCUIT DESIGN</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>4</td>
<td>12L304</td>
<td>DATA STRUCTURES AND ALGORITHMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>5</td>
<td>12L305</td>
<td>SIGNALS AND SYSTEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>6</td>
<td>12L306</td>
<td>ELECTROMAGNETIC WAVES AND WAVE GUIDES</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>12L307</td>
<td>ELECTRON DEVICES AND CIRCUITS LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td>8</td>
<td>12L308</td>
<td>DATA STRUCTURES LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
<td></td>
<td></td>
<td>800</td>
<td>27</td>
</tr>
</tbody>
</table>

### FOURTH SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>12L401</td>
<td>RANDOM PROCESS AND QUEUING THEORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>2</td>
<td>12L402</td>
<td>ENVIRONMENTAL SCIENCE AND ENGINEERING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>3</td>
<td>12L403</td>
<td>ANALOG INTEGRATED CIRCUITS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>4</td>
<td>12L404</td>
<td>ANALOG COMMUNICATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>5</td>
<td>12L405</td>
<td>DIGITAL LOGIC WITH HDL</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>6</td>
<td>12L406</td>
<td>NETWORKS AND TRANSMISSION LINES</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td>PRACTICAL</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7</td>
<td>12L407</td>
<td>INTEGRATED CIRCUITS LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td>8</td>
<td>12L408</td>
<td>ANALOG COMMUNICATION LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
<td></td>
<td></td>
<td>800</td>
<td>24</td>
</tr>
</tbody>
</table>
### FIFTH SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</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>12L501</td>
<td>DIGITAL SIGNAL PROCESSING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</td>
</tr>
<tr>
<td>2</td>
<td>12L502</td>
<td>MICROPROCESSORS AND MICROCONTROLLERS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 2 4</td>
</tr>
<tr>
<td>3</td>
<td>12L503</td>
<td>DIGITAL COMMUNICATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>4</td>
<td>12L504</td>
<td>COMPUTER ARCHITECTURE AND ORGANIZATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>5</td>
<td>12L505</td>
<td>CMOS VLSI SYSTEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>6</td>
<td>12L506</td>
<td>CONTROL SYSTEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 1 0 4</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>12L507</td>
<td>DIGITAL COMMUNICATION SYSTEMS LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td>8</td>
<td>12L508</td>
<td>VLSI LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td>800</td>
</tr>
</tbody>
</table>

### SIXTH SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</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>12L601</td>
<td>MANAGEMENT THEORY AND PRACTICE</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>2</td>
<td>12L602</td>
<td>MIXED SIGNAL CIRCUITS AND INTERFACING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>3</td>
<td>12L603</td>
<td>ANTENNAS AND WAVE PROPAGATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>4</td>
<td>12L604</td>
<td>EMBEDDED SYSTEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>5</td>
<td>12L605</td>
<td>COMPUTER COMMUNICATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>ELECTIVE I</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 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>12L607</td>
<td>EMBEDDED SYSTEMS LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td>8</td>
<td>12L608</td>
<td>NETWORKING LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td></td>
<td>800</td>
</tr>
</tbody>
</table>

**Credits:**
- **L**: Lecture
- **T**: Tutorial
- **P**: Practicals
- **C**: Credit

Total Credits: 25 and 22 for FIFTH and SIXTH SEMESTER respectively.
### SEVENTH SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L T P C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td>12L701</td>
<td>MICROWAVE AND RF SYSTEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>2</td>
<td>12L702</td>
<td>LOW POWER VLSI DESIGN</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>3</td>
<td>12L703</td>
<td>WIRELESS COMMUNICATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>4</td>
<td>12L704</td>
<td>FIBER OPTIC COMMUNICATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>5</td>
<td></td>
<td>ELECTIVE II</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>6</td>
<td></td>
<td>ELECTIVE III</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 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>12L707</td>
<td>MICROWAVE AND RF LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td>8</td>
<td>12L708</td>
<td>ELECTIVE LABORATORY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>0 0 3 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>800</td>
<td>22</td>
</tr>
</tbody>
</table>

### EIGHTH SEMESTER

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td>L T P C</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1</td>
<td></td>
<td>Elective IV</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>2</td>
<td></td>
<td>Elective V</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>12L801</td>
<td>PROJECT WORK &amp; VIVA VOCE</td>
<td>50</td>
<td>150</td>
<td>200</td>
<td>0 0 12 6</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td></td>
<td>400</td>
<td>12</td>
</tr>
</tbody>
</table>
### LIST OF ELECTIVES FOR B.E. ELECTRONICS AND COMMUNICATION ENGINEERING (SIXTH SEMESTER)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12L6E0</td>
<td>AUTOMOTIVE ELECTRONIC SYSTEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>12L6E1</td>
<td>RELATIONAL DATABASE MANAGEMENT SYSTEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>12L6E2</td>
<td>OPERATING SYSTEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>12L6E3</td>
<td>MEASUREMENTS AND INSTRUMENTATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>12L6E4</td>
<td>TV AND VIDEO ENGINEERING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>12L6E5</td>
<td>STATISTICAL THEORY OF COMMUNICATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
</tbody>
</table>

### (SEVENTH SEMESTER)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12L7E0</td>
<td>SPREAD SPECTRUM TECHNIQUES</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>12L7E1</td>
<td>ADVANCED DIGITAL SIGNAL PROCESSING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>12L7E2</td>
<td>VLSI SIGNAL PROCESSING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>12L7E3</td>
<td>SOFTWARE ENGINEERING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>12L7E4</td>
<td>NEURAL NETWORKS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>12L7E5</td>
<td>RADAR SYSTEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>12L7E6</td>
<td>IMAGE PROCESSING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>12L7E7</td>
<td>MULTIMEDIA COMPRESSION TECHNIQUES</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>12L7E8</td>
<td>MEMS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>10</td>
<td>12L7E9</td>
<td>AVIONICS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3</td>
</tr>
<tr>
<td>11</td>
<td>12L7EA</td>
<td>REAL TIME CONTROLLERS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>2</td>
</tr>
</tbody>
</table>
(EIGHTH SEMESTER)

<table>
<thead>
<tr>
<th>S. No.</th>
<th>Subject Code</th>
<th>Course Title</th>
<th>Sessional marks</th>
<th>Final Exam marks</th>
<th>Total marks</th>
<th>Credits</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>12L8E0</td>
<td>PROFESSIONAL ETHICS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>2</td>
<td>12L8E1</td>
<td>DSP SYSTEM DESIGN</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>3</td>
<td>12L8E2</td>
<td>NANO ELECTRONICS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>4</td>
<td>12L8E3</td>
<td>SOFT COMPUTING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>5</td>
<td>12L8E4</td>
<td>TOTAL QUALITY MANAGEMENT</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>6</td>
<td>12L8E5</td>
<td>BIO MEDICAL INSTRUMENTATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>7</td>
<td>12L8E6</td>
<td>POWER ELECTRONICS</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>8</td>
<td>12L8E7</td>
<td>VLSI TESTING</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>9</td>
<td>12L8E8</td>
<td>SATTELITE COMMUNICATION</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
<tr>
<td>10</td>
<td>12L8E9</td>
<td>NETWORK SECURITY</td>
<td>25</td>
<td>75</td>
<td>100</td>
<td>3 0 0 3</td>
</tr>
</tbody>
</table>
COURSE OBJECTIVES:

- To increase reading ability of students
- To create ability to write effectively for a variety of professional and technical settings
- To gain knowledge about the formal elements of language
- To improve technical writing skills

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO1: An increased reading ability of students
CO2: An ability to write effectively for a variety of professional and technical settings
CO3: An ability to apply the formal elements of language
CO4: An improvement in technical writing skills

UNIT-I

Tenses - Word formation- Vocabulary (Synonyms & Antonyms)- Listening and transfer of information- Pronunciation Practice- Word Stress-Sentence Stress-Intonation-Introducing oneself-Role play activities based on real life situations- Non-Verbal Communication -Reading Comprehension (Skimming and Scanning)- An introduction to Letter Writing – E-Tender Notices

UNIT-II

Technical Vocabulary-Abbreviations and Acronyms- Commonly Confused Words- Active Voice to Passive Voice- Impersonal Passive- Listening at Specific Contexts such as Airport, Railway Station, Bus Stand, Sea Port/Shipboard etc-Debates on Chosen Topics - Reading For Identifying Stylistic Features- Recommendations-Letter to the Editor of a News Paper

UNIT-III

Subject-Verb Agreement (Concord) - Preposition-Listening to News in English- Mini Oral Presentation on the assumption of a historian, celebrity, famous Personality etc.- Reading and Note-making- Notice -Agenda- Memo- Advertisement and Slogan Writing.

UNIT-IV

Common Errors in English-Conditional Statements -Use of Modal Auxiliaries- Definition-Listening to a Discussion at a Business Meeting- Group Discussion on chosen topics-Reading for interpreting tables, charts etc. -Writing E-mails-Graphic Description
UNIT-V

Extensive Reading- APJ Abdul Kalam’s “Wings of Fire”- An Abridged Special Edition for students.

LECTURE: 45  TUTORIAL: 15  TOTAL: 60

TEXT BOOKS:


REFERENCE BOOKS:

4. Authentic NET Resources
COURSE OBJECTIVES:

- The wider applications in engineering problems using matrix theory and its properties.
- The area of hyperbolic functions and solid geometry leads to solve sphere, cone and cylinder problems.
- The applications of differential equations and integral complex leads to bending of beams, electric circuits and transmission lines.
- Functions of two variables including extremum problems, Leibnitz rule of integration.
- Performing double and triple integration.

COURSE OUTCOMES:

At the end of the course the students should be able to

CO1: Find eigen values and eigen vectors of real Matrix, Reduce quadratic form to canonical form (Usage)
CO2: Identify and solve problems using hyperbolic functions and apply solid geometry for solving problems (Usage)
CO3: Apply differential calculus to solve problems and curvature, evolute and envelopes (Usage)
CO4: Apply Taylor’s theorem, Lagrangian multiplier method, Jacobians - differentiation under integral sign for two independent variables (Usage)
CO5: Calculate the area using double integral and volume using triple integral (Usage)

UNIT I MATRICES

Characteristic equation– Eigen values and Eigen vectors of a real matrix – Properties of Eigen values- Cayley-Hamilton Theorem (statement only) and applications-Diagonalisation by similarity transformation- Reduction of quadratic form to canonical form.

UNIT II HYPERBOLIC FUNCTIONS AND SOLID GEOMETRY

Hyperbolic functions and Inverse Hyperbolic functions- Identities- Real and imaginary parts-solving problems using hyperbolic functions.Sphere– tangent plane– Orthogonal spheres- Cone-right circular cone– Cylinder–right circular cylinder.

UNIT III APPLICATIONS OF DIFFERENTIAL CALCULUS

Curvature- Cartesian and polar coordinates– centre and radius of curvature- circle of curvature-Evolutes- Envelopes- Evolutes as envelope of normal.
UNIT IV FUNCTION OF SEVERAL VARIABLES

Function of two variables- Taylor’s theorem (statement only) and expansions- maxima and minima-constrained maxima and minima by Lagrangian multiplier method- Jacobians-differentiation under integral sign.

UNIT V INTEGRAL CALCULUS

Gamma and Beta functions- Double integration- Cartesian and Polar Coordinates– change of order of integration- Area as double integral– Triple integration– Volume as a triple integral-Transformation to Cylindrical and Spherical co-ordinates.

LECTURE: 45 TUTORIAL: 15 TOTAL: 60

TEXT BOOKS:


REFERENCE BOOKS:


COURSE OBJECTIVES:

- To learn the methods and materials used in construction
- To gain knowledge about principles of engines and steam generators
- To acquire fundamental knowledge on manufacturing and metal cutting process
- To motivate students to participate in cross disciplinary groups

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Knowledge about methods and materials used in construction
CO 2: An ability to explain the working principles of engines and steam generators
CO 3: A fundamental knowledge on manufacturing and metal cutting process
CO 4: Motivation for students to participate in cross disciplinary groups

MATERIALS IN CONSTRUCTION

Stone- Types- Qualities - Qualities of good building stone
Bricks- Manufacturing- Qualities- Uses
Cement- Different types- Manufacturing- Qualities- Uses
Steel- Qualities- Uses.

CONSTRUCTION

Masonry- Brick masonry-Types of bonds- Stone masonry-Types-Methods of construction
Concrete-Materials used- Preparation- Qualities- Uses
Flooring- Types-Methods of construction
Roofing- Types- Construction of tiled roof, Asbestos roof and Concrete roof.
TEXT BOOKS:


REFERENCE BOOKS:


SECTION B
MECHANICAL ENGINEERING

ENERGY ENGINEERING

Working principles of impulse and reaction turbines - Working principles of IC Engines (CI and SI Engines)

STEAM GENERATORS

Classifications- working of Cochran, Lamont and Benson boilers (separate study of boiler mountings and accessories are beyond the scope of this syllabus).

MANUFACTURING PROCESS


METAL CUTTING PROCESS

Lathe: Main components and their functions Basic operations of turning, facing, taper turning and thread cutting- Drilling machine: Types of drilling machines- bench, upright-main parts and their functions- Reaming operations.

TOTAL: 25 HOURS

TEXT BOOKS:


REFERENCE BOOKS:

12L104-MATERIALS SCIENCE

COURSE OBJECTIVES:

- To explain the theory behind conducting materials and their characteristics
- To gain knowledge on the behavior of semiconducting materials and dielectrics
- To exploit magnetic and superconducting materials
- To update with the modern engineering materials and their applications

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: An ability to explain theory behind conducting materials and their characteristics
CO 2: Knowledge on the behavior of semiconducting materials and dielectrics
CO 3: Exploitation of magnetic and superconducting materials
CO 4: An ability to update with the modern engineering materials and their applications

UNIT I CONDUCTING MATERIALS

(9)


UNIT II SEMICONDUCTING MATERIALS AND DEVICES

(9)


UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS

(9)

UNIT IV DIELECTRICS


UNIT V MODERN ENGINEERING MATERIALS

Metallic glasses— preparation of metallic glasses— properties— applications of the metallic glasses— Shape Memory Alloys (SMA)— Characteristics, properties of NiTi alloy— applications of the Shape memory alloys— advantages and disadvantages of SMA— Nano materials— synthesis— chemical vapour deposition— SolGels— ball Milling— properties of nano particles and applications of nano particles— Carbon Nano tubes (CNT)— structure— properties— applications of the CNTs.

LECTURE: 45   TUTORIAL: 0   TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

COURSE OBJECTIVES:

- To enrich knowledge on basic electrochemistry
- To compare the performances of various batteries
- To explain the types of corrosion and protection methods
- To gain knowledge about planar technology and concept of polymers

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Knowledge on basic electrochemistry
CO 2: An ability to compare the performances of various batteries
CO 3: An ability to explain the types of corrosion and protection methods
CO 4: Knowledge about planar technology and concept of polymers

UNIT I BASIC ELECTROCHEMISTRY

EMF and thermodynamic principles of electrochemical systems- Nernst equation, problems- applications of emf measurement – potentiometric titrations- acid alkali, redox reactions - pH measurements using glass electrode- ion selective electrode- fluoride analysis, solubility of sparingly soluble salts - concentration cells - electrode/electrolyte - simple examples - Polarisation- concentration - over voltage.

UNIT II BATTERIES

Batteries - components - Characteristics - voltage , current , capacity, electrical storage density, energy density, discharge rate – types of batteries ( primary and secondary )- primary- Zn- MnO₂ , Zn- AgO , Zn- HgO , Li- SO₂ Cl- cells- construction and working- Comparison of performance of primary cells–Secondary- Lead acid, Ni-Cd, Ni-Fe-Lithium ion batteries – Components – Characteristics-functioning-comparison of performances.

UNIT III CORROSION

Corrosion-spontaneity –chemical- oxidation corrosion- nature of oxides- Pilling and Bedworth rule - electrochemical corrosion- general mechanism- differential aeration- Pitting, Galvanic & stress corrosion. Prevention of corrosion-Proper design of structures, cathodic protection (sacrificial anode and impressed current cathodic), Inhibitors – Protective coatings- Paints, electro plating (plating of chromium and nickel only), electroforming and electropolishing - applications.

UNIT IV PLANAR TECHNOLOGY

12L105- APPLIED CHEMISTRY
Silicon-poly crystalline and single crystalline - crystal growth techniques-Czochralski process and float zone process-wafer preparation-PN junction formation by solid fusion-open type diffusion system, Ion implantation and molecular beam epitaxy—Deposition of dielectrical layers by crystal vapor deposition and sputtering techniques – Fabrication silicon devices -Masking and photolithography- Etching techniques wet and electrochemical – metal deposition techniques.

UNIT V POLYMERS (9)
Monomers-functionality, Degree of polymerization-Coordination polymerization Zeigler-Natta catalyst, Polymers, structure, properties and their end uses of Polycarbonate, PVC, Polyamide, PET, Polyester, Teflon, Epoxy resin, Polyurethane, PMMA. Compounding of plastics- ingredients and functions, Fabrication-compression molding-Injection moulding-blow moulding and Extrusion moulding-Conducting polymers, poly acetylene, mechanism of conduction-natural rubber-vulcanization of rubberBiodegradable polymers - polylactide, cellulose and starch.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:


COURSE OBJECTIVES:

- To get basic knowledge on the fundamental concepts of digital computer and information technology
- To exploit the appropriate decision statements for the given program
- To inscribe C programs by applying the concepts of arrays, pointers and functions
- To implement user defined data types like structures and unions in a C program
- To gain basic knowledge on file operation and graphics in C

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Knowledge on the fundamental concepts of digital computer and information technology
CO 2: An ability to exploit the appropriate decision statements for the given program
CO 3: An ability to inscribe C programs by applying the concepts of arrays, pointers and functions
CO 4: An ability to implement user defined data types like structures and unions in a C program
CO 5: Basic knowledge on file operation and graphics in C

UNIT I BASICS OF COMPUTER, PROGRAMMING AND INFORMATION TECHNOLOGY (9)


UNIT II BASIC ELEMENTS OF C (9)

Introduction to C- C Declaration- Operators and Expressions- Input and output Functions- Decision statements: If- If else- Nested If else- If else If ladder- break- continue- goto- switch- nested switch case- Switch case and nested ifs- Loop control: for, nested for, while, do-while- do while statement with while loop- Arrays: initialization, characteristics, types and operations.

UNIT III POINTERS AND FUNCTIONS (9)

Strings and Standard functions: Declaration and Initialization, formats, standard, conversion and memory functions, applications; Pointers- pointers and address- declaration- void, wild, constant pointers- arithmetic operations with pointers- pointers and arrays- pointers to pointers- pointers and strings; Functions- return
statement- types- call by value and reference-returning more values, function as an argument, function with operators, decision statements, loop statements, arrays and pointers, recursion- Tower of Hanoi.

UNIT IV STORAGE CLASSES, STRUCTURE AND UNION

Storage classes: auto- extern- static-register; Preprocessor directives; Structures: Declaration and initialization, structure within structure- Array Of Structures- pointer to structure-structure and functions- typedef- bitfields- enumerated data types; union: calling BIOS and DOS services- union of structures.

UNIT V FILES, GRAPHICS AND DYNAMIC MEMORY ALLOCATION

Files: streams and file types- operations- FileI/O- read and write- other-creating, processing and updating files- simple file handling programs- low level programming- command line arguments-Environment variables; Graphics: initialization- functions- library functions- text- patterns and styles-mouse programming- drawing non common figures; Dynamic memory allocation

LECTURE: 45     TUTORIAL: 15     TOTAL: 60

TEXT BOOKS:

1. ITL Education solutions Limited, "Introduction to Information Technology", Pearson Education(India), 2005. (Unit I) (Chapter:1,7,9,10,15,16)


REFERENCE BOOKS:


12L107 - WORKSHOP

COURSE OBJECTIVES:

- To model various types of joints in carpentry and welding
- To create ability for sand mould preparation
- To develop skill for metal fabrication of simple parts

COURSE OUTCOMES:

Upon completion of this course the students will have:

- CO1: An ability to model various joints in carpentry and welding
- CO2: An ability to prepare sand moulds for cube, bush, pipes, etc.
- CO3: An ability to fabricate the various parts in metal sheet

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
</tbody>
</table>

LIST OF EXPERIMENTS

1. Introduction to use of tools and equipments in Carpentry, Welding, Foundry and Sheet metal.
2. Safety aspects in Welding, Carpentry and Foundry.
3. Half lap Joint and Dovetail Joint in Carpentry
4. Welding of Lap joint, Butt joint and T-joint
5. Preparation of Sand mould for cube, conical bush, pipes and V pulley.
6. Fabrication of parts like tray, frustum of cone and square box in sheet metal.

TOTAL: 45HOURS
12L108-CHEMISTRY LABORATORY

COURSE OBJECTIVES:

- To perform analytical experiments in the field of chemistry
- To estimate various chemical elements in the given substance
- To create exposure to practical knowledge of various chemical phenomena by demonstration of experiments

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: An ability to perform analytical experiments in the field of chemistry
CO 2: An ability to estimate various chemical elements in the given substance
CO 3: Exposure to practical knowledge of various chemical phenomena by demonstration of experiments

LIST OF EXPERIMENTS

1. Estimation of hardness by EDTA method
2. Estimation of chloride by argentometric method
3. Determination Dissolved oxygen by Winkler’s method
4. Estimation of available chlorine in bleaching powder
5. Estimation of copper and zinc in brass sample
7. Surface area of activated carbon by adsorption technique using acetic acid
8. Estimation of calcium and magnesium in magnesite ore
9. Estimation of manganese in pyrolusite ore
10. Conductometric titration of mixture of strong and weak acids using strong base
11. Potentiometric titration (Ferrous iron versus potassium dichromate)
12. Estimation of sodium or potassium using flame photometer
13. Estimation nickel using spectrophotometer
14. Estimation of iron by spectrophotometer.

(Any twelve experiments only)
REFERENCE BOOKS:


COURSE OBJECTIVES:

- To illustrate flowchart and algorithm for a given problem
- To exploit operators, decision making and looping in C programs
- To develop an efficient C program using appropriate C elements
- To identify, analyze and formulate C programs for the real time applications

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: An ability to illustrate flowchart and algorithm for a given problem
CO 2: An ability to exploit operators, decision making and looping in C programs
CO 3: An ability to develop an efficient C program using appropriate C elements
CO 4: An ability to identify, analyze and formulate C programs for the real time applications

L T P C
0 0 3 2

Exercises illustrating the following concepts:

1. Operators, Expressions and IO formatting
2. Decision Making and Looping
3. Arrays and Strings
4. Functions and Recursion
5. Pointers
6. Dynamic Memory Allocation
7. Structures
8. Unions
9. Files
10. Command line arguments
12. Mini Project

TOTAL: 45 HOURS
12L2ZI-COMMUNICATION SKILLS IN ENGLISH-II

PREREQUISITE: COMMUNICATION SKILLS IN ENGLISH-I

COURSE OBJECTIVES:

- To improve the grammatical knowledge of the students
- To acquire knowledge on both American & British English listening skills
- To develop skill to address the gathering on an occasion
- To gain basic knowledge to prepare an industrial report

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Improvement in the grammatical knowledge of the students
CO 2: An ability to improve listening skills on both American & British English
CO 3: An ability to address the gathering on an occasion
CO 4: Development of a basic knowledge to prepare an industrial report

L  T  P  C
3  1  0  4

UNIT I

Use of Relative Clauses-Noun Phrases- Listening to Conversations- Telephonic Conversational Skills
Paralinguistic Communication (Articulation, Stress and Pause) – Cloze Reading-Reading to practice stress, pause etc. –Process Description- Transcoding

UNIT II

Cause and Effect Expressions-Time and Contracted Time Statements- Listening to Narration/Speech – Extemporaneous -Instructions with Imperatives- Reading for inferring meaning: Lexical and Contextual -Understanding the organization of the Texts -Writing Articles (Technical & General)

UNIT III

Phrasal Verbs -American and British Vocabulary- Video Listening: Listening to Authentic Clippings in English (Movie/Play)-Making Speeches (Introducing a Chief Guest, Delivering Welcome Address, Proposing Vote of Thanks)-Reading for understanding discourse cohesion-Logical Connectives - Minutes of the Meeting

UNIT IV

Idiomatic Expressions -Numerical Expressions- Listening to authentic songs in English-Mock Interviews-Reading for identifying the topic sentence in each paragraph-An Introduction to Different kinds of Report-Report on an Industrial Visit-Report on an accident
UNIT V

Abstract – foot notes-bibliography-plagiarism- Technical Style- Presentation of a Mini Project Report of 25 to 30 pages on one of the topics from the First Year B.E Syllabus or similar topics.

LECTURE: 45 TUTORIAL: 15 TOTAL: 60

REFERENCE BOOKS:

3. Herbert, A.J, “Structure of Technical English”: the English Language Society
4. Authentic NET Resources
PREREQUISITE: ENGINEERING MATHEMATICS-I

COURSE OBJECTIVES:

- Understand vector calculus operations and identities to solve physical problems
- Develop the ability of mathematical modeling of systems using differential equations
- Understand the concept of Complex differentiation leads to analytic functions, conformal mapping and bilinear mapping
- Gain the knowledge on Complex Integration around unit circle and semi circle
- Understand the concepts of Laplace Transforms including applications

COURSE OUTCOMES:

At the end of the course the students should be able to

CO 1: Apply Green’s, Gauss divergence and Stoke’s theorems to verify applications (Usage)
CO 2: Apply first, second and higher order differential equations to solve real world applications (Usage)
CO 3: Obtain the images corresponding to conformal and bilinear mapping (Usage)
CO 4: Evaluate contour integration using Cauchy-Residue theorem (Usage)
CO 5: Perform Laplace transformations to solve linear and second order differential equations with constant coefficients (Usage)

UNITI - VECTOR CALCULUS

Gradient, Divergence, Curl, Directional derivative – Irrotational and Solenoidal fields - Vector identities - Line, Surface and Volume Integrals – Green’s Theorem in a Plane, Gauss Divergence and Stoke’s Theorems (Statements only) - Verifications and Applications.

UNITII - ORDINARY DIFFERENTIAL EQUATIONS

Linear equations of Second and Higher order with constant coefficients - Simultaneous first order Linear equations with constant coefficients - Linear equations of Second and Higher order with variable coefficients - Legendre type Method of variation of parameters - method of reduction of order.

UNIT III - COMPLEX DIFFERENTIATION

Linear equations of Second and Higher order with constant coefficients - Simultaneous first order Linear equations with constant coefficients - Linear equations of Second and Higher order with variable coefficients - Legendre type Method of variation of parameters - method of reduction of order.
UNIT IV-COMPLEX DIFFERENTIATION

Cauchy’s integral theorem, Cauchy’s integral formula-Taylor’s and Laurent’s theorems (Statements only) and expansions–Poles and Residues–Cauchy’s Residue theorem–Contour integration–Circular and semicircular contours.

UNIT V-LAPLACE TRANSFORMATIONS

Laplace transforms – Properties and standard transforms-Transforms of unit step, unit impulse and error functions–Transforms of periodic functions-Inverse Laplace transforms-Initial and Final –Convolution theorem (statement only) and applications-Applications to Solution of Linear differential equations of second order with constant coefficients.

LECTURE: 45 TUTORIAL: 15 TOTAL: 60

TEXT BOOKS:


REFERENCE BOOKS:

12L203-ENGINEERING PHYSICS

PREREQUISITE: MATERIALS SCIENCE

COURSE OBJECTIVES:

- To gain a basic knowledge on Lasers and its applications
- To study basic optical fibers that are useful for communication systems
- To gain knowledge on quantum and crystal physics

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Basic knowledge on Lasers and its applications.
CO 2: Knowledge on working principles of optical fibers and their applications
CO 3: Exposure to quantum and crystal physics

<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>

UNIT I-LASERS


UNIT II-FIBER OPTICS AND APPLICATIONS


UNIT III-QUANTUM PHYSICS AND APPLICATIONS

Limitations of classical Physics—Introduction to Quantum theory—Dual nature of matter and radiation—de-Broglie wavelength in terms of voltage, energy, and temperature—Heisenberg’s Uncertainty principle— verification—Schrödinger’s Time independent and Time dependent wave equations—physical significance of a wave function—Particle in a one dimensional deep potential well—microscope—basic definitions of microscope— Electron microscope—Scanning Electron Microscope(SEM)—Transmission Electron Microscope(TEM).
UNIT-IV ULTRASONICS


UNIT-V CRYSTAL PHYSICS

Introduction–Crystalline and Non-crystalline materials–Lattice–Unit Cell–Crystal system-Bravais lattices–Millerindices–d-spacing in cubic lattice–Calculation of number of atoms per unit cell–Atomic radius–Coordination number– Packing factor for SC, BCC, FCC, and HCP structures–NaCl-Polymorphism and allotropy–Crystal defects–Point, line and surfaced effects.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L204-OBJECT ORIENTED PROGRAMMING USING C++

PREREQUISITE: PROGRAMMING IN C

COURSE OBJECTIVES:

- To acquire a basic knowledge on object oriented programming concepts and methods
- To develop a skill to write a C++ program
- To learn the concepts of classes and data abstraction
- To develop and increase the confidence level of the students in the programming part and encourage them in the automation side

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Basic knowledge on object oriented programming concepts and methods
CO 2: Development of a skill to write a C++ program
CO 3: Knowledge on the concepts of classes and data abstraction
CO 4: Improvement in the confidence level of the students in the programming part and encouraging them in the automation side

L T P C
3 0 0 3

UNIT-I CONCEPTS


UNIT-II METHODS


UNIT-III OVERVIEW OF C++

Introduction-Variables and basic types- library types-Arrays- Pointers-Expressions-Statements- Functions-I/O library

UNIT-IV CLASSES AND DATAABSTRACTION

Classes: definitions and Declarations—this pointer-scope constructors-friend, static class members; Copy control; Overloading operations and conversions; Definitions, Input, output operators, arithmetic, relational, assignment,
subscript, member access, increment and decrement, call operators, function objects, conversions and class types.

UNIT-V OBJECT ORIENTED AND GENERIC PROGRAMMING  

Object Oriented Programming: Inheritance, virtual functions; Templates-Template compilation models-class template members-generic and leclass-template specialization-overloading and function templates-exception handling

LECTURE: 45       TUTORIAL: 0       TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L205- ELECTRICAL ENGINEERING

COURSE OBJECTIVES:

- To get a basic knowledge on motors and transformers
- To learn the principles of stepper motors used in microprocessor applications
- To gain a basic knowledge on special machines
- To know the various types of motors, its application and operation, which helps students to identify the range of motors in home and industrial applications

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: A basic knowledge on motors and transformers
CO 2: Knowledge on the principles of stepper motors used in microprocessor applications
CO 3: A basic knowledge on special machines
CO 4: Exposure to various types of motors, its application and operation

L T P C
3 0 0 3

UNIT I DC MACHINES

DC Generator-Construction-Working principle-Armature reaction-Commutation-EMF equation-Electrical characteristics- Applications- DC Motors-Back emf-Torque equation-Performance characteristics-Starters-tests-Speed control-Applications.

UNIT II TRANSFORMERS

Single phase-Working principle-emf equation-Types-Phasor diagram-Equivalent circuit-Auto transformers-All day efficiency- Three phase-Construction-Star and Delta connections.

UNIT III SYNCHRONOUS MACHINES


UNIT IV INDUCTION MACHINES


UNIT V SPECIAL MACHINES

TEXT BOOKS:


REFERENCE BOOKS:

12L206- SEMICONDUCTOR DEVICES

COURSE OBJECTIVES:

- To gain a basic knowledge on Active and passive components
- To learn the principles of diodes and transistors suitable for various applications
- To gain a basic knowledge on optoelectronic devices
- To learn the concepts of analog devices

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Knowledge on theory of basic semiconductor devices
CO 2: Ability to design biasing circuits for basic semiconductor devices
CO 3: Basic knowledge on optoelectronic devices and special diodes
CO 4: Knowledge on principles and applications of display devices

UNIT 1-PN JUNCTION AND SEMICONDUCTOR DIODES (9)

Energy band structure of conductors, semiconductors and Insulators-Classification of semiconductors-conductivity of semiconductors-Drift and diffusion currents-Continuity Equation-Energy band structure of PN junction diode- Diode current equation-Transitionor space charge capacitance-Diffusion capacitance-Effect of temperature on PN junction diodes-Diode switching characteristics-PN diode and Zener diode applications.

UNIT II-BIPOLAR JUNCTION TRANSISTORS (9)

Transistor current components-Ebermoll’s model of transistor-Transistor as an amplifier-CE, CB and CC configurations: Analysis of cut-off and saturation regions- Transistor switching times-maximum voltage rating.

UNIT III-FIELD EFFECT TRANSISTORS (9)

Operation and Characteristics of JFET,FET as a Voltage variable resistor, Metal oxide semiconductor field effect transistor(MOSFET)-Enhancement and Depletion mode MOSFET-Characteristics of n-MOS and p-MOS- CMOS characteristics-Inverted TFET-Operation and Characteristics.

UNIT IV-BIASING OF BJT AND FET (9)

DC operating point and Load line-Q point-Bias Stability, Transistor biasing methods: Fixed bias-Collector to basebias-Self biasing, Bias compensation methods, Thermistor and sensistor compensation techniques, thermalrunaway ,thermal stability, FET biasing methods: Self bias-Source bias-Voltage divider bias-Biasing enhancement and depletion MOSFET.
UNIT V DISPLAY DEVICES AND SPECIAL DIODES

Photo emissitivity and photo-conductivity-Construction and characteristics of LCD, LED, Photoconductive cell, photo voltaic cell, photo diode, solar cell, photo transistors, plasma display, numeric displays, opto couplers and LASER diodes-Theory and Characteristics of Schottky diode, Tunnel diode and Varactor diode, SCR, TRIAC, LDR.

LECTURE: 45    TUTORIAL: 0    TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:


COURSE OBJECTIVES:

- To get practical knowledge on electromagnetism and optics
- To apply knowledge about electrical and electronic devices
- To work in a team to achieve goals

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Practical knowledge on electromagnetism and optics
CO 2: An ability to apply knowledge about electrical and electronic devices
CO 3: An ability to work in a team to achieve goals

LIST OF EXPERIMENTS

1. Spectrometer - diffraction grating Normal incidence method
2. Air wedge
3. Youngs modulus – cantilever bending Koening’s method
4. Particle size determination
5. Thermal conductivity of the bad conductor Lee’s disc method
6. Ammeter and voltmeter calibration – low range
7. Resistance of the given coil of wire – carey Foster’s bridge
8. Torsional pendulum
9. Young’s modulus - non uniform bending
10. Transistor characteristics

(Any Eight experiments only)

TOTAL: 45 HOURS
COURSE OBJECTIVES:

- To gain a basic knowledge in representing various curves & conics
- To learn geometrical constructions and orthographic projections
- To convert pictorial view to orthographic projections

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Basic knowledge in representing various curves & conics
CO 2: Ability to learn geometrical constructions and orthographic projections
CO 3: Ability to convert pictorial view to orthographic projections

UNIT I GEOMETRICAL CONSTRUCTIONS

Dimensioning- Lettering-Types of Lines-Scaling conversions- Dividing a given straight line in to any number of equal parts-Bisecting a give angle-Drawing a rectangular polygon given one side-Special methods of constructing a pentagon and hexagon-Construction of curves like ellipse, parabola, cycloid and involute using one method.

UNIT II ORTHOGRAPHIC PROJECTIONS

Introduction to Orthographic Projection-Projection of points-Projection of straight lines with traces-Projection of planes-Conversion of pictorial views to orthographic views-Projection of solids-Auxiliary projections

UNIT III SECTION OF SOLIDS AND DEVELOPMENT

Section of solids-Development of surfaces

UNIT IV INTERPETRATION OF SOLIDS

Cylinder and cylinder, cone and cylinder only

UNIT V PICTORIAL VIEWS

Isometric projections-Conversion of orthographic views to pictorial views (simple objects).
REFERENCE BOOKS:

12L209- ELECTRICAL ENGINEERING LABORATORY

COURSE OBJECTIVES:

- To implement the theoretical concepts of motors and generators
- To perform various load tests on motors and generators
- To apply practical knowledge on DC motors and transformers

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO 1: Implementation of the theoretical concepts of motors and generators
CO 2: An ability to perform various load tests on motors and generators
CO 3: An ability to apply practical knowledge on DC motors and transformers

LIST OF EXPERIMENTS

1. Speed control of DC shunt motor.
2. Swinburne’s Test.
3. DC series motor load test.
4. Magnetization characteristics of separately excited generator.
5. Load and Magnetization characteristics of self excited generator.
6. Load test on DC compound generator.
7. Load test on DC Shunt Motor.
8. Load test on DC Compound Motor.
9. OC and SC tests on single phase transformers.
10. Regulation of Alternator.
12. Load test on three phase Induction motor.
14. Load test on single phase Induction motor.
15. Study of Starters: for AC motors and DC motors.

REFERENCE BOOKS:

PREREQUISITE: ENGINEERING MATHEMATICS-II

COURSE OBJECTIVES:

- Understand the partial differential equation concepts.
- Form the Fourier series and perform Harmonics Analysis.
- Understand the concepts of finite and infinite Fourier transformations.
- Understand the method of separating variables and introduce Fourier series analysis to solve the boundary value problems.
- Gain the knowledge to find solutions for difference equation using z-transformation

COURSE OUTCOMES: At the end of the course, students will be able to

CO1: Form and solve first& higher order partial differential equation, Lagrange’s equations (Usage)
CO2: Determine the behavior of the Fourier series at points of discontinuity using Dirichlet’s boundary Condition, Use half range sine and cosine series, Parseval’s Identity and perform Harmonic Analysis of a discrete function. (Familiarity)
CO3: Solve problems using Fourier integral theorem and convolution theorem. (Usage)
CO4: Solve one dimensional wave and heat equation using separation of variables method and Fourier series. (Usage)
CO5: Develop Z-transform techniques for discrete time systems. (Assessment)

L  T  P  C
3  1  0  4

UNIT I PARTIAL DIFFERENTIAL EQUATIONS

Formation of PDE by elimination arbitrary constants and functions – Solutions of standard first order partial differential equations – Lagrange’s equation – Linear partial differential equations of second and higher order with constant coefficients-homogeneous and non homogeneous types.

UNIT II FOURIER SERIES

Dirichlet’s Conditions – General Fourier Series –Odd and even functions- Half range Sine and Cosine series – Parseval’s Identity – Harmonic Analysis.

UNIT III FOURIER TRANSFORMS

Statement of Fourier integral Theorem – Fourier transform pair– Fourier Sine and Cosine Transforms – Properties – Transforms of Simple functions- Convolution Theorem – Parseval’s Identity-Finite Fourier transforms
UNIT IV BOUNDARY VALUE PROBLEMS

Method of separation of variables – One dimensional wave equation – One dimensional heat equation – Unsteady and Steady state conditions – Fourier series solution.

UNIT V Z-TRANSFORMS

Z-transforms - Elementary properties - Inverse Z-transform - Initial and Final value theorems - Convolution theorem - Formation of difference equations - Solution to difference equations of second order with constant coefficients using Z-transform.

LECTURE: 45 TUTORIAL: 15 TOTAL: 60

TEXT BOOKS:


REFERENCE BOOKS:

COURSE OBJECTIVES:

- To Acquire a thorough knowledge of the Circuit components, parameters and theorems related to AC and DC circuit analysis
- To apply the concepts of resonance, transients and coupled circuits and develop, design and problem solving skills in allied circuits
- To gain knowledge about various concepts of graph theory, its terminology and its application in circuit analysis

COURSE OUTCOMES:

Upon completion of this course the students will have:

CO1: A thorough knowledge of the Circuit components, parameters and theorems related to AC and DC circuit analysis
CO2: Ability to apply the concepts of resonance, transients and coupled circuits to design, develop, and analyze the electric circuits, thus improving the problem solving skills
CO3: Knowledge on various concepts of graph theory, its terminology and its application in circuit Analysis

L T P C
3 1 0 4

UNIT I DC AND AC CIRCUITS

DC circuits-Circuit elements - Current and voltage sources - Ohm’s and Kirchhoff’s laws - Resistive circuits - Series and parallel reduction method and analysis- Voltage and current division-Source transformation-Star delta transformation. AC circuits-Introduction to alternating quantities- Average and RMS values-Circuits elements, series and parallel combination of circuit elements - Use of complex notation- Phasor representation of variables - Steady state solution using phasor algebra - Analysis of series, parallel and series, parallel circuits - Active and reactive power.

UNIT II NETWORK ANALYSIS AND THEOREMS


UNIT III RESONANCE AND COUPLED CIRCUITS

Series and parallel resonance - Variation of impedance with frequency- Bandwidth of RLC circuit - Q factor - Impedance of RLC circuit near resonance - Selectivity - Effect of variation in circuit reactive elements on selectivity-Self inductance- Coefficient of coupling-Dot convention analysis of coupled circuits-Ideal transformer- Analysis of single tuned and double tuned circuits

UNIT IV NETWORK TRANSIENTS

(9)

UNIT V GRAPH THEORY


LECTURE:45 TUTORIAL:15 TOTAL:60 HOURS

TEXT BOOKS:


REFERENCES BOOKS:


PREREQUISITE: SEMICONDUCTOR DEVICES

COURSE OBJECTIVES:

- To gain knowledge about the basic electronic circuits
- To acquire an in-depth knowledge of low frequency and high frequency analysis of BJT and FET amplifiers
- To design feedback amplifiers and oscillators
- To design the wave shaping circuits

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO1: Knowledge of the basic electronic circuits
CO2: In-depth knowledge of low frequency and high frequency analysis of BJT and FET amplifiers
CO3: Ability to design feedback amplifiers and oscillators
CO4: Ability to design the wave shaping circuits

L T P C 3 1 0 4

UNIT I RECTIFIERS AND POWER SUPPLIES

Classification of power supplies, Rectifiers - Half-wave, full-wave and bridge rectifiers - Rectifiers with filters - C, L, LC and CLC filter - Voltage regulators - Zener diode as a voltage regulator - Over voltage protection, Switched mode power supply-Power control using SCR-Uninterrupted Power supplies.

UNIT II LOW FREQUENCY AND HIGH FREQUENCY ANALYSIS OF AMPLIFIERS

Frequency response of amplifiers - BJT AC Analysis- Hybrid and \( \pi \) equivalent models - Low frequency analysis of BJT & FET - High frequency analysis of BJT and FET - Miller’s theorem - Midband analysis of amplifiers- Multistage frequency effects.

UNIT III FEEDBACK AMPLIFIERS AND OSCILLATORS

Types of feedback amplifiers - Analysis of voltage and current feedback amplifiers - Oscillators - Barkhausen criterion - Design of Oscillators - Colpitts oscillator, Hartley oscillator, RC Phase Shift Oscillator, Wein Bridge oscillator and Crystal Oscillators.

UNIT IV LARGE SIGNAL AND TUNED AMPLIFIERS

Classification of large signal amplifiers - Class A, B, C, D and AB amplifiers operation - efficiency - Class A amplifier with load - Class B push-pull amplifier - Distortion in amplifiers - MOSFET power amplifier - Tuned Amplifiers - Single, Double Tuned and Stagger Tuned Amplifiers.
UNIT V MULTIVIBRATORS

Design of Monostable, bistable and astable multivibrators-Schmitt trigger-Monostable and astable blocking oscillators using emitter based timing-UJT Saw tooth generator.

LECTURE:45  TUTORIAL:15  TOTAL:60 HOURS

TEXT BOOKS:


REFERENCE BOOKS


12L304- DATA STRUCTURES AND ALGORITHMS

PREREQUISITE: OBJECT ORIENTED PROGRAMMING USING C++

COURSE OBJECTIVES:

- To Acquire basic knowledge of linear and non-linear data structures
- To apply the knowledge of linear and non-linear data structures to Engineering problems
- To formulate algorithms for sorting and searching problems
- To apply the knowledge of Algorithmic design techniques for optimization problems

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO1: Basic knowledge of linear and non-linear data structures
CO2: Ability to apply the knowledge of linear and non-linear data structures to Engineering problems
CO3: Ability to formulate algorithms for sorting and searching problems
CO4: Ability to apply the knowledge of Algorithmic design techniques for optimization problems

UNIT I ALGORITHM ANALYSIS

Algorithm analysis - Mathematical background - Run time calculations - Logarithms in running time – List ADT

UNIT II STACK AND QUEUES

Stack - Primitive operation – Application – Queues ADT – Array implementation of queues and Applications
- Priority Queues – Applications – Binomial queue structure - Binomial queue operations.

UNIT III TREES

Binary trees - Basic operations and representations - Binary tree transversal - Representation of lists as binary trees – Application - Balanced Trees - AVL trees - B trees - Various types of hashing.

UNIT IV SORTING AND SEARCHING


UNIT V GRAPHS AND ALGORITHM DESIGN TECHNIQUES

LECTURE:45  TUTORIAL:0  TOTAL:45 HOURS

TEXT BOOKS:


REFERENCE BOOKS:

12L305- SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

- To analyze the Continuous Time and Discrete Time signals and systems
- To gain knowledge of Fourier and Laplace Transforms and its application in the analysis of Continuous Time Systems
- To gain knowledge of Discrete Time Fourier Transforms and Z-Transforms and its application in the analysis of Discrete Time Systems
- To analyze state variable equations of linear time invariant Continuous and Discrete Time Systems and its matrix representation

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO1: Knowledge of Continuous Time and Discrete Time signals and systems
CO2: Ability to apply Fourier and Laplace Transforms for the analysis of Continuous Time Systems
CO3: Ability to apply Discrete Time Fourier Transforms and Z-Transforms for the analysis of Discrete Time Systems
CO4: Ability to analyze state variable equations of linear time invariant Continuous and Discrete Time Systems and its matrix representation

UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS (9)
Continuous Time (CT) signals - Discrete Time (DT) signals - Step, Ramp, Pulse, Impulse, Exponential, classification of CT and DT signals –periodic and aperiodic signals, random signals, Energy and Power signals - CT systems and DT systems, Classification of systems.

UNIT II ANALYSIS OF CONTINUOUS TIME SIGNALS (9)
Fourier series analysis- spectrum of Continuous Time signals- Fourier and Laplace Transforms in signal Analysis.

UNIT III LINEAR TIME INVARIANT CONTINUOUS TIME SYSTEMS (9)
Differential Equation-Block diagram representation-impulse response, convolution integrals-Fourier and Laplace transforms in Analysis- State variable equations and matrix representation of systems.

UNIT IV ANALYSIS OF DISCRETE TIME SIGNALS (9)
Baseband Sampling of CT signals - Aliasing - DTFT and properties - Z transform and properties.

UNIT V LINEAR TIME INVARIANT DISCRETE TIME SYSTEMS (9)
Difference Equations-Block diagram representation-Impulse response-Convolution sum- DTFT and Z Transform analysis of Recursive and Non-Recursive systems- State variable equations and matrix representation of systems.
TEXT BOOKS:


REFERENCE BOOKS:

COURSE OBJECTIVES:

- To Gain basic knowledge of static electric and magnetic field principles and related laws governing them
- To derive wave equations for Electromagnetic wave propagation in free space and media
- To analyze the characteristics of wave propagation in parallel plate, rectangular and circular waveguides
- To gain knowledge about cavity resonators and waveguide components

COURSE OUTCOMES:

Upon completion of this course the student will have:

- **CO1**: Basic knowledge of static electric and magnetic field principles and related laws governing them
- **CO2**: Ability to derive wave equations for electromagnetic wave propagation in free space and media
- **CO3**: Ability to analyze the characteristics of wave propagation in parallel plate, rectangular and circular waveguides
- **CO4**: Knowledge on cavity resonators and waveguide components

UNIT I ELECTROSTATIC FIELDS

Vector analysis- Orthogonal co-ordinate systems-Coulomb’s Law-Electric field intensity-Field due to continuous Volume charge distribution-Field due to line charge-Field due to sheet of charge-Electric flux-Gauss law-Application of Gauss law- Divergence theorem-Electric scalar potential-Equipotential surface-Poisson’s and Laplace equations-Capacitance of parallel plate-Capacitance of Coaxial cable-Parallel wire capacitance-Boundary conditions-Energy stored in electric field-Energy density.

UNIT II STEADY MAGNETIC FIELDS


UNIT III ELECTROMAGNETIC WAVES

Displacement current-Maxwell’s equation-Equation of continuity-Inconsistency of Ampere’s law-Wave motion in free space- Uniform plane waves-Sinusoidal time variations-Conductors and Dielectrics-Propagation in good conductors and Good dielectrics-Skin effect-Polarization-Reflection and Refraction of plane waves-Reflection by a conductor –Normal and Oblique incidence-Reflection by a Dielectric-Reflection at the surface of a conducting medium-Surface impedance-Poynting Theorem- power loss in a plane conductor.
UNIT IV GUIDED WAVES AND RECTANGULAR WAVEGUIDES


UNIT V CIRCULAR WAVEGUIDES, CAVITY RESONATORS AND WAVEGUIDE COMPONENTS

Bessel functions-TE and TM modes in circular Waveguides-Wave impedances-Dominant mode-Field configuration- Comparison of Circular and Rectangular waveguides-Excitation of modes-Microwave cavity resonators-Rectangular and Circular cavity resonators-Q factor of a cavity resonator for the TE_{101} mode-Cavity excitation and tuning-Applications- TEM wave in co-axial lines-Waveguide components.

LECTURE : 45  TUTORIAL : 15  TOTAL:60 HOURS

TEXT BOOKS:


REFERENCE BOOKS:

COURSE OBJECTIVES:

- To learn the characteristics of the basic devices and determine their parameters
- To design various transistor amplifiers and oscillators
- To design rectifiers, wave shaping circuits and resonant circuits
- To design and model electronic circuits using circuit simulation tool

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO1: Ability to learn the characteristics of the basic devices and determine their parameters
CO2: Ability to design various transistor amplifiers and oscillators
CO3: Ability to design rectifiers, wave shaping circuits and resonant circuits
CO4: Ability to design and model electronic circuits using circuit simulation tool

LIST OF EXPERIMENTS
(Both Discrete and P-spice Simulation)

1. Characteristics and applications of diodes.
2. Computation of h parameters for BJT.
3. Characteristics of MOSFET.
4. Characteristics of SCR/TRIAC.
6. Design of Rectifiers with filters.
7. Design of AF amplifiers.
10. Design of RF amplifiers.
11. Design of Oscillators.
12. Design of Wave shaping Circuits.

TOTAL: 45 HOURS

REFERENCE BOOKS:


12L308 DATA STRUCTURES LABORATORY

PREREQUISITE: C PROGRAMMING LABORATORY

COURSE OBJECTIVES:

- To develop programming skills in C++
- To implement various linear and non-linear data structures, sorting and searching algorithms in C++
- To identify suitable data structures and algorithms for a given contextual problem

COURSE OUTCOMES:

Upon completion of this course the student will have:

- **CO1**: Development of programming skills in C++
- **CO2**: Ability to implement various linear and non-linear data structures, sorting and searching algorithms in C++
- **CO3**: Ability to identify suitable data structures and algorithms for a given contextual problem

L T P C

0 0 3 2

LIST OF EXPERIMENTS

Implementation of the following using C++

1. Arrays
2. Linked list
3. Stacks
4. Queues
5. Trees
6. Sorting and Searching
7. Graphs

TOTAL: 45 HOURS

REFERENCE BOOKS:

12L401 - RANDOM PROCESSES AND QUEUEING THEORY

COURSE OBJECTIVES:

- Gain knowledge on basis of random variables and understand the various standard distributions and their properties
- Understand the basic concepts of various processes and Markov chains
- Acquire knowledge on various types of spectral densities and their properties
- Gain the knowledge about linear systems with random inputs
- Understand the various types of Markovian models and Birth and death models in queuing theory.

COURSE OUTCOMES:

At the end of the course, students will be able to

CO1: Characterize probability models using probability mass functions & cumulative distribution functions and have a well-founded knowledge of standard distributions which can describe real life phenomenon (Assessment)
CO2: Gain adequate knowledge about basics of various processes and Markov chains including transition probabilities and limiting distributions (Usage)
CO3: Describe a random process in terms of its correlation functions and spectral densities (Usage)
CO4: Solve the problems of autocorrelation and cross correlation functions of input and output - white noise (Usage)
CO5: Formulate concrete problems using queuing theoretical approaches through Birth and Death process-single and multiple server queuing models.

UNIT I RANDOM VARIABLES
Discrete and continuous random variables - Moments - Moment Generating Functions and their properties. Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions - Function of Random variables.

UNIT II CLASSIFICATION OF RANDOM PROCESS

UNIT III CORRELATION AND SPECTRAL DENSITIES
Autocorrelation - Cross correlation - properties - Power spectral density - Cross spectral density - properties - Wiener- Khintchine relation - Relation between cross power spectrum and cross correlation function.

UNIT IV LINEAR SYSTEMS WITH RANDOM INPUTS
Linear time invariant system - System transfer function - Linear systems with random inputs - Auto correlation
and cross correlation functions of input and output - white noise.

UNIT V QUEUING THEORY

Markovian models - Birth and Death Queuing models - Steady state results - Single and multiple server queuing models - Little’s formula - M/G/1 queue.

LECTURE:45 TUTORIAL:15 TOTAL:60 HOURS

TEXT BOOKS:


REFERENCE BOOKS:


12L402 ENVIRONMENTAL SCIENCE AND ENGINEERING

COURSE OBJECTIVES:

- To gain basic knowledge about various resources of environment
- To create an exposure to the basic concepts of ecosystems and biodiversity
- To gain knowledge about engineering solutions for solving issues of pollution and hazards of solid Waste
- To acquire knowledge on environmental threats and social issues.

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO1: Basic knowledge about various resources of environment
CO 2: Exposure to the basic concepts of ecosystems and biodiversity
CO 3: Knowledge about engineering solutions for solving issues of pollution and hazards of solid Waste
CO 4: Knowledge on environmental threats and social issues.

UNIT I ENVIRONMENTAL RESOURCES


UNIT II ECO SYSTEM AND BIODIVERSITY


UNIT III ENVIRONMENTAL POLLUTION

Air pollution, classification of air pollutants gaseous particulars, sources effects and control of gaseous pollutants SO2, NO2, H2S, CO, CO2 and particulates, control methods, cyclone separator, electrostatic precipitator, catalytic combustion water pollution-classification of water pollutants, inorganic pollutants, sources, effects and control of heavy metals, organic pollutants, oxygen demanding wastes, aerobic and anaerobic decomposition, soil pollution, Noise pollution, sources, effects, decibel scale.
UNIT IV ENVIRONMENTAL THREATS


UNIT V SOCIAL ISSUES AND ENVIRONMENT


LECTURE: 45 TUTORIAL: 0 TOTAL: 45HOURS

TEXT BOOKS:


REFERENCE BOOKS:

12L403- ANALOG INTEGRATED CIRCUITS

PREREQUISITE: ELECTRONIC CIRCUIT DESIGN

COURSE OBJECTIVES:

- To gain knowledge of IC fabrication
- To design analog integrated circuits using opamp in linear and nonlinear domain
- To gain knowledge on Analog multipliers, PLL and Data Converters
- To acquire knowledge on special function ICs

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO1: Knowledge of IC fabrication,
CO2: Ability to design analog integrated circuits using opamp in linear and nonlinear domain
CO3: Knowledge on Analog multipliers, PLL and Data Converters
CO4: Knowledge on special function ICs

UNIT I IC FABRICATION AND CIRCUIT CONFIGURATION FOR LINEAR ICS

Advantages of ICs over discrete components – Fabrication of monolithic ICs – Current mirror and current sources- Current sources as active loads- BJT Differential amplifier with active loads- General operational amplifier stages and internal circuit diagram of IC 741- DC and AC performance characteristics- slew rate- Open and closed loop configurations.

UNIT II APPLICATIONS OF OPERATIONAL AMPLIFIERS


UNIT III ANALOG MULTIPLIER AND PLL

Analog Multiplier using Emitter Coupled Transistor Pair - Gilbert Multiplier cell - Variable transconductance technique- analog multiplier ICs and their applications- Operation of the basic PLL- Closed loop analysis- Voltage controlled oscillator- Monolithic PLL IC 565- application of PLL for AM detection- FM detection and Frequency synthesizing.

UNIT IV DATA CONVERTERS

Analog and Digital Conversions- D/A converter – specifications - weighted resistor type- R-2R Ladder type- Inverted R-2R Ladder type - switches for D/A converters- A/D Converters – specifications - Flash type -
counter type-Successive Approximation type -charge balancing type and Dual Slope type.

UNIT V WAVEFORM GENERATORS AND SPECIAL FUNCTION ICs (9)
Sine-wave generators- Multivibrators and Triangular wave generator- Saw-tooth wave generator- Timer IC 555-IC Voltage regulators - Three terminal fixed and adjustable voltage regulators - IC 723 general purpose regulator - Monolithic switching regulator- Switched capacitor filter IC MF10- Frequency to Voltage and Voltage to Frequency converters- Audio Power amplifier and Video Amplifier

LECTURE: 45 TUTORIAL: 0 TOTAL: 45HOURS

TEXT BOOKS:


REFERENCE BOOKS:

12L404- ANALOG COMMUNICATION

PREREQUISITE: SIGNALS AND SYSTEMS, RANDOM PROCESS

COURSE OBJECTIVES:

- To understand the concepts of analog modulation and demodulation techniques
- To understand the sources of noise and its effects in Communication systems
- To analyze the performance of receiver in the presence of noise
- To gain the basic concepts of satellite communication

COURSE OUTCOMES:

Upon completion of this course the student have:

CO1: Knowledge on analog modulation and demodulation techniques
CO2: Exposure to the sources of noise and its effects in Communication systems
CO3: Ability to analyze the performance of receiver in the presence of noise
CO4: Basic knowledge on satellite communication

L T P C
3 0 0 3

UNIT I AMPLITUDE MODULATION (9)
Spectral characteristics of periodic and non periodic signals - Generation and demodulation of AM, DSBSC, SSB and VSB signals - Comparison of amplitude modulation systems.

UNIT II ANGLE MODULATION AND PULSE MODULATION (9)

UNIT III NOISE THEORY (9)

UNIT IV PERFORMANCE OF CW MODULATION SYSTEMS (9)
Super heterodyne radio receiver and its characteristics - SNR - Noise in DSBSC systems using coherent detection - Noise in AM system using envelope detection - Noise in FM system – FM threshold effect - Pre emphasis and De emphasis in FM - Comparison of performances.

UNIT V SATELLITE COMMUNICATIONS (9)
Satellite communication - Orbit dynamics - Kepler’s law - Orbits parameters - Orbital perturbations - Station keeping - Geostationary - Frequency allocation - Units of visibility - Launching vehicles and propulsion.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45HOURS
TEXT BOOKS:


REFERENCE BOOKS:

12L405- DIGITAL LOGIC WITH HDL

COURSE OBJECTIVES:

- To Acquire knowledge on number systems and Boolean algebra
- To implement Combinational and Sequential logic circuits
- To design Synchronous and Asynchronous digital circuits
- To realize combinational and sequential logic circuits using Verilog HDL

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO1: Indepth knowledge on number systems and Boolean algebra
CO2: Ability to implement Combinational and Sequential logic circuits
CO3: Ability to design Synchronous and Asynchronous digital circuits
CO4: Ability to realize combinational and sequential logic circuits using Verilog HDL

UNIT I NUMBER SYSTEMS
Number Systems - Number base conversions - Complements - Signed Binary Numbers - Binary codes -Boolean Algebra - Boolean functions - Canonical and Standard Forms - Minimization of Boolean expressions - Karnaugh map minimization- Don’t care conditions - Tabulation Method - Implementation of logic functions using gates - NAND and NOR implementation.

UNIT II COMBINATIONAL LOGIC CIRCUITS

UNIT III SEQUENTIAL LOGIC CIRCUITS

UNIT IV ASYNCHRONOUS SEQUENTIAL CIRCUITS
UNIT V MEMORY AND PROGRAMMING LOGIC

Classification of memories - RAM organization - Memory decoding - Memory expansion - Static RAM cell - Dynamic RAM cell - ROM organization - Types of ROM - Programmable Logic Array - Programmable Array Logic - Field Programmable Gate Arrays.

LECTURE:45 TUTORIAL:15 TOTAL:60 HOURS

TEXT BOOKS:


REFERENCE BOOKS:

12L406-NETWORKS AND TRANSMISSION LINES

PREREQUISITE: CIRCUIT THEORY

COURSE OBJECTIVES:

- To understand the symmetrical and asymmetrical two port networks and passive networks
- To gain knowledge in the design of matched networks for loaded transmission lines
- To synthesize the Foster and Cauer forms of RC and LC networks
- To analyze the distortionless line and the effects of loading
- To compute various parameters for loaded transmission lines using Smith chart and acquire knowledge of stub matching in Transmission Lines

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO1: Knowledge on symmetrical and asymmetrical two port networks and passive networks
CO2: In-depth knowledge in the design of matched networks for loaded transmission lines
CO3: Ability to synthesize the Foster and Cauer forms of RC and LC networks
CO4: Ability to analyze distortionless line and the effects of loading
CO5: Ability to compute various parameters for loaded transmission lines using Smith chart and acquire knowledge of stub matching in Transmission Lines

UNIT I SYMMETRICAL AND ASYMMETRICAL TWO PORT NETWORKS

Two port networks- Characterization in terms of impedance, Admittance, Hybrid and Transmission parameters - Inter relationships among parameter sets - Interconnection of two port networks - Series, parallel and cascade. Lattice Networks- Symmetrical two port networks: T and δ Equivalent of a two port network - Image impedance - Characteristic impedance and propagation constant of a symmetrical two port network.

UNIT II PASSIVE NETWORKS

Constant K filters-m derived filters-Composite filters-Design procedures-Series and shunt equalizer-Symmetrical and asymmetrical attenuators - T and δ sections.

UNIT III PASSIVE NETWORK SYNTHESIS


UNIT IV TRANSMISSION LINE THEORY

Line parameters and transmission constants-Transmission line equation-Physical significance of the equation-
Infinite line- Input and transfer impedance-Waveform distortion- Distortionless line- Loading-Reflection phenomena-Reflection loss and insertion loss-Skin and proximity effect-T and δ equivalent of transmission lines.

UNIT V LINE AT RADIO FREQUENCIES

Parameters of open wire line and co-axial line at high frequencies-Standing waves-Standing wave ratio-Input impedance of open and short circuited lines-Relation between VSWR and reflection co-efficient-Quarter wave transformer-Single and double stub matching-Smith chart and its applications.

LECTURE:45 TUTORIAL:0 TOTAL:45 HOURS

TEXT BOOKS:


REFERENCE BOOKS:

12L407- INTEGRATED CIRCUITS LABORATORY

PREREQUISITE: ELECTRON DEVICES AND CIRCUITS LABORATORY

COURSE OBJECTIVES:

- To design and implement realize combinational and sequential logic circuits
- To design and realize various applications of Op-Amp and IC 555 timer.

COURSE OUTCOMES:

Upon completion of this course the student will have:

- **CO1**: Ability to design and implement combinational and sequential logic circuits
- **CO2**: Ability to design and realize various applications of Op-Amp and IC 555 timer

LIST OF EXPERIMENTS

1. Implementation of Simple Boolean expression using Universal gates.
2. Half Adder and Full adder
3. Multiplexer and Demultiplexers
4. Flip-flops
5. Synchronous and Asynchronous Counters
6. Data transfer using shift register.
7. Applications of op-amp.
8. Schmitt trigger using op-amp
10. Multivibrators using 555 timer

TOTAL: 45 HOURS

REFERENCE BOOKS:

12L408- ANALOG COMMUNICATION LABORATORY

COURSE OBJECTIVES:

- To create exposure to the practical aspects of modulation and demodulation techniques
- To Visualize the characteristic features of radio receivers
- To realize the principles of TDM and noise spectrum measurement using spectrum analyzer

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO1: Exposure to the practical aspects of modulation and demodulation techniques
CO2: Ability to visualize the characteristic features of radio receivers
CO3: Ability to realize the principles of TDM and noise spectrum measurement using spectrum analyzer

LIST OF EXPERIMENTS

1. Cross over network
2. Tone control circuits
3. Amplitude modulation and demodulation
4. AM- DSBSC generation
5. Characteristics of AM receiver
6. Frequency modulation and demodulation
7. Pre emphasis and de emphasis in FM
8. Pulse modulation – PAM/PWM/PPM
9. Transistor mixer
10. IF tuned Oscillator
11. IF tuned Amplifier
12. Time division multiplexing

TOTAL: 45 HOURS
REFERENCE BOOKS:

PREREQUISITE: SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

- To understand the principle of discrete time signals and systems
- To design and realize IIR and FIR filters
- To gain knowledge about DSP architecture and programming
- To apply the concepts of Multirate signal processing in real time applications

COURSE OUTCOMES:

Upon completion of this course the student will have

CO 1: An in-depth knowledge on the principles of discrete time signals and systems
CO 2: An ability to design and realize IIR and FIR filters
CO 3: Knowledge on DSP architecture and programming
CO 4: An ability to apply the concepts of Multirate signal processing in real time applications

UNIT I DISCRETE –TIME SIGNALSAND SYSTEMS (9)

Review of discrete-time signals and systems - DFT and its properties, FFT algorithms and its application to convolution, Overlap-add and overlap-save methods.

UNIT II DESIGN OFINFINITE IMPULSE RESPONSE FILTERS (9)

Analog filters - Butter worth and Chebyshev Type I. Analog Transformation of prototype LPF to BPF /BSF/ HPF. Transformation of analog filters into equivalent digital filters using Impulse invariant method and Bilinear transform method- Realization structures for IIR filters – direct, cascade, parallel forms.

UNIT III DESIGN OFFINITE IMPULSE RESPONSE FILTERS (9)

Linear phase response of FIR-FIR design using window method- Rectangular, Hamming, Hanning and Blackmann Windows- Frequency sampling method - Realization structures for FIR filters - Transversal and Linear phase structures- Comparison of FIR and IIR filters.

UNIT IV QUANTIZATION EFFECTSAND DSPARCHITECTURE (9)

Representation of numbers-ADC Quantization noise-Coefficient Quantization error-Product Quantization error-truncation & rounding errors -Limit cycle due to product round-off error-Round- off noise power-limit cycle oscillation due to overflow in digital filters- Principle of scaling- Introduction to PDSP - special features-TMS320C54x DSP processor architecture and addressing schemes.
UNIT V MULTIRATE SIGNAL PROCESSING

Introduction to Multirate signal processing-Decimation-Interpolation (by an integer and rational factor)-Poly phase Decomposition of FIR filter-Multistage implementation of sampling rate conversion- Applications

LECTURE: 45 TUTORIAL: 15 TOTAL: 60

TEXT BOOKS:

REFERENCE BOOKS:
12L502- MICROPROCESSORS AND MICROCONTROLLERS

PREREQUISITE: DIGITAL LOGIC WITH HDL

COURSE OBJECTIVES:

- To gain knowledge about architecture and programming concepts of 8086 Microprocessor, 8051 and PIC Microcontrollers
- To acquire knowledge on peripheral interfacing concepts
- To design microprocessor and Microcontrollers based systems

COURSE OUTCOMES:

Upon completion of this course the student will have

CO 1: Knowledge on architecture and programming concepts of 8086 Microprocessor, 8051 and PIC Microcontrollers
CO 2: Knowledge on peripheral interfacing concepts
CO 3: An ability to design microprocessor and Microcontrollers based systems

UNIT I 8086 ARCHITECTURE

8086 Microprocessor Architecture - Pin Description - Minimum/Maximum mode system configuration - Memory and I/O interfacing - Bus cycles - Timing diagram - Interrupts.

UNIT II 8086 PROGRAMMING AND INTERFACING

8086 Instruction set, Addressing Modes- Procedures, Macros, Assembler Directives - Assembly language programming - Peripheral Interfacing using 8255 PPI - 8279 Keyboard/Display controller - 8251 USART.

UNIT III 8051 MICROCONTROLLER

8051 Microcontroller Architecture - Signals - Memory organization - SFRs - Interrupts - Timer/Counter- Port operation - Serial communication.

UNIT IV 8051 PROGRAMMING AND INTERFACING

8051 Instruction Set - Programming 8051 Timers - Serial Port Programming - Interrupts Programming, LCD and Keyboard Interfacing- ADC, DAC and Sensor Interfacing, External Memory Interface - RTC Interfacing - Motor Control.

UNIT V PIC MICROCONTROLLER

TEXT BOOKS:


REFERENCE BOOKS:

12L503- DIGITAL COMMUNICATION

PREREQUISITE: ANALOG COMMUNICATION

COURSE OBJECTIVES:

- To understand the principle of Pulse modulation techniques and digital modulation techniques
- To analyze Base band pulse transmission
- To apply the concepts of Error control coding
- To understand the principles of spread spectrum and its applications

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Knowledge on the principle of Pulse modulation techniques and digital modulation techniques
CO 2: An ability to analyze Base band pulse transmission
CO 3: An ability to apply the concepts of Error control coding
CO 4: Knowledge on the principle of spread spectrum and its applications

UNIT I PULSE MODULATION


UNIT II ERROR CONTROL CODING

Discrete memoryless channels - Linear block codes - Cyclic codes - Convolutional codes -Maximum likelihood decoding of convolutional codes-Viterbi Algorithm-Trellis coded Modulation-Turbo codes -Applications.

UNIT III BASEBAND PULSE TRANSMISSION


UNIT IV DIGITAL MODULATION TECHNIQUES

Generation of ASK,PSK,FSK - Signal space diagram - matched filter-detection - bit error probability and Power spectra of BPSK, QPSK, FSK -Differential phase shift keying - Comparison of Digital modulation systems - Carrier and symbol synchronization.
UNIT V SPREAD SPECTRUM MODULATION

Pseudo-noise sequences - A notion of spread spectrum - Direct sequence spread spectrum with coherent binary phase shift keying - Signal space dimensionality and processing gain - Probability of error - Frequency - Hop spread spectrum - Code Division Multiplexing.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L504- COMPUTER ARCHITECTURE AND ORGANIZATION

PREREQUISITE: MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES:

- To understand the basic concepts of computer system design
- To apply the principle of micro programming to design the major components like ALU, Controller etc
- To know the concepts of advanced computer architectures and multiprocessing

COURSE OUTCOMES:

Upon completion of this course the student will have

CO 1: Knowledge on the basic concepts of computer system design
CO 2: An ability to apply the principle of micro programming to design the major components like ALU, Controller etc
CO 3: Knowledge on the concepts of advanced computer architectures and multiprocessing

L T P C 
3 0 0 3

UNIT I BASICS OF COMPUTER SYSTEM DESIGN (9)

Machine computation - Evolution: First, Second, Third and Fourth generation of computer systems - Recent developments - Different layers of Computer systems - Complexity of computing - Computer system Design Layers - RTL structure of computer system.

UNIT II CENTRAL PROCESSING UNIT (9)

Data path and Control path support – Micro operations and Control signals on Data path: Memory, Bus and Inter register transfer and Arithmetic and Logic micro operations - Machine language instructions - Execution of instructions - ALU - Bit sliced ALU.

UNIT III CONTROLLER DESIGN (9)


UNIT IV MEMORY SUBSYSTEM (9)

CPU – Memory interaction - Performance measures - Memory array organization: 2D, 3D and 2.5D memory organization - Memory Hierarchy - Cache memory - address mapping techniques - Associate memory: Principle of CAM - Associative memory block diagram - Applications of Associative memory - Virtual memory: organization - Address translation schemes.
UNIT V ADVANCED COMPUTER ARCHITECTURES

RISC architecture - Instruction pipelining - R2000/R3000 functional block diagram and Instruction pipeline
- Parallel architectures: models of computation - classification - dataflow architecture - reduction machine
- Control driven machines - Multiprocessing architecture - MIMD model - Key issues of Multiprocessing.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L505- CMOS VLSI SYSTEMS

PREREQUISITE: DIGITAL LOGIC WITH HDL

COURSE OBJECTIVES:

- To gain knowledge about basic concepts of CMOS and CMOS Logic Design
- To design static CMOS and dynamic clocked CMOS circuits
- To apply knowledge on High-Level Digital Functional Block

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic concepts of CMOS and CMOS Logic Design
CO 2: An ability to design static CMOS and dynamic clocked CMOS circuits
CO 3: An ability to apply knowledge on High-Level Digital Functional Block

UNIT I OVERVIEW OF VLSI
Complexity and Design - MOSFETs as switches - Basic Logic Gates in CMOS - Complex Logic Gates in CMOS - Transmission Gate circuits - CMOS Layers - Designing FET Arrays.

UNIT II MOS PHYSICS

UNIT III CMOS CIRCUITS

UNIT IV CLOCKING AND TESTING

UNIT V VLSI SYSTEMS SPECIFICATIONS AND COMPONENTS
Systems Specifications - Structural Gate Level Modeling - Switch Level Modeling - Design Hierarchy - Behavioral

LECTURE: 45    TUTORIAL: 0    TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L506- CONTROL SYSTEMS

PREREQUISITE: SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

- To compute differential equation and transfer function of a given control system
- To gain knowledge on the concepts of time response and frequency response analysis
- To analyze the stability and state variable of a control system

COURSE OUTCOMES:

Upon completion of this course the student will have

CO 1: An ability to compute differential equation and transfer function of a given control system
CO 2: Knowledge on the concepts of time response and frequency response analysis
CO 3: An ability to analyze the stability and state variable of a control system

UNIT I CONTROL SYSTEM MODELING

Basic Elements of Control System - Open loop and Closed loop systems - Differential equation - Transfer function, Modeling of Electric systems, Translational and rotational mechanical systems - Block diagram reduction Techniques - Signal flow graph.

UNIT II TIME RESPONSE ANALYSIS


UNIT III FREQUENCY RESPONSE ANALYSIS


UNIT IV STABILITY ANALYSIS


UNIT V STATE VARIABLE ANALYSIS

State space representation of Continuous Time systems - State equations - Transfer function from State Variable Representation - Solutions of the state equations - Concepts of Controllability and
Observability - State space representation for Discrete time systems- Sampled Data control systems-
Sampling Theorem- Sampler and Hold - Open loop and Closed loop sampled data systems.

Case study: Any two examples of control systems.

LECTURE: 45   TUTORIAL: 15   TOTAL: 60

TEXT BOOKS:


REFERENCE BOOKS:


12L507- DIGITAL COMMUNICATION SYSTEMS LABORATORY

PREREQUISITE: ANALOG COMMUNICATION LABORATORY

COURSE OBJECTIVES:

- To implement FFT algorithms, Linear/Circular convolution using MATLAB
- To design IIR, FIR and Multirate filters
- To implement the DSP algorithms using TMS320C5X
- To implement digital modulation techniques using SIMULINK

COURSE OUTCOMES:

Upon completion of this course the student will be familiar with:

CO 1: An ability to implement FFT algorithms, Linear/Circular convolution using MATLAB
CO 2: An ability to design IIR, FIR and Multirate filters
CO 3: An ability to implement the DSP algorithms using TMS320C5X
CO 4: An ability to implement digital modulation techniques using SIMULINK

LIST OF EXPERIMENTS

DIGITAL SIGNAL PROCESSING (IMPLEMENTATION USING MATLAB/ TMS320C5X)

1. Fast Fourier Transform algorithms, Linear convolution/ circular convolution.
2. IIR filter Design- Impulse invariant and Bilinear transformation methods.
3. FIR Filter Design - Window-based method.
4. Multi rate filters, Decimation by poly phase decomposition.
5. Study of various addressing modes of DSP using simple programming examples.

DIGITAL COMMUNICATION (IMPLEMENTATION USING SIMULINK/ HARDWARE)

6. Signal sampling and reconstruction.
8. Convolutional coder.
10. ASK, FSK, PSK schemes.
11. Code Division Multiplexing.

TOTAL: 45
REFERENCE BOOKS


12L508- VLSI LABORATORY

PREREQUISITE: INTEGRATEDCIRCUITSLABORATORY

COURSE OBJECTIVES:

- To apply the HDL programming knowledge for modeling and synthesis of digital circuits
- To learn FPGA tools and devices
- To implement digital circuits/systems on FPGA devices

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Ability to apply the HDL programming knowledge for modeling and synthesis of digital circuits
CO 2: Knowledge of FPGA tool and devices
CO 3: An ability to implement digital circuits/systems on FPGA devices

L T P C
0 0 3 2

LIST OF EXPERIMENTS

DESIGN AND SIMULATION USING HDL

1. Combinational Logic circuits
2. Synchronous Sequential Logic circuits
3. Asynchronous Sequential Logic circuits
4. Architecture level:
   a. Memory devices
   b. ALU
   c. RISC CPU (3 bit opcode, 5 bit address)
5. Implementation of Traffic light controller
6. Study of Synthesis tools
7. Layout Design of Logic gates and Combinational circuits
8. Study of development tool for FPGAs for schematic entry and Verilog

TOOLS:

Xilinx Tools, Cadence Tools, Model SIM, Mentor Graphics Tools, T-SPICE

TOTAL: 45

REFERENCE BOOKS:

12L601- MANAGEMENT THEORY AND PRACTICE

COURSE OBJECTIVES:

- To gain a basic knowledge of business and management
- To plan for effective organization
- To communicate effectively and control

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic knowledge of business and management
CO 2: Ability to plan for effective organization
CO 3: Ability to communicate effectively and control

UNIT I BASICS OF MANAGEMENT THOUGHT


UNIT II PLANNING

Nature, Purpose, Types, Steps, Management by Objectives, Strategic planning process, Decision-making- Types of decisions, Approaches to decision-making under uncertainty.

UNIT III ORGANIZING


UNIT IV STAFFING AND LEADING


UNIT V CONTROLLING

Process, Feedback loop of Management control, Requirements for effective control- control techniques- Operations research for controlling, Overall and Preventive control.

LECTURE: 45 TUTORIAL: 15 TOTAL: 60

L T P C
3 1 0 4

(9)
TEXT BOOKS:


REFERENCE BOOKS:

12L602- MIXED SIGNAL CIRCUITS AND INTERFACING

PREREQUISITE: ANALOG INTEGRATED CIRCUITS, ECD

COURSE OBJECTIVES:
- To gain a basic knowledge of sampling circuits and Sample & Hold architectures
- To acquire in-depth knowledge in digital to analog and analog to digital architectures
- To analyze MOSFET based power amplifiers

COURSE OUTCOMES:
Upon completion of this course the student will have:

CO 1: Basic knowledge of sampling circuits and Sample & Hold architectures
CO 2: In-depth knowledge of digital to analog and analog to digital architectures
CO 3: Ability to analyze MOSFET based power amplifiers

UNIT I BASIC SAMPLING CIRCUITS
Introduction to data conversion and processing - Analog switches - High and low level analog multiplexers - analog multiplexer IC - Sample and hold circuits - MOS - Comparison of diode and MOS switches - Improvements in MOS switch performance.

UNIT II SAMPLE AND HOLD ARCHITECTURES
Open loop architecture - closed loop architecture - multiplexed input architecture - switched capacitor architecture - current mode architecture..

UNIT III DIGITAL TO ANALOG CONVERTER ARCHITECTURE
Basic principles of digital to analog conversion - general considerations - performance metrics - reference multiplication and division - switching functions in resistor ladder DACs, current steering DACs, capacitor DACs, Binary- thermometer code conversion

UNIT IV ANALOG TO DIGITAL CONVERTER ARCHITECTURE
General considerations - performance metrics - Successive approximation ADC, Pipelined ADC, Flash Converters, Sigma delta ADC.

UNIT V CMOS POWER AMPLIFIERS
MOSFET based Class A, B, AB, C and D Power Amplifiers – characteristics analysis.

LECTURE: 45 TUTORIAL: 15 TOTAL: 60
TEXT BOOKS:


REFERENCE BOOKS:

PREREQUISITE: ELECTROMAGNETIC WAVES AND WAVEGUIDES

COURSE OBJECTIVES:

- To understand the Antenna fundamentals and parameters
- To learn the concepts of wire antennas and antenna arrays
- To design various types of antennas
- To get thorough knowledge about wave propagation and characteristics

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic knowledge of Antenna fundamentals and parameters
CO 2: Knowledge on wire antennas and antenna arrays
CO 3: An ability to design various types of antennas
CO 4: A thorough knowledge about wave propagation and characteristics

UNIT I ANTENNA FUNDAMENTALS AND PARAMETERS (9)

UNIT II LINEAR WIRE AND LOOP ANTENNAS (9)
Linear wire antenna - Infinitesimal dipole - small dipole - finite length dipole - Half wavelength dipole, Loop antenna - Circular loop antenna of constant current - ferrite loop.

UNIT III ARRAYS (9)
Two-element array (with equal and unequal magnitude and spacing) - N element linear array (with uniform spacing and Magnitude), Broad side array, End fire array, Phased array, Multifunction of patterns, Binomial array, Tchebyshev array, Planar array, Circular array.

UNIT IV TRAVELING WAVE AND BROADBAND ANTENNAS (9)
Folded dipole, V antenna, Rhombic antenna, Helical antenna, Yagi-uda array of linear elements - Spiral antenna - Log periodic antenna, Patch antenna. Concept of Horn antenna - Parabolic reflector, Antenna measurement - radiation pattern, far and near field measurement - Anechoic chamber.
UNIT V WAVE PROPAGATION

Fundamental equation for free space propagation—modes of propagation structure of atmosphere and characteristics-sky wave propagation-effects of Earth’s magnetic field- Application of Bartree magnetic ionic formula-Hartree formula-effective dielectric constant and conductivity of the ionosphere and collision frequency –lowest Usable frequency-Skip distance- Optimum working frequency-ionospheric Abnormalities – Multi hop propagations - space wave propagation —Duct propagation.

LECTURE: 45      TUTORIAL: 15      TOTAL: 60

TEXT BOOKS:


REFERENCE BOOKS:

12L604- EMBEDDED SYSTEMS

PREREQUISITE: MICROPROCESSORS AND MICROCONTROLLERS

COURSE OBJECTIVES:

• To gain basic knowledge about design and analysis of embedded systems
• To learn the concepts of real time operating systems
• To apply embedded concepts to real time applications

COURSE OUTCOMES:
Upon completion of this course the student will have:

CO 1: Basic knowledge about design and analysis of embedded systems
CO 2: Knowledge on real time operating systems
CO 3: Ability to apply embedded concepts to real time applications

<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>

UNIT I INTRODUCTION TO EMBEDDED COMPUTING  
Complex systems and microprocessors - Embedded system design process - Formalism for system design - Instruction sets Preliminaries - ARM Processor - CPU: Programming input and output – Supervisor mode, exception and traps - Coprocessor - Memory system mechanism - CPU performance – CPU power consumption.

UNIT II COMPUTING PLATFORM AND DESIGN ANALYSIS  
CPU buses - Memory devices - I/O devices - Component interfacing - Design with microprocessors - Development and Debugging - Program design - Model of programs - Assembly and Linking - Basic compilation techniques - Analysis and optimization of execution time, power, energy, program size - Program validation and testing.

UNIT III PROCESS AND OPERATING SYSTEMS  

UNIT IV HARDWARE/SOFTWARE INTEGRATION  
Compiler - Cross compiler - Emulator, Simulators - Host and target machines - Linkers/locators for embedded software - Getting embedded software into the target system and testing on host machine.

UNIT V EMBEDDED SYSTEM APPLICATIONS  
Applications of Embedded systems - Recent trends in Embedded systems - Case study of Embedded systems like Digital camera, Smart card, Flight simulation and control.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45
TEXT BOOKS:


REFERENCE BOOKS:

12L605- COMPUTER COMMUNICATION

PREREQUISITE: DIGITAL COMMUNICATION

COURSE OBJECTIVES:

- To learn about data communication and protocols
- To acquire knowledge of LAN, MAN, WAN.
- To know about upper OSI layers and cloud computing

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Knowledge on data communication and protocols
CO 2: In-depth knowledge of LAN, MAN, WAN.
CO 3: Knowledge about upper OSI layers and cloud computing

<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>2</td>
<td>4</td>
</tr>
</tbody>
</table>

UNIT I DATA COMMUNICATION


UNIT II DATA LINK CONTROL AND PROTOCOLS

Flow control and error control, stop and wait, Sliding windows, Automatic Repeat (ARQ), Asynchronous Protocols, - X MODEM, Y MODEM, Synchronous protocols - Character Oriented and Bit oriented protocols (HDLC).

UNIT III LOCAL AREA NETWORKS AND METROPOLITAN NETWORKS

IEEE 802 standards, LLC, MAC layer protocols - CSMA/CD Ethernet, Token Bus, Token Ring, FDDI, Distributed Queue Dual Bus, Switched Multimega Bit Data Service.

UNIT IV WIDE AREA NETWORKS


UNIT V UPPER OSI LAYERS AND INTRODUCTION TO CLOUD COMPUTING

Session layer protocols, Presentation layer - Data Security, Encryption/Decryption, Authentication, Data Composition, Application layer protocols - MHS, File transfer, Virtual terminal, CMIP.

TEXT BOOKS:


REFERENCE BOOKS:


12L607- EMBEDDED SYSTEMS LABORATORY

PREREQUISITE: MICROPROCESSORS AND MICROCONTROLLERS LABORATORY

COURSE OBJECTIVES:

- To apply the programming skills for embedded system design
- To design real time system using the concepts of peripheral interfacing with PIC microcontroller
- To communicate effectively the concepts, principles and techniques learnt on embedded systems

COURSE OUTCOMES:

Upon completion of this course the student will have:

- **CO 1:** An ability to apply the programming skills for embedded system design
- **CO 2:** An ability to work in teams to design real time system using the concepts of peripheral interfacing with PIC microcontroller
- **CO 3:** An ability to communicate effectively the concepts, principles and techniques learnt on embedded systems

LIST OF EXPERIMENTS

**PIC Microcontroller Programming**

1. BCD to Seven Segment Display
2. Timer/Counter Programming
3. Serial Communication
4. Pulse Width Modulation
5. DC Motor Control

**Embedded Experiments using Proteus & Keil software**

6. Clock using timer interrupt
7. Square wave generation
8. BCD to Seven segment display
9. Frequency Adder/Multiplier
10. Serial Transmission and Reception
11. Experiments based on Embedded Application Development Systems
REFERENCE BOOKS:

12L608- NETWORKING LABORATORY

PREREQUISITE: COMPUTER COMMUNICATION

COURSE OBJECTIVES:

- To implement and analyze network protocols
- To apply the knowledge of data packet scheduling
- To get practical knowledge about network management, network security and WiFi
- To communicate effectively the concepts, principles and techniques learnt on network protocols

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: An ability to implement and analyze network protocols
CO 2: An ability to apply the knowledge of data packet scheduling
CO 3: Practical knowledge about network management, network security and WiFi
CO 4: An ability to communicate effectively the concepts, principles and techniques learnt on network protocols

LIST OF EXPERIMENTS

NETWORK PROGRAMMING

1. Analysis of logical link control layer protocols – Stop and wait, Sliding window
2. Analysis of MAC protocols – ALOHA, SLOTTED ALOHA, CSMA, CSMA/CD, TOKEN BUS and TOKEN RING
3. Client / Server communication using TCP / UDP Socket programming
4. Data packet scheduling, Congestion control, transmission flow control, Error Detection and Control algorithms

NETWORK MANAGEMENT

5. Switches / Routers
   - Interface PC’s using connectivity devices
   - Configure a router to connect two different Networks(WAN).
   - Create Access Control Lists in a router and filter network traffic
6. Wi-Fi Physical Layer
7. Wi-Fi MAC Layer
8. Cryptography (Network Security)
REFERENCE BOOKS:

12L701- MICROWAVE AND RF SYSTEMS

PREREQUISITE: NETWORKS AND TRANSMISSION LINE, ELECTROMAGNETIC WAVES AND WAVEGUIDES

COURSE OBJECTIVES:

- To acquire the basic knowledge of planar transmission lines and parameters
- To realize the significance of impedance matching in transceiver
- To apply the concepts of microwave sources and circuits
- To gain knowledge about RF circuits and systems

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic knowledge on planar transmission lines and parameters
CO 2: An ability to realize the significance of impedance matching in transceiver
CO 3: An ability to apply the concepts of microwave sources and circuits
CO 4: An in-depth knowledge of RF circuits and systems

UNIT I Z, Y AND S PARAMETERS AND PLANAR TRANSMISSION LINES


UNIT II IMPEDANCE MATCHING


UNIT III ACTIVE MICROWAVE CIRCUITS


UNIT IV WIRELESS RF SYSTEMS

UNIT V RF CIRCUITS


LECTURE: 45  TUTORIAL: 15  TOTAL: 60

TEXT BOOKS:


REFERENCE BOOKS:

12L702- LOW POWER VLSI DESIGN

PREREQUISITE: CMOS VLSI SYSTEMS

COURSE OBJECTIVES:

- To learn the sources of power dissipation and principles of low power VLSI design
- To design and analyze low power CMOS circuits
- To gain knowledge in power estimation and optimization techniques
- To synthesis low power circuits

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Knowledge on the sources of power dissipation and principles of low power VLSI design
CO 2: Ability to design and analyze low power CMOS circuits
CO 3: An in-depth knowledge of power estimation and optimization techniques
CO 4: An ability to synthesis low power circuits

UNIT I POWER DISSIPATION IN CMOS

Hierarchy of limits of power - Sources of power consumption - Physics of power dissipation in CMOS FET devices- Basic principle of low power design.

UNIT II POWER OPTIMIZATION

Logical level power optimization - Circuit level low power design - Circuit techniques for reducing power consumption in adders and multipliers.

UNIT III DESIGN OF LOW POWER CMOS CIRCUITS

Computer Arithmetic techniques for low power systems - Reducing power consumption in memories - Low power clock, Interconnect and layout design - Advanced techniques - Special techniques.

UNIT IV POWER ESTIMATION

Power estimation techniques - Logic level power estimation - Simulation power analysis - Probabilistic power analysis.

UNIT V SYNTHESISANDSOFTWAREDESIGNFORLOWPOWER

Synthesis for Low power - Behavioural level transforms- Software design for low power.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45
TEXT BOOKS:


REFERENCE BOOKS:

12L703- WIRELESS COMMUNICATION

PREREQUISITE: DIGITAL COMMUNICATION, RF SYSTEMS

COURSE OBJECTIVES:

- To acquire knowledge of Wireless channels and parameters
- To learn mobile communication and cellular system architecture
- To create exposure to multipath mitigation techniques and wireless standards

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic knowledge on Wireless channels and parameters
CO 2: Knowledge on mobile communication and cellular system architecture
CO 3: Exposure to the concepts of multipath mitigation techniques and wireless standards

L T P C
3 0 0 3

UNIT I WIRELESS CHANNELS (9)
Large scale path loss - Path loss models - Link Budget design - small scale fading - Fading due to Multipath time delay spread - flat fading - frequency selective fading - Fading due to Doppler spread - fast fading - slow fading - Parameters of mobile multipath channels - Time dispersion parameters - coherence bandwidth - Doppler spread and Coherence time.

UNIT II CELLULAR ARCHITECTURE (9)
Evolution of Mobile Communication - trends in Cellular radio and personal communications - Cellular concept - Frequency reuse - channel assignment - hand off interference and system capacity - trunking and grade of service.

UNIT III DIGITAL SIGNALING FOR FADING CHANNELS (9)
Structure of a wireless communication link, Modulation and demodulation - Quadrature Phase Shift Keying, \( \pi / 4 \)-Differential Quadrature Phase Shift Keying, Offset-Quadrature Phase Shift Keying, Binary Frequency Shift Keying, Minimum Shift Keying, Gaussian Minimum Shift Keying, Power spectrum and Error performance in fading channels, OFDM principle – Transceiver implementation, Cyclic prefix, PAPR, Intercarrier interference.

UNIT IV MULTIPATH MITIGATION TECHNIQUES (9)
Diversity - Micro - and Macrodiversity, Diversity combining techniques, Error probability in fading channels with diversity reception, Rake receiver, MIMO systems - Spatial Multiplexing, System Model, Channel state information, Capacity in fading and non-fading channels.
UNIT V WIRELESS STANDARDS

Principles of Spread Spectrum Techniques, FDMA, TDMA and CDMA - Capacity Calculations - GSM and GPRS, CDMA in IS-95 / CDMA 2000, Wi-Fi, WiMax

LECTURE: 45   TUTORIAL: 0   TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L704- FIBER OPTIC COMMUNICATION

PREREQUISITE: SEMICONDUCTOR DEVICES, DIGITAL COMMUNICATION

COURSE OBJECTIVES:

- To acquire knowledge of optical fibers and optical communication systems
- To learn the principles of optical modulation techniques
- To apply the fiber optic concepts for various communication systems

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Indepth knowledge on optical fibers and optical communication systems
CO 2: Knowledge on the working principles of optical modulation techniques
CO 3: Ability to apply the fiber optic concepts for various communication systems

UNIT I INTRODUCTION TO OPTICAL FIBERS


UNIT II FIBER OPTICAL SOURCES & PHOTO DETECTORS

Characteristics and requirements - Spontaneous and stimulated emission - Source classifications: Ruby, He-Ne lasers, Homo & Hetero structures, Laser Diodes and LED’s characteristics, Comparison and applications - Physical principles of Photodiodes, Photo detector Noise, Detector response time - Avalanche multiplication Noise - Comparisons of photo detectors.

UNIT III MODULATION TECHNIQUES


UNIT IV TRANSMISSION MEDIA & OPTICAL RECEIVERS

Fiber-optics Vs Coaxial cables - Optical fiber modes and configurations - Fiber transmission properties-Choice of wave length for fiber-optic transmission - Cable configurations - Splices, connectors and couplers - Requirements - Methods of detection process - Comparison - Basic principles of photo detection - Photo diode - Avalanche photo multiplier - Receiver configurations - Pre amplifiers for detectors.
UNIT V SYSTEM CONFIGURATIONS AND FIBER OPTIC APPLICATIONS (9)

Laser radar system - Fiber optic link for computers - Multichannel audio/video communication systems- Repeater/Regenerator for fiber-optic systems - Power Budget and Rise-time Budget - Basic networks - SONET/SDH - WDM concepts and components - Optical CDMA - generation of optical fiber link - Introduction to Ultra High Capacity Networks - optical networking technology in enterprise.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L707- MICROWAVE AND RF LABORATORY

PREREQUISITE: NETWORKS AND TRANSMISSION LINE

COURSE OBJECTIVES:

- To measure various parameters using microwave bench setup
- To analyze the radiation pattern of various Antennas and RF circuits
- To measure various parameters of RF circuits using network analyzer and spectrum analyzer

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: An ability to measure various parameters using microwave bench setup
CO 2: An ability to analyze the radiation pattern of various Antennas and RF circuits
CO 3: An ability to measure various parameters of RF circuits using network analyzer and spectrum analyzer

LIST OF EXPERIMENTS

2. Study of mode characteristics of Klystron tube.
3. Study of isolator, circulator, directional coupler and magic tee.
4. Study of GUNN oscillator characteristics.
5. Design of RF low pass, high pass and Band pass filters.
6. Study of IF and RF amplifiers.
7. Study of mixer.
10. Spectral analysis of RF circuits using spectrum analyzer.
11. Study of Antenna parameters.

REFERENCE BOOKS:

3. www.agilent.com
PREREQUISITE: EMBEDDED SYSTEMS, DIGITAL IMAGE PROCESSING

COURSE OBJECTIVES:

- To implement image processing and neural network training algorithms using MATLAB
- To learn ARM based real time applications
- To design wireless data modem and DSP based system
- To design and simulate PCB layout and ASIC layout using cadence tool

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Ability to implement image processing and neural network training algorithms using MATLAB
CO 2: Knowledge on ARM based real time applications
CO 3: Ability to design wireless data modem and DSP based system
CO 4: Ability to design and simulate PCB layout and ASIC layout using cadence tool

LIST OF EXPERIMENTS

1. Implementation of Image Processing Algorithm Using Matlab
2. Implementation of Neural Networks Using Matlab
3. Real Time Embedded Applications using ARM.
4. DC power supply design using buck-boost converters.
5. Design of AC/DC voltage regulator.
6. Design of process control timer.
7. Design of Wireless data modem.
8. PCB layout design.
9. DSP based system design.
10. CADENCE Tool Experiments.

REFERENCE BOOKS:


12L6E0 – AUTOMOTIVE ELECTRONIC SYSTEMS

PREREQUISITE: EMBEDDED SYSTEMS, CONTROL SYSTEMS

COURSE OBJECTIVES:

- To acquire the knowledge of basic electrical and electronic components used in an automotive systems
- To formulate and solve the problems of an embedded system in automotive electronic systems
- To learn the various vehicle communication protocols

COURSE OUTCOMES:

Upon completion of this course the student will have:

- **CO 1**: An in-depth knowledge of the basic electrical and electronic components used in an automotive systems
- **CO 2**: An ability to apply knowledge of an embedded system in automotive electronic systems
- **CO 3**: Knowledge on various vehicle communication protocols

UNIT I ELECTRONICS IN AUTOMOTIVE SYSTEMS (9)

Overview of Automotive Mechanical systems - Need for Automotive Electronics System - Performance (Speed, Power and Torque) - Control (Emission, Fuel Economy, Drivability and Safety) and Legislation (Environmental legislation for pollution and safety norms) - Overview of vehicle electronic systems - Basic electrical components and their operation in an automobile - Power train subsystem (Starting systems, Charging systems, Ignition systems, Electronic fuel control) - Chassis subsystem (ABS, TCS and ESP) - Comfort and safety subsystems (Night vision, airbags, Seatbelt Tensioners, Cruise Control- Lane-departure-warning, Parking)

UNIT II EMBEDDED HARDWARE AND SOFTWARE (9)

Hardware module - Introduction to an embedded board - components - Software Module: IDE - Getting started: Creating new project, creating new files, adding files to project, compile, build, debug and simulation of a project.

UNIT III EMBEDDED SYSTEM PROGRAMMING AND DEBUGGING (9)

Embedded System Programming - Up-loaders- ISP - ROM Emulators - In-Circuit Emulators - Debug Interfaces: BDM and JTAG

UNIT IV EMBEDDED SYSTEM IN AUTOMOTIVE APPLICATIONS (9)

Engine management systems - Gasoline/ Diesel systems, various sensors used in system - Electronic transmission control - Vehicle safety system - Electronic control of braking and traction - Body electronics - Infotainment systems - Navigation systems - System level tests - Software calibration using engine and vehicle
dynamometers - Environmental tests for Electronic Control Unit - Application Control Unit - Application of Control elements and control methodology in Automotive System.

UNIT V EMBEDDED SYSTEM COMMUNICATION PROTOCOLS


LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCES BOOKS:

12L6E1- RELATIONAL DATABASE MANAGEMENT SYSTEMS

COURSE OBJECTIVES:

- To learn the basics of the structure of database system and various data models
- To acquire the knowledge on the concepts of data storage, query processing and transaction management
- To know about the latest techniques in current databases

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic knowledge on the structure of the database system and various data models
CO 2: An ability to gain knowledge about data storage, query processing and transaction management
CO 3: An awareness about the latest techniques in current databases

UNIT I INTRODUCTION AND CONCEPTUAL MODELING (9)
Introduction to File and Database systems- Database system structure - Data Models - Introduction to Network and Hierarchical Models - ER model - Relational Model - Relational Algebra and Calculus.

UNIT II RELATIONAL MODEL (9)
SQL - Data definition- Queries in SQL- Updates- Views - Integrity and Security - Relational Database design - Functional dependences and Normalization for Relational Databases (up to BCNF).

UNIT III DATA STORAGE AND QUERY PROCESSING (9)
Record storage and Primary file organization- Secondary storage Devices- Operations on Files- Heap File-Sorted Files- Hashing Techniques – Index Structure for files - Different types of Indexes- B-Tree - B+Tree - Query Processing.

UNIT IV TRANSACTION MANAGEMENT (9)
UNIT V CURRENT TRENDS

Object Oriented Databases - Need for Complex Data types- OO data Model- Nested relations- Complex Types- Inheritance Reference Types - Distributed databases- Homogenous and Heterogenous- Distributed data Storage - XML - Structure of XML- Data- XML Document- Schema- Querying and Transformation. - Data Mining and Data Warehousing.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCES BOOKS:

12L6E2 - OPERATING SYSTEMS

COURSE OBJECTIVES:

- To learn the concepts of various operating systems
- To acquire the knowledge of Process, memory and I/O management techniques
- To know the basics of Unix and Windows operating systems

COURSE OUTCOMES:

Upon completion of this course the student will have:

- CO 1: An in-depth knowledge on the concepts of various operating systems
- CO 2: Knowledge on Process, memory and I/O management techniques
- CO 3: An exposure to Unix and Windows operating systems

UNIT I OPERATING SYSTEM CONCEPTS

Introduction - Multitasking - Multiprogramming - Multi user - Multithreading - Types of Operating Systems - Batch operating system - Time sharing systems - Distributed OS - Network OS - Real Time OS - Operating system services - Architectures - System programs and calls.

UNIT II PROCESS MANAGEMENT AND PROCESS SYNCHRONIZATION


UNIT III MEMORY MANAGEMENT

Logical and Physical address Space - Swapping - Contiguous memory allocation - Non-contiguous memory allocation - Virtual memory management - Paging and Segmentation techniques - Segmentation with paging - Demand Paging – Page replacement Algorithms.

UNIT IV FILE SYSTEM AND I/O SYSTEMS

UNIT V OVERVIEW OF UNIX SYSTEM AND WINDOWS

UNIX system call for processes and file system management - Windows architecture overview - Windows file system – Case studies: Linux System - Windows XP - Mach system.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L6E3 - MEASUREMENTS AND INSTRUMENTATION

PREREQUISITE: CIRCUIT THEORY, LINEAR INTEGRATED CIRCUITS

COURSE OBJECTIVES:

- To understand the basics of measurement, different types of sensors and transducers
- To acquire an in-depth knowledge on ac and dc bridges for measurement
- To learn the concepts of signal analyzers, digital instruments, data display and recording systems

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Knowledge on the basics of measurement, different types of sensors and transducers
CO 2: An in-depth knowledge on ac and dc bridges for measurement
CO 3: Basic knowledge on the working principles of signal analyzers, digital instruments, data display and recording systems

UNIT I BASICS OF MEASUREMENT

Measurement System - Instrumentation - Characteristics of measurement systems - Static and Dynamic - Errors in Measurements - Calibration and Standards.

UNIT II TRANSDUCERS

Classification of Transducers - Variable Resistive transducers - Strain gauges, Thermistor, RTD - Variable Inductive transducers - LVDT, RVDT, - Variable Capacitive Transducers - Capacitor microphone - Photo electric transducers - Piezoelectric transducers - Thermocouple-IC sensors - Fibre optic sensors - Smart/intelligent sensors.

UNIT III SIGNAL CONDITIONING AND SIGNAL ANALYZERS

DC and AC bridges - Wheatstone, Kelvin, Maxwell, Hay and Schering. Pre- amplifier - Isolation amplifier - Filters - Data acquisition systems. Spectrum Analyzers - Wave analyzers - Frequency selective wave analysers, Heterodyne wave analyser, Total harmonic distortion - Harmonic distortion analysers - Logic analyzers.

UNIT IV DIGITAL INSTRUMENTS

UNIT V DATA DISPLAY AND RECORDING SYSTEMS

Dual trace CRO -Digital storage and Analog storage oscilloscope. Analog and Digital Recorders and printers. Virtual Instrumentation - Block diagram and architecture - Applications in various fields. Measurement systems applied to Micro and Nanotechnology.

LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

PREREQUISITE: DIGITAL COMMUNICATION

COURSE OBJECTIVES:

- To gain the basic knowledge on the fundamentals of monochrome and color television
- To understand the principles of monochrome and color television transmitter and receiver systems
- To acquire the knowledge on advanced television systems

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic knowledge on the fundamentals of monochrome and color television
CO 2: Description about the principles of monochrome and color television transmitter and receiver systems
CO 3: Exposure to advanced television systems

<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>

UNIT I FUNDAMENTALS OF TELEVISION (9)

UNIT II MONOCHROME TELEVISION TRANSMITTER AND RECEIVER (9)

UNIT III ESSENTIALS OF COLOUR TELEVISION (9)
Compatibility- colour perception- three colour television cameras- values of luminance and colour difference signals- colour television display tubes- delta- gun precision-in-line and Trinitron colour picture tubes- purity and convergence- purity and static and dynamic convergence adjustments- pincushion-correction techniques- automatic degaussing circuits- gray scale tracking- colour signal transmission- bandwidth- modulation of colour difference signals- weighting factors- formation of chrominance signal.
UNIT IV COLOUR TELEVISION SYSTEMS


UNIT V ADVANCED TELEVISION SYSTEMS

Satellite TV technology- geo stationary satellites- satellite electronics- domestic broadcast system- cable TV – cable signal sources- cable signal processing, distribution and scrambling- video recording- VCR electronics-video home formats- video disc recording and playback- DVD players- tele text signal coding and broadcast receiver- digital television- transmission and reception- projection- flat panel display TV receivers- LCD and plasma screen receivers- 3DTV- EDTV

LECTURE: 45       TUTORIAL: 0       TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L6E5- STATISTICAL THEORY OF COMMUNICATION

PREREQUISITE: RANDOM PROCESS, DIGITAL COMMUNICATION, DSP

COURSE OBJECTIVES:

- To know the concepts of information theory and coding
- To acquire the basic knowledge on hypothesis testing and estimation theory
- To understand the coherent detection of signals and optimum linear filters

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: An exposure to the concepts of information theory and coding
CO 2: Basic knowledge on hypothesis testing and estimation theory
CO 3: Knowledge on the coherent detection of signals and optimum linear filters

UNIT I INFORMATION MEASURE AND NOISELESS CODING
Discrete entropy - Joint and conditional entropies - Uniquely decipherable and instantaneous codes - Kraft-Mcmillan inequality - Noiseless coding theorem - Construction of optimal codes.

UNIT II DISCRETE MEMORYLESS CHANNEL
Mutual information and channel capacity - Shannon’s fundamental theorem- Entropy in the continuous case- Shannon-Hartley law.

UNIT III HYPOTHESIS TESTING AND ESTIMATION THEORY
Baye’s, minimax and Neyman-Pearson tests - Random parameter estimation-Minimum Mean Square Error(MMSE), Minimum Mean Absolute Error (MMAE) and MAP estimates - Nonrandom parameters - Maximum Likelihood estimation.

UNIT IV DETECTION OF SIGNALS IN NOISE
Coherent signal detection in the presence of additive white and non-white Gaussian noise- Matched filter.

UNIT V DISCRETE OPTIMUM LINEAR FILTERING
Orthogonality principle- Spectral factorization- FIR and IIR Wiener filters.
TEXT BOOKS:


REFERENCE BOOKS:

12L7E0 SPREAD SPECTRUM TECHNIQUES

PREREQUISITE: DIGITAL COMMUNICATION

COURSE OBJECTIVES:

- To understand the principles of spread spectrum techniques.
- To create exposure to the fundamental concepts of cryptosystems.
- To apply the concepts of spread spectrum techniques to mobile communication.

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Indepth knowledge on the principles of spread spectrum techniques.
CO 2: Exposure to the fundamental concepts of cryptosystems.
CO 3: An ability to apply the spread spectrum techniques to mobile communication.

UNIT I INTRODUCTION TO SPREAD SPECTRUM


UNIT II SPREAD SPECTRUM TECHNIQUES

Frequency hop SS signals, performance of FHSS – Fast hopping and Slow hopping-DS and FH, CDMA system based on FH SS signals – types of SS signals-time hoping SS systems.

UNIT III SPREAD SPECTRUM ANALYSIS

Synchronization of SS System - Acquisition, Tracking, Jamming Considerations – Broad Band- Partial – Multiple Tone – Pulse – Repeat Band Jamming Blade Systems.

UNIT IV CRYPTOGRAPHY

Fundamental concepts of cryptosystems - authentication, digital signature, key schedule-encipherment, decipherment, stream cipher system, public key- cryptosystem- public key distribution system- RSA cryptosystem and authentication scheme- protocols, internetworking security mechanisms-private and public key encryption.

UNIT V APPLICATIONS


LECTURE: 45  TUTORIAL: 15  TOTAL: 60
TEXT BOOKS:


REFERENCE BOOKS:

1217E1 ADVANCED DIGITAL SIGNAL PROCESSING

PREREQUISITE: DIGITAL SIGNAL PROCESSING

COURSE OBJECTIVES:

- To analyze the discrete random process
- To know about non-parametric and parametric power spectrum estimation and prediction
- To understand the concepts of adaptive filters and multi-rate digital signal processing

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: An ability to analyze discrete random process
CO 2: An exposure to non-parametric and parametric power spectrum estimation and prediction
CO 3: Knowledge about the concepts of adaptive filters and multi-rate digital signal processing

UNIT I DISCRETE RANDOM SIGNAL PROCESSING


UNIT II SPECTRAL ESTIMATION

Estimation of spectra from finite duration signals-Nonparametric methods-Periodogram-Modified periodogram-Bartlett- Welch and Blackman-Tukey methods-Parametric methods-ARMA-AR and MA model based spectral estimation-Solution using Levinson-Durbin algorithm.

UNIT III LINEAR ESTIMATION AND PREDICTION

Linear prediction –Forward and Backward prediction-Solution of Prony’s normal equations-Least mean-squared error criterion-Wiener filter for filtering and prediction-FIR and IIR Wiener filters-Discrete Kalman filter.

UNIT IV ADAPTIVE FILTERS


UNIT V MULTIRATE DIGITAL SIGNAL PROCESSING

Mathematical description of change of sampling rate - Interpolation and Decimation - Decimation by an integer factor – Interpolation by an integer factor-Sampling rate conversion by a rational factor Polyphase filter structures-Time invariant structures-Multistage implementation of multirate system, Application to subband coding-Wavelet transform.
TEXT BOOKS:


REFERENCE BOOKS:

**COURSE OBJECTIVES:**

- To realize the concepts of DSP algorithms using pipelining and parallel processing
- To design filters using systolic and parallel architectures
- To know about bit level arithmetic architectures and numerical strength reduction

**COURSE OUTCOMES:**

Upon completion of this course the student will have:

CO 1: Ability to realize DSP algorithms using pipelining and parallel processing
CO 2: An ability to realize filters using systolic and parallel architectures
CO 3: Exposure to bit level arithmetic architectures and numerical strength reduction

**UNIT I ITERATION BOUND**


**UNIT II UNFOLDING**


**UNIT III FAST CONVOLUTION**


**UNIT IV BIT LEVEL ARITHMETIC ARCHITECTURES**

Bit-Level Arithmetic Architectures Scaling and roundoff noise-scaling operation-roundoff noise-state variable description of digital filters-scaling and roundoff noise computation-roundoff noise in pipelined first-order filters-Bit-Level Arithmetic Architectures-parallel multipliers with sign extension-parallel carry-ripple array multipliers-parallel carry-save multiplier-4x4 bit Baugh-Wooley carry-save multiplication tabular form and
implementation-bit-serial FIR filter-CSD representation- CSD multiplication using Horner’s rule for precision improvement.

UNIT V NUMERICAL STRENGTH REDUCTION


LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

COURSE OBJECTIVES:

- To gain knowledge on the software process and requirements
- To gain knowledge about software architectural design
- To exploit software testing and project management

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: An in-depth knowledge on the software process and requirements
CO 2: Knowledge about the concepts of software architectural design
CO 3: An ability to exploit software testing and project management

UNIT I SOFTWARE PROCESS

Introduction-S/W Engineering Paradigm–life cycle models (waterfall, incremental, spiral, WIN WIN spiral, evolutionary, prototyping, object oriented)-system engineering-computer based system verification-validation-life cycle process- development process-system engineering hierarchy.

UNIT II SOFTWARE REQUIREMENTS


UNIT III DESIGN CONCEPTS AND PRINCIPLES

Design process and concepts-modular design-design heuristic-design model and document. Architectural design- software architecture-data design- architectural design-transform and transaction mapping-user interface design-user interface design principles. Real time systems-Real times of tware design-system design-real time executives-data acquisition system-monitoring and control system. SCM – Need for SCM-Version control-Introduction to SCM process-Software configuration items.

UNIT IV TESTING

Taxonomy of software testing - levels - test activities - types of s/w test - black box testing - testing boundary conditions – structural testing-test coverage criteria based on dataflow mechanisms-regression testing-testing in the large. S/W testing strategies-strategic approach and issues-unit testing-integration testing-validation testing-system testing and debugging.

UNIT V SOFTWARE PROJECT MANAGEMENT

Measures and measurements-S/W complexity and science measure-size measure-data and logic structure

LECTURE: 45  TUTORIAL: 0  TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L7E4- NEURAL NETWORKS

COURSE OBJECTIVES:

- To understand the basic concepts of Artificial Neural Networks
- To solve problems using Feed forward and Feedback Neural networks
- To understand the concepts of simulated annealing and adaptive resonance theory
- To apply the concepts of Neural networks to Pattern recognition

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Exposure to basics of Artificial Neural Network
CO 2: Ability to solve problems using Feed forward and Feedback Neural networks
CO 3: Knowledge about the concepts of simulated annealing and adaptive resonance theory
CO 4: Ability to apply the concepts of Neural networks to Pattern recognition

L  T  P  C
3   0   0   3

UNIT I INTRODUCTION


UNIT II FEEDFORWARD AND FEEDBACK NETWORKS


UNIT III SIMULATED ANNEALING AND COMPETITIVE NETWORKS

Annealing-Boltzman machine architecture, learning and processing-Practical considerations-Neural networks based on competition-Counter propagation network-Forward mapping CPN and complete CPN-Building blocks-Architecture, Training and data processing-Practical considerations and applications.

UNIT IV SOM AND ADAPTIVE RESONANCE THEORY

UNIT V HANDWRITTEN CHARACTER AND SPEECH RECOGNITION


LECTURE: 45  TUTORIAL: 0  TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

PREREQUISITE: MICROWAVE AND RF SYSTEMS

COURSE OBJECTIVES:

- To understand the basic concepts of radar signals and systems
- To gain knowledge about radar transmitter and receiver
- To understand the concepts of radar detection, tracking and measurement

COURSE OUTCOMES:

Upon completion of this course the student will have:

- CO 1: Basic knowledge on radar signals and systems
- CO 2: An exposure to radar transmitter and receiver
- CO 3: Knowledge on the concepts of radar detection, tracking and measurement

UNIT I INTRODUCTION TO RADAR


UNIT II RADAR SIGNALS


UNIT III RADAR TRANSMITTER AND RECEIVER

Radar Transmitters- Introduction-Linear Beam Power Tubes-Solid State RF Power Sources-Magnetron-Crossed Field Amplifiers-Other RF Power Sources-Other aspects of Radar Transmitter. Radar Receivers-The Radar Receiver-Receiver noise Figure-Superheterodyne Receiver-Duplexers and Receiver Protectors-Radar Displays.

UNIT IV RADAR DETECTION

Radar detection. Optimum Bayesian decision rules. Detection criteria for different target models.

UNIT V MEASUREMENT AND TRACKING

LECTURE: 45    TUTORIAL:15    TOTAL: 60

TEXT BOOKS:


REFERENCE BOOKS:

12L7E6 - IMAGE PROCESSING

PREREQUISITE: SIGNALS AND SYSTEMS, DIGITAL SIGNAL PROCESSING

COURSE OBJECTIVES:

- To understand the basics of digital imaging and image transforms
- To gain knowledge about various image processing techniques
- To apply knowledge of different image processing schemes for real time applications

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Knowledge on the basics of digital imaging and image transforms
CO 2: Exposure to various image processing techniques
CO 3: An ability to apply knowledge of different image processing schemes for real time applications

<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>

UNIT I DIGITAL IMAGE FUNDAMENTALS

Elements of digital image processing systems, Vidicon and Digital Camera working principles, Elements of visual perception, brightness, contrast, hue, saturation, MachBand effect, Image sampling, Quantization, Dither, Two-dimensional mathematical preliminaries.

UNIT II IMAGE TRANSFORMS

1D DFT, 2D transforms-DFT, DCT, Discrete Sine, Walsh, Hadamard, Slant, Haar, KLT, SVD, Wavelet transform.

UNIT III IMAGE ENHANCEMENT AND RESTORATION


UNIT IV IMAGE SEGMENTATION AND RECOGNITION

Image segmentation-Edge detection-Edge linking and boundary detection-Region growing, Region splitting and Merging- Image Recognition-Patterns and pattern classes, Matching by minimum distance classifier, Matching by correlation. Neural networks-Back propagation network and training, Neural network to recognize shapes.

UNIT V IMAGE COMPRESSION

Need for data compression-Huffman-Run Length Encoding-Shift codes-Arithmetic coding-Vector
Quantization-Block Truncation Coding- Transform coding- JPEG standard-JPEG 2000-EZW-SPIHT-MPEG

LECTURE: 45  TUTORIAL: 0  TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:


12L7E7-MULTIMEDIA COMPRESSION TECHNIQUES

PREREQUISITE: DIGITAL COMMUNICATION, SIGNALS AND SYSTEMS

COURSE OBJECTIVES:

- To gain knowledge about Multimedia components and characteristics
- To understand various text and image compression algorithms
- To know about audio and video compression techniques and standards

COURSE OUTCOMES:

Upon completion of this course the student will have:

- CO 1: Knowledge about Multimedia components and characteristics
- CO 2: Exposure to various text and image compression algorithms
- CO 3: Exposure to audio and video compression techniques and standards

L T P C
3 0 0 3

UNIT I MULTIMEDIA COMPONENTS
(9)

UNIT II TEXT COMPRESSION
(9)
Compression principles-source encoders and destination encoders-Lossless and Lossy compression-entropy encoding-source encoding-text compression-static Huffman coding-dynamic coding-arithmetic coding-LZW Compression-Entropy and Quality measures.

UNIT III IMAGE COMPRESSION
(9)

UNIT IV AUDIO COMPRESSION
(9)
Audio compression-Companding laws-frequency domain filtering-Basic subband coding-application to speech coding-G722-Application to Audio coding-MPEG Audio-Progressive encoding for Audio-Silence compression-Speech compression techniques-CELP Vocoders-LPC.

UNIT V VIDEO COMPRESSION
(9)
Video compression techniques-Standards-MPEG1, 2, 4, 7 Video coding-Motion estimation and compensation techniques-H.261-H.263.
TEXT BOOKS:


REFERENCE BOOKS:


COURSE OBJECTIVES:

- To understand the basics of MEMS and mechanics for MEMS Design
- To get knowledge about the concepts of optical and RF MEMS
- To apply the basic knowledge of MEMS in different fields

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Knowledge on the basics of MEMS and mechanics for MEMS Design
CO 2: Exposure to concepts of optical and RF MEMS
CO 3: Ability to apply the basic knowledge of MEMS in different fields

UNIT I INTRODUCTION TO MEMS


UNIT II MECHANICS FOR MEMS DESIGN

Elasticity-Stress-strain and material properties-Bending of thin plates-Spring configurations-torsional deflection-Mechanical vibration-Resonance-Thermomechanics-actuators-force and response time-Fracture and thin film mechanics.

UNIT III ELECTROSTATIC DESIGN AND SYSTEM ISSUES


UNIT IV MEMS APPLICATION

Case studies-Capacitive accelerometer-Piezo electric pressure sensor-Micro fluidics application-Modeling of MEMS systems-CAD for MEMS.

UNIT V INTRODUCTION TO OPTICAL AND RF MEMS

Optical MEMS—System design basics-Gaussian optics-matrix operations-resolution. Case studies-MEMS scanners and retinal scanning display-Digital Micro mirror devices.RF Mem-design basics-case study-Capacitive RF MEMS switch-performance issues.

LECTURE: 45  TUTORIAL: 0  TOTAL: 45
TEXT BOOKS:


REFERENCE BOOKS:

COURSE OBJECTIVES:

- To understand the basics of Avionics and navigation systems
- To get knowledge on Radio and satellite navigation systems
- To acquire knowledge on air data systems and aircraft display technology

COURSE OUTCOMES:

Upon completion of this course the student will have:

- CO 1: Basic knowledge about Avionics and navigation systems
- CO 2: Exposure to Radio and satellite navigation systems
- CO 3: Knowledge of air data systems and aircraft display technology

UNIT I INTRODUCTION

Introduction to aircraft- Axes system-Parts, importance and role of Avionics-systems which interface directly with pilot – Aircraft state sensor systems- Navigation systems- External world sensor systems-task automation systems. Avionics architecture evolution. Avionics Data buses - MILSTD 1553, ARINC 429, ARINC629.

UNIT II RADIO NAVIGATION

Types of Radio Navigation- ADF, DME, VOR, LORAN, DECCA, OMEGA. ILS, MLS

UNIT III INERTIAL AND SATELLITE NAVIGATION SYSTEMS

Inertial sensors - Gyroscopes, Accelerometers, Inertial navigation systems – Block diagram, Platform and strap down INS. Satellite Navigation- GPS

UNIT IV AIR DATA SYSTEMS AND AUTOPILOT

Air data quantities - Altitude, Airspeed, Mach no., Vertical speed, Total Air temperature, Stall warning, Altitude warning. Autopilot-basic principles - longitudinal and lateral autopilot.

UNIT V AIRCRAFT DISPLAYS

Display technologies- LED, LCD, CRT, Flat Panel Display. Primary Flight parameter displays- Head Up Display, Helmet Mounted Display, Night vision goggles, Head Down Display, MFD, MFK, Virtual cockpit.

LECTURE: 45    TUTORIAL: 0    TOTAL: 45
**TEXT BOOKS:**


**REFERENCE BOOKS:**

12L8E0 - PROFESSIONAL ETHICS

COURSE OBJECTIVES:

- To gain knowledge of Engineering Ethics and their responsibility in society
- To know about safety & risk assessment and benefit analysis
- To know the employee responsibilities and rights
- To follow the ethics of Engineers in global issues

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Awareness of Engineering Ethics and their responsibility in society
CO 2: Knowledge on safety & risk assessment and benefit analysis
CO 3: Awareness of employee responsibilities and rights
CO 4: Ability to follow the ethics of Engineers in global issues

UNIT I ENGINEERING ETHICS (9)


UNIT II ENGINEERING AS SOCIAL EXPERIMENTATION (9)

Engineering as experimentation-engineers as responsible experimenters-codes of ethics- a balanced outlook on law-the challenger case study

UNIT III SAFETY (9)

Safety and risk-assessment of safety and risk-risk benefit analysis and reducing risk-the three mile island and Chernobyl case studies.

UNIT IV RESPONSIBILITIES AND RIGHTS (9)


UNIT V GLOBAL ISSUES (9)

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

LECTURE: 45  TUTORIAL: 0  TOTAL: 45
TEXT BOOKS:


REFERENCE BOOKS:

2. Charles E Harris, Michael S.Protchand and Michael J Rabins, “Engineering Ethics–Concepts and Cases”, Wadsworth Thompson Learning, United States, 2000 (Indian Reprint now available)
12L8E1-DSP SYSTEM DESIGN

PREREQUISITE:  DIGITAL SIGNAL PROCESSING, MICROPROCESSOR AND MICROCONTROLLERS

COURSE OBJECTIVES:

- To gain knowledge about architecture, instruction set and programming concepts of TMS320C6X, ADSP 21XX processors
- To design different types of filters
- To know about code optimization techniques
- To understand the concepts of frame processing, Real Time Analysis and scheduling

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Knowledge of architecture, instruction set and programming concepts of TMS320C6X, ADSP 21XX processors
CO 2: Ability to implement FFT algorithms and design digital filters
CO 3: Knowledge in the code optimization techniques
CO 4: Awareness about the concepts of frame processing, Real Time Analysis and scheduling

UNIT I ADSP21XX ARCHITECTURE AND PROGRAMMING (9)

Introduction to ADSP-2100 family of processors-Assembly language overview-Development systems-Single precision fixed point division-Multi precision fixed point addition-subtraction-multiplication and division-Fixed point to floating point conversion and vice versa - Floating point addition-subtraction-multiplication and division-Sine-arc tangent-square root and logarithm approximation-Uniform random number generation.

UNIT II FFT AND FILTER IMPLEMENTATION USING ADSP21XX (9)


UNIT III TMS320C6X ARCHITECTURE (9)

CPU Operation-Pipelined CPU-VelociTI-C64x DSP-Software tools: EVM-DSK Target C6x board Assembly file-Memory management-Compiler utility-Code initialization-Code composer studio-Interrupt data processing.

UNIT IV CODE OPTIMIZATION (9)

Word-wide optimization-Mixing C and assembly-software pipelining-C64x improvements-Real time filtering-Circular buffering-Adaptive filtering.
UNIT V FRAME PROCESSING, REAL TIME ANALYSIS AND SCHEDULING

Frame processing: DMADSP Host Communication-DFT and FFT Implementation-Real time FFT-Real time analysis-Real time scheduling-real time data exchange-DSP/BIOS-Data synchronization and communication.

LECTURE: 45  TUTORIAL: 0  TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L8E2 -NANO ELECTRONICS

COURSE OBJECTIVES:

- To Understand the fundamentals of Nanotechnology and Nanoelectronics
- To Acquire Knowledge on Silicon MOSFETS & quantum Transport devices
- To get Exposed to carbon Nanotubes and molecular electronics

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic knowledge on the fundamentals of Nanotechnology and Nanoelectronics
CO 2: Knowledge on Silicon MOSFETS & quantum Transport devices
CO 3: Exposure to carbon Nanotubes and molecular electronics

UNIT I INTRODUCTION TO NANO TECHNOLOGY


UNIT II FUNDAMENTALS OF NANOELECTRONICS


UNIT III SILICON MOSFETS & QUANTUM TRANSPORT DEVICES


UNIT IV CARBON NANOTUBES

UNIT V MOLECULAR ELECTRONICS


LECTURE: 45  TUTORIAL: 0  TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L8E3- SOFT COMPUTING

COURSE OBJECTIVES:

- To Understand the concepts of Fuzzy set theory, optimization and Neuro-Fuzzy modeling
- To get Exposed to artificial intelligence and search techniques
- Able to apply soft computing techniques in real time applications

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Awareness about the concepts of Fuzzy set theory, optimization and Neuro-Fuzzy modeling
CO 2: Exposure to artificial intelligence and search techniques
CO 3: An ability to apply soft computing techniques in real time applications

L T P C
3 0 0 3

UNIT I FUZZY SET THEORY


UNIT II OPTIMIZATION


UNIT III ARTIFICIAL INTELLIGENCE


UNIT IV NEURO FUZZY MODELING

UNIT V APPLICATIONS OF COMPUTATIONAL INTELLIGENCE

Printed Character Recognition-Inverse Kinematics Problems-Automobile Fuel Efficiency Prediction-Soft
Computing for Color Recipe Prediction.

LECTURE: 45    TUTORIAL: 0    TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

   Comp., 2006, New Delhi.


12L8E4- TOTAL QUALITY MANAGEMENT

COURSE OBJECTIVES:

- To Understand the basics concepts and principles of TQM
- To get Exposed to TQM tools and Techniques
- To gain knowledge of different quality standards in manufacturing and service sectors

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic Knowledge about the concepts and principles of TQM
CO 2: Exposure to TQM tools and Techniques
CO 3: Knowledge of different quality standards in manufacturing and service sectors

UNIT I INTRODUCTION

Introduction-Need for quality-Evolution of quality-Definition of quality-Dimensions of manufacturing and service quality - Basic concepts of TQM-Definition of TQM- TQM Framework-Contributions of Deming, Juran and Crosby - Barriers to TQM.

UNIT II PRINCIPLES OF TQM

Leadership- Strategic quality planning, Quality statements-Customer focus-Customer orientation, Customer satisfaction, complaints, and retention-Employee involvement-Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Appraisal of Performance

UNIT III TQM TOOLS &TECHNIQUES

The seven traditional tools of quality-New management tools-Six-sigma: Concepts, methodology, applications to manufacturing, service sector including IT-Benchmarking-process-FMEA-Stages,Types.

UNIT IV TQM TOOLS &TECHNIQUES II

Quality circles-5s, Kaizen, Quality Function Deployment (QFD)-Taguchi Quality loss function-TPM-Concepts, improvement needs-Cost of Quality-Performance measures.
UNIT V QUALITY SYSTEMS


LECTURE: 45 TUTORIAL: 0 TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:


12L8E5- BIO MEDICAL INSTRUMENTATION

PREREQUISITE: MEASUREMENTS AND INSTRUMENTATION

COURSE OBJECTIVES:

- To Understand the Human physiology and components of biomedical system
- To get exposed to electro and non-electro physiological parameter measurements
- To know about medical imaging and biotelemetry systems
- To Understand the principle of operation of Therapeutic equipments

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic knowledge on Human physiology and components of biomedical system
CO 2: Exposure to electro and non-electro physiological parameter measurements
CO 3: Knowledge of medical imaging and biotelemetry systems
CO 4: Description on the principles of operation of Therapeutic equipments

L T P C
3 0 0 3

UNIT I PHYSIOLOGY AND TRANSDUCERS (9)

UNIT II ELECTRO – PHYSIOLOGICAL MEASUREMENTS (9)

UNIT III NON-ELECTRICAL PARAMETER MEASUREMENTS (9)
UNIT IV MEDICAL IMAGING AND BIOTELEMETRY

Radio graphic and fluoroscopic techniques -Computer tomography-Magnetic Resonance Imaging - Ultrasonography- A mode, B mode , M mode - Endoscopy-Thermography-Different types of biotelemetry systems and patient monitoring-Wireless telemetry, single channel, multi channel, multi patient and implantable telemetry systems.

UNIT V ASSISTING AND THERAPEUTIC EQUIPMENTS

Pacemakers-External and internal pacemakers-Defibrillators-DC defibrillator, implantable defibrillators-Ventilators -Nerve and muscle stimulators -TENS-Surgical diathermy machine, safety aspects in Electrosurgical units- Heart Lung machine- Audiometers-Dialysers-Lithotripsy.

LECTURE: 45  TUTORIAL: 0  TOTAL: 45

TEXT BOOKS:


REFERENCE BOOKS:

12L8E6- POWER ELECTRONICS

PREREQUISITE: ELECTRONIC DEVICES

COURSE OBJECTIVES:

- To learn about power semiconductor devices and their characteristics
- To acquire the knowledge of Power supplies and inverters
- To be aware of the applications of power electronics

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Knowledge of power semiconductor devices and their characteristics
CO 2: Description about the working principles of Power supplies and inverters
CO 3: Exposure to the applications of power electronics

UNIT I POWER SEMICONDUCTOR DEVICES (9)


UNIT II CONTROLLED RECTIFIERS AND AC VOLTAGE CONTROLLERS (9)

Single Phase and Three Phase Controlled rectifiers- Design of Trigger circuits- Dual Converters-AC Voltage controllers

UNIT III POWER SUPPLIES (9)

DC-DC Converters-Gating requirements-Switching mode regulators-Boost, Buck, Buck-Boost and Cuk regulators, DC and AC Power supplies- Switched mode- Resonant and Bidirectional Power supplies.

UNIT IV INVERTERS (9)

Voltage and current source inverters-Resonant-Series inverter-PWM inverter.

UNIT V APPLICATIONS (9)

DC motor drives-Induction and Synchronous motor drives-Switched reluctance and brushless motor drives- Solid state relays-Microelectronic relays

LECTURE: 45 TUTORIAL: 0 TOTAL:
TEXT BOOKS:


REFERENCE BOOKS:


PREREQUISITE: DIGITAL LOGIC WITH HDL

COURSE OBJECTIVES:

- To learn about the faults and fault models in digital circuits
- To be aware of test pattern generation methods and learn the concepts of design for testability
- To Acquire knowledge of fault diagnosis at various logic and system levels

COURSE OUTCOMES:

Upon completion of this course the student will have:

- CO 1: Basic knowledge on the faults and fault models in digital circuits
- CO 2: Exposure to test pattern generation methods and concepts of design for testability
- CO 3: Indepth knowledge on fault diagnosis at various logic and system levels

L T P C
3 0 0 3

UNIT-I FAULT SIMULATION (9)

UNIT-II TEST GENERATION (9)
Test generation for combinational logic circuits - Testable combinational logic circuit design – Test generation for sequential circuits - design of testable sequential circuits.

UNIT-III TESTABLE DESIGN (9)
Design for Testability-Ad-hoc design-Generic scan based design-Classical scan based design-System level DFT approaches.

UNIT-IV BUILT IN SELF TEST (9)
Built-In Self Test-Test pattern generation for BIST-Circular BIST-BIST Architectures-Testable Memory Design – Test algorithms-Test generation for Embedded RAMs

UNIT-V FAULT DIAGNOSIS (9)
Logic Level Diagnosis - Diagnosis by UUT reduction - Fault Diagnosis for Combinational Circuits - Self-checking design - System Level Diagnosis.
TEXT BOOKS:


REFERENCE BOOKS:

12L8E8- SATELLITE COMMUNICATION

PREREQUISITE: DIGITAL COMMUNICATION

COURSE OBJECTIVES:

- To realize the importance of Keplar’s law of satellite orbits and to know about different satellite subsystems
- To learn about satellite link design and multiple access Techniques
- To be aware of various satellite communication applications

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: An ability to realize the importance of Keplar’s law of satellite orbits and to know about different satellite subsystems
CO 2: Exposure to satellite link design and access Techniques
CO 3: Exposure to various satellite services

<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>

UNIT I SATELLITE ORBITS AND TRAJECTORIES (9)
Orbital Mechanics-Orbit Equations, Kepler’s Laws, Orbital Period, Orbits and their types, look angle calculation; Satellite Launch.

UNIT II SATELLITE SUBSYSTEM (9)

UNIT III LINK DESIGN, MODULATION AND ERROR CONTROL (9)
Single link design-double link design aspects-PAM, baseband processing-Digital Modulation for satellite links-BPSK, QPSK and QAM-TDM standards for satellite systems-Error control requirements for satellite link-ARQ, Concatenated Codes, Interleaving, Turbo codes.

UNIT IV MULTIPLE ACCESS FOR SATELLITE COMMUNICATIONS (9)
FDM-FM-FDMA-TDMA-structure and system design-Onboard Processing systems-DAMA and PAMA-CDMA-system design and capacity.

UNIT V APPLICATIONS (9)
Remote sensing, navigation, scientific and military application, VSAT-Network architecture, Access Control
protocols and techniques, VSAT Earth stations; Satellite Mobile Telephony-Global star, DBS/DTH Television, GPS, Weather satellites.

Lecture: 45   Tutorial: 0   Total: 45

Text Books:


Reference Books:

PREREQUISITE: COMPUTER COMMUNICATION

COURSE OBJECTIVES:

- To learn the concepts of classical encryption techniques and message authentication codes
- To apply the knowledge about public key cryptography and authentication.
- To illustrate network and system level security.

COURSE OUTCOMES:

Upon completion of this course the student will have:

CO 1: Basic knowledge on the concepts of classical encryption techniques and message authentication codes
CO 2: An ability to apply the knowledge of public key cryptography and authentication
CO 3: Illustration of network and system level security

<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>

UNIT-I INTRODUCTION


UNIT-II PUBLIC KEY CRYPTOGRAPHY

Key Management-Diffie-Hellman key Exchange-Elliptic Curve Architecture and Cryptography-Introduction to Number Theory-Confidentiality using Symmetric Encryption-Public Key Cryptography and RSA.

UNIT-III AUTHENTICATION AND HASH FUNCTION


UNIT-IV NETWORK SECURITY


UNIT-V SYSTEM LEVEL SECURITY

Intrusion detection - password management - Viruses and related Threats - Virus Counter measures - Firewall Design Principles – Trusted Systems.
TEXT BOOKS:


REFERENCE BOOKS:


