**Department Vision**

To render services to meet the growing global challenges of Engineering Industries and Organizations by Educating Students to become exemplary Professional Electronics and Communication Engineers of High Ethics

**Department Mission**

To enable Graduates evolve as Competent Hardware and Software Engineers needed by Industry with emphasis on virtues contributing to Societal Welfare

**Programme Educational Objectives (PEOs)**

<table>
<thead>
<tr>
<th>PEO</th>
<th>Professional Development</th>
<th>Team Work and Leadership</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEO-1</td>
<td>Integrate fundamentals and up to date approaches derived from the engineering sciences and practice to accomplish professional development in a responsive and innovative manner</td>
<td>Handle multi-faceted and multi-disciplinary projects to engage in effective teamwork &amp; exercise leadership with significant legal, social, environmental and economic considerations</td>
</tr>
</tbody>
</table>
PEO-3  Lifelong Learning & Virtues
Continually receptive to new technological and cultural challenges through life-long learning leading to advanced degrees, publications, presentations, awards and exhibit good citizenship with elegant mannerism

Programme Outcomes (POs)
PO1 Apply knowledge of mathematics, science, engineering fundamentals and an engineering specialization to the conceptualization of Electronics & Communication engineering models.

PO2 Identify, formulate, research literature and solve complex Electronics & Communication engineering problems reaching substantiated conclusions using first principles of mathematics and engineering sciences.

PO3 Design solutions for complex Electronics & Communication engineering problems and design systems, components or processes that meet specified needs with appropriate consideration for public health and safety, cultural, societal, and environmental considerations.

PO4 Conduct investigations of complex Electronics & Communication problems including design of experiments, analysis and interpretation of data, and synthesis of information to provide valid conclusions.

PO5 Create, select and apply appropriate techniques, resources, and modern engineering tools, including prediction and modeling, to complex engineering activities, with an understanding of the limitations.

PO6 Function effectively as an individual, and as a member or leader in diverse teams and in multi-disciplinary settings.
PO7  Communicate effectively on complex Electronics & Communication engineering activities with the engineering community and with society at large, such as being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO8  Demonstrate understanding of the societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to Electronics & Communication engineering practice.

PO9  Understand and commit to professional ethics and responsibilities and norms of engineering practice.

PO10 Understand the impact of Electronics & Communication engineering solutions in a societal context and demonstrate knowledge of and need for sustainable development.

PO11 Demonstrate a knowledge and understanding of management and business practices, such as risk and change management, and understand their limitations.

PO12 Recognize the need for, and have the ability to engage in independent and life-long learning.

CURRICULUM (I TO VIII SEMESTER)
SEMESTER I (Common to all UG Programmes)

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>THEORY</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>13HS101</td>
<td>Technical English – I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>13BS101</td>
<td>Mathematics – I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>13BS102</td>
<td>Engineering Physics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13BS103</td>
<td>Engineering Chemistry</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>SL. NO.</td>
<td>COURSE CODE</td>
<td>COURSE TITLE</td>
<td>L</td>
<td>T</td>
<td>P</td>
<td>C</td>
</tr>
<tr>
<td>--------</td>
<td>-------------</td>
<td>---------------------------------------------------</td>
<td>----</td>
<td>----</td>
<td>----</td>
<td>----</td>
</tr>
<tr>
<td>5.</td>
<td>13GE101</td>
<td>Engineering Graphics</td>
<td>2</td>
<td>0</td>
<td>4</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>13GE102</td>
<td>Computer Programming</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>13BS151</td>
<td>Physics and Chemistry Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>13GE151</td>
<td>Engineering Practices Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>13GE152</td>
<td>Computer Practice Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>17</td>
<td>2</td>
<td>13</td>
<td>27</td>
</tr>
</tbody>
</table>

**SEMESTER II**

<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>13HS201</td>
<td>Technical English –II*</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13BS201</td>
<td>Mathematics–II*</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>13BS202</td>
<td>Environmental Science*</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13BS204</td>
<td>Material Science (Common to EEE / ECE / CSE / IT)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>13GE203</td>
<td>Basic Civil and Mechanical Engineering (Common to EEE / ECE)</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>13EE202</td>
<td>Electric Circuits and Machines</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>
PRACTICAL

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>13BS251</td>
<td>Applied Physics and Environmental Chemistry Lab <em>(Common to EEE/ECE/ CSE/ MECH/IT/Bio-Tech)</em></td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>13EE252</td>
<td>Electric Circuits and Machines lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>13CS251</td>
<td>Linux Commands and Shell Programming Lab <em>(Common to EEE/ECE/CSE/IT/ Bio-Tech)</em></td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td>TOTAL</td>
<td>18</td>
<td>3</td>
<td>8</td>
<td>26</td>
</tr>
</tbody>
</table>

* Common to all UG Programmes

SEMESTER III

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>13MA301</td>
<td>Mathematics –III <em>(Common to all UG Programmes)</em></td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>13EC301</td>
<td>Electronic Circuits-I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13EC302</td>
<td>Digital Electronics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13EC303</td>
<td>Electromagnetic Fields</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>13EC304</td>
<td>Network Analysis and Synthesis</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>13CS305</td>
<td>Data Structures and Object Oriented Programming in C++</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
### PRACTICAL

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>13EC351</td>
<td>Electronic Circuits Lab – I</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>13EC352</td>
<td>Digital Electronics Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>13CS353</td>
<td>Data Structures and Object Oriented Programming Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>3</td>
<td>9</td>
<td>27</td>
</tr>
</tbody>
</table>

### SEMESTER IV

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>13MA402</td>
<td>Linear Algebra and Random Processes</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>13EC401</td>
<td>Electronic Circuits-II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13EC402</td>
<td>Signals and Systems</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>13EC403</td>
<td>Transmission Lines and Wave Guides</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>13EC404</td>
<td>Linear Integrated Circuits</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>13EC405</td>
<td>Microprocessors and Interfacing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>13EC451</td>
<td>Electronic Circuits Lab - II</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>13EC452</td>
<td>Linear Integrated Circuits Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>13HS451</td>
<td>Presentation Skills Lab</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>3</td>
<td>8</td>
<td>26</td>
</tr>
</tbody>
</table>
## SEMESTER V

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>13EC501</td>
<td>Communication Theory</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>13EC502</td>
<td>Antenna and Wave Propagation</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13EC503</td>
<td>Digital Signal Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13EE506</td>
<td>Control Systems</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>5.</td>
<td>13EC504</td>
<td>Computer Architecture and Organization</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>13EC505</td>
<td>Embedded Processors and Applications</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

### PRACTICAL

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>7.</td>
<td>13EC551</td>
<td>Digital Signal Processing Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>13EC552</td>
<td>Microprocessors and Embedded Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>13HS551</td>
<td>Professional Communication Skills Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><em>(Common to Civil/EEE/ECE)</em></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td><strong>TOTAL</strong></td>
<td></td>
<td>18</td>
<td>2</td>
<td>9</td>
<td>26</td>
</tr>
</tbody>
</table>

66
## SEMESTER VI

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>13EC601</td>
<td>Digital Communication</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13EC602</td>
<td>Wireless Communication</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13EC603</td>
<td>Optical Communication and Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13EC604</td>
<td>Telecommunication Switching Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>13EC605</td>
<td>VLSI Design</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td></td>
<td>Elective I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>13EC651</td>
<td>Communication Systems Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>13EC652</td>
<td>VLSI Design Lab</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>0</td>
<td>6</td>
<td>22</td>
</tr>
</tbody>
</table>

## SEMESTER VII

<table>
<thead>
<tr>
<th>SL. NO</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>13EC701</td>
<td>Analog VLSI design</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13EC702</td>
<td>RF and Microwave Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
### Satellite Communication Systems

#### Theory
- **SL. NO:** 3
- **Course Code:** 13EC703
- **Course Title:** Satellite Communication Systems
- **L:** 3
- **T:** 0
- **P:** 0
- **C:** 3

#### Practical
- **SL. NO:** 7
- **Course Code:** 13EC751
- **Course Title:** Optical and Microwave Lab
- **L:** 0
- **T:** 0
- **P:** 3
- **C:** 2

- **SL. NO:** 8
- **Course Code:** 13EC752
- **Course Title:** Computer Communication Networks Lab
- **L:** 0
- **T:** 0
- **P:** 3
- **C:** 2

- **SL. NO:** 9
- **Course Code:** 13EC753
- **Course Title:** Comprehensive Skill Development **
- **L:** 0
- **T:** 0
- **P:** 2
- **C:** 1

**TOTAL** 18 0 8 23

**Internal Assessment only**

### Semester VIII

#### Theory
- **SL. NO:** 1
- **Course Code:** 13EC851
- **Course Title:** Elective IV
- **L:** 3
- **T:** 0
- **P:** 0
- **C:** 3

- **SL. NO:** 2
- **Course Code:** 13EC851
- **Course Title:** Elective V
- **L:** 3
- **T:** 0
- **P:** 0
- **C:** 3

#### Practical
- **SL. NO:** 3
- **Course Code:** 13EC851
- **Course Title:** Project Work
- **L:** 0
- **T:** 0
- **P:** 12
- **C:** 6

**TOTAL** 6 0 12 12
<table>
<thead>
<tr>
<th>SL. NO.</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>13EC902</td>
<td>Medical Electronics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>13EC903</td>
<td>Measurements and Instrumentation</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>13EC904</td>
<td>Multicore Programming</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>13EC905</td>
<td>Internet and Java</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>13EC906</td>
<td>Real time Operating Systems</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>13EC907</td>
<td>Numerical Methods for Electromagnetic Fields</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>7.</td>
<td>13EC908</td>
<td>Artificial Intelligence and Robotics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>8.</td>
<td>13EC909</td>
<td>High Speed Networks</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>9.</td>
<td>13EC910</td>
<td>Soft Computing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>10.</td>
<td>13EC911</td>
<td>Parallel and Distributed Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>11.</td>
<td>13EC912</td>
<td>Digital Image Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>12.</td>
<td>13EC913</td>
<td>Statistical Digital Signal Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>13.</td>
<td>13EC914</td>
<td>Advanced Electronic system design</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>14.</td>
<td>13EC915</td>
<td>Multirate Signal Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>15.</td>
<td>13EC916</td>
<td>Avionics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>16.</td>
<td>13EC917</td>
<td>Television and Video Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Credits</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>-----------------------------------------------------------------</td>
<td>---------</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>17</td>
<td>13EC918</td>
<td>Mobile Adhoc Networks</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>18</td>
<td>13EC919</td>
<td>Wireless Sensor Networks</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>19</td>
<td>13EC920</td>
<td>Total Quality Management</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>20</td>
<td>13EC921</td>
<td>Remote Sensing</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>21</td>
<td>13EC922</td>
<td>Wireless Networks</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>22</td>
<td>13EC923</td>
<td>Advanced Wireless Systems</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>23</td>
<td>13EC924</td>
<td>Telecommunication System Modeling and Simulation</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>24</td>
<td>13EC925</td>
<td>Radar and Navigational Aids</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>25</td>
<td>13EC926</td>
<td>Electromagnetic Interference and Compatibility</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>26</td>
<td>13EC927</td>
<td>Tele Medicine</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>27</td>
<td>13EC928</td>
<td>Sparse Signal Processing</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>28</td>
<td>13EC929</td>
<td>Computational Intelligence Techniques</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>29</td>
<td>13EC930</td>
<td>Cryptography and Network Security</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>30</td>
<td>13EC931</td>
<td>Multimedia Compression &amp; Communication</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>31</td>
<td>13EC932</td>
<td>Engineering Acoustics</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>32</td>
<td>13EC933</td>
<td>Advanced Computer Programming</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>33</td>
<td>13EC934</td>
<td>Electronic Product Development</td>
<td>3</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
## OPEN ELECTIVES

<table>
<thead>
<tr>
<th>Sl. No.</th>
<th>COURSECODE</th>
<th>COURSETITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>13MA901</td>
<td>Operations Research</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2</td>
<td>13EE901</td>
<td>Professional Ethics in Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3</td>
<td>13EC901</td>
<td>Automotive Electronics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4</td>
<td>13CS901</td>
<td>Cyber Security</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5</td>
<td>13ME901</td>
<td>Industrial Safety Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>13ME902</td>
<td>Nano Materials</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>7</td>
<td>13IT901</td>
<td>Intellectual Property Rights</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>8</td>
<td>13BA901</td>
<td>Engineering Entrepreneurship</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>9</td>
<td>13ME903</td>
<td>Human Behavior at Work</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

Total No. of Credits : 189 (Regular)
Total No. of Credits : 136 (LES)
Course Objectives:

- To enable the students of Engineering and Technology to build up vocabulary
- To improve grammatical accuracy
- To develop language functions
- To understand the basic nuances of language

Course Outcomes:

At the end of the course students are able to

- The students of Engineering and Technology will be able to build up their vocabulary
- Grammatical accuracy will be improved
- Language functions will be developed
- The basic nuances of language will be understood

UNIT I

Listening - Introducing learners to GIE - Types of listening - Listening to audio (verbal & sounds)

Speaking - Speaking about one’s place, important festivals etc. – Introducing oneself, one’s family / friend; Reading - Skimming a reading passage – Scanning for specific information - Note-making

Writing - Free writing on any given topic (My favourite place / Hobbies / School life, etc.) - Sentence completion - Autobiographical writing (writing about one’s leisure time activities, hometown, etc.)

Grammar - Prepositions - Reference words - Wh-questions - Tenses (Simple)
Vocabulary - Word formation - Word expansion (root words / etymology)
E-materials - Interactive exercises for Grammar & Vocabulary - Reading comprehension exercises - Listening to audio files and answering questions.

UNIT II

Listening - Listening and responding to video lectures / talks
Speaking - Describing a simple process (filling a form, etc.) - Asking & answering questions - Telephone skills – Telephone etiquette
Reading – Critical reading - Finding key information in a given text - Sifting facts from opinions
Writing - Biographical writing (place, people) – Process descriptions (general / specific) - Definitions – Recommendations
Instruction - Grammar - Use of imperatives - Subject-verb agreement - Vocabulary - Compound words - Word Association
E-materials - Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures - Picture-based activities.

UNIT III

Listening - Listening to specific task - focused audio tracks
Speaking - Role-play – Simulation - Group interaction - Speaking in formal situations (teachers, officials, foreigners)
Reading - Reading and interpreting visual material; Writing - Jumbled sentences - Coherence and cohesion in writing - Channel conversion (flowchart into process) - Types of paragraph (cause & effect / compare & contrast / narrative / analytical) - Informal writing (letter/e-mail/blogs) - Paraphrasing
Grammar - Tenses (Past) - Use of sequence words - Adjectives - Vocabulary - Different forms and uses of words, Cause and effect words
E-materials - Interactive exercises for Grammar and Vocabulary -
Excerpts from films related to the theme and follow up exercises - Pictures of flow charts and tables for interpretations

UNIT IV

Listening - Watching videos / documentaries and responding to questions based on them
Speaking - Responding to questions - Different forms of interviews - Speaking at different types of interviews
Reading - Making inference from the reading passage - Predicting the content of a reading passage
Writing - Interpreting visual materials (line graphs, pie charts etc.) - Essay writing – Different types of essays; Grammar - Adverbs – Tenses – future time reference
Vocabulary - Single word substitutes - Use of abbreviations & acronyms

UNIT V

Listening - Listening to different accents, Listening to Speeches/Presentations, Listening to broadcast & telecast from Radio & TV
Speaking - Giving impromptu talks, Making presentations on given topics; Reading - Email communication - Reading the attachment files having a poem/joke/proverb - Sending their responses through email Writing - Creative writing, Poster making; Grammar - Direct and indirect speech; Vocabulary - Lexical items (fixed / semi fixed expressions)
E-materials - Interactive exercises for Grammar & Vocabulary - Sending emails with attachment – Audio / video excerpts of different accents, - Interpreting posters.

TOTAL: 60 PERIODS
TEXTBOOKS:


REFERENCE BOOKS:


Extensive reading:


13BS101: MATHEMATICS I

(Common to all UG Programmes)

L T P C

3 1 0 4

Course Objectives:

- To develop the use of matrix algebra techniques needed by engineers for practical applications
- To make the student knowledgeable in the area of infinite series and their convergence so that he/ she will be familiar with limitations of using infinite series approximations for solutions
arising in mathematical modeling

- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To introduce the concepts of improper integrals, Gamma, Beta and Error functions which are needed in engineering applications.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

**Course Outcomes:**

At the end of the course students are able to

- Expertise matrix algebra
- Apply tests of convergence
- Understand and apply functions of several variables
- Evaluate integrals using Beta and Gamma function
- Expertise multiple integrals and their usage

**UNIT 0 (Not for Examination) 5+0**

Basic concepts on limits, continuity, derivative & integrals of a single variable

**UNIT I MATRICES 9+3**


**UNIT II INFINITE SERIES 9+3**

Sequences – Convergence of series – General properties – Series of positive terms – Tests of convergence (Comparison test, Integral test,
Comparison of ratios and D'Alembert's ratio test) – Alternating series – Series of positive and negative terms – Absolute and conditional convergence – Power Series – Convergence of exponential, logarithmic and Binomial Series.

UNIT III  FUNCTIONS OF SEVERAL VARIABLES  9+3


UNIT IV  IMPROPER INTEGRALS  9+3

Improper integrals of the first and second kind and their convergence – Evaluation of integrals involving a parameter by Leibnitz rule – Beta and Gamma functions – Properties – Evaluation of integrals using Beta and Gamma functions – Error functions

UNIT V   MULTIPLE INTEGRALS  9+3


TOTAL: 65 PERIODS

TEXT BOOKS:


REFERENCE BOOKS:

3. Allen Jeffrey, “Advanced Engineering Mathematics”, Academic press publications, Elseiver India, 1st Edition 2003 (For unit 0-Section 1.8,1.9,1.11)

13BS102: ENGINEERING PHYSICS          LT P C
(Common to all UG Programmes)        3 0 0 3

Course Objectives

- To impart sound knowledge about basic concepts of physics.
- To introduce the basic physics concepts relevant to different branches of Engineering and Technology
- To introduce the fundamentals of physics and its applications in engineering.

Course Outcomes:

At the end of the course students are able to

- Understand the elastic properties of the materials.
- Acquire knowledge about solid state physics.
- Acquire knowledge about the basic concepts of physics in the topics such as acoustics, ultrasonics, thermal physics, and applied optics.
UNIT I PROPERTIES OF MATTER


UNIT II ACOUSTICS AND ULTRASONICS


UNIT III THERMAL PHYSICS


UNIT IV APPLIED OPTICS

UNIT V  SOLID STATE PHYSICS

Nature of bonding - growth of single crystals (qualitative) - unit cell, crystal systems, Bravais space lattices - crystal planes and directions, Miller indices - expressions for interplanar distance - coordination number and packing factor for simple structures: SC, BCC, FCC and HCP - structure and significance of NaCl, ZnS, diamond and graphite - crystal imperfections: point defects, dislocations and stacking faults.

TOTAL: 45 PERIODS

TEXTBOOKS:


REFERENCE BOOKS:


13BS103: ENGINEERING CHEMISTRY  L T P C
(Common to all UG Programmes)  3 0 0 3

Course Objectives:
To make the students familiar with
- The treatment of water for potable and industrial purposes.
• The principles of electrochemistry, electrochemical cells, emf and applications of emf measurements.
• The principles of corrosion and corrosion control techniques.
• Different types of fuels and combustion.
• Different materials and their engineering applications.

Course Outcomes:
At the end of the course the student will be able to
• Understand the basic principles of water quality parameters, their analysis and various water treatment processes for domestic and industrial applications.
• Understand the basic principles of electrochemistry and its applications.
• Know the principles, various types of corrosion and corrosion control techniques.
• Have a sound knowledge on various engineering materials and their industrial applications.
• Have a sound knowledge on different types of fuels.

UNIT I  WATER TECHNOLOGY

UNIT II  ELECTROCHEMISTRY
UNIT III  CORROSION AND ITS CONTROL  

UNIT IV  ENGINEERING MATERIALS
Refractories - classification - acidic, basic and neutral refractories - properties (refractoriness, refractoriness under load, dimensional stability, porosity, thermal spalling) - manufacture of alumina, magnesite and zirconia bricks.
Lubricants - mechanism of lubrication, liquid lubricants - properties (viscosity index, flash and fire points, cloud and pour points, oiliness) - solid lubricants - graphite and molybdenum disulphide - semi solid lubricants and emulsions.
Nanomaterials - introduction to nano chemistry - carbon nanotubes and their applications.

UNIT V  FUELS AND COMBUSTION

TOTAL: 45 PERIODS

TEXT BOOKS:
REFERENCES:

13GE101: ENGINEERING GRAPHICS
/Common to all UG Programmes/ 2 0 4 4

Course Objectives:
• To gain knowledge on the basics of Engineering Drawing construction procedures.
• To understand the principles involved in graphic skill for communication of concepts, ideas and design of Engineering products.
• To draw the drawing of various solids.
• To expose the above to existing national standards related to technical drawings.
• An ability to draw the drawing for any given object to the required standard.

Course Outcomes:
At the end of the course students are able to
• Sketch multiple views of Engineering components
• Create the projection of point, straight line and plane
• Project the solid objects
• Section the solid
• Develop lateral surfaces of solids
• Apply isometric and perspective projections
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Lettering and Dimensioning-Size, layout and folding of drawing sheets.

UNIT I PLANE CURVES AND PICTORIAL VIEWS TO ORTHOGRAPHIC VIEWS

Geometrical Constructions like bisection of a straight line, division of a straight line into n equal parts, bisection of angles, Curves used in engineering practices: Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves.

Orthographic projection – principles – Principal planes- Representation of Three Dimensional objects – Layout of views– Sketching of multiple views (Front, Top and Side views) from pictorial views of simple objects and Engineering Components.

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES

First Angle projection—projection of points in four quadrants. Projection of straight lines (only First angle projection) inclined to both the principal planes – Determination of true lengths and true inclinations by rotating line method and traces.

Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by change of position method.

UNIT III PROJECTION OF SOLIDS

Projection of simple solids like prisms, pyramids, cylinder and cone when the axis is inclined to one of the principal planes by change of position method.

UNIT IV SECTION OF SOLIDS AND DEVELOPMENT OF LATERAL SURFACES OF SOLIDS

Sectioning of above solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of the section.
Development of lateral surfaces of simple solids – Prisms, pyramids, cylinders and cones. Development of lateral surfaces of sectioned solids and simple applications like funnel.

UNIT V  ISOMETRIC AND PERSPECTIVE PROJECTIONS

Principles of isometric projection - isometric scale - Isometric View - Isometric projections of simple solids and cut solids - Prisms, pyramids, cylinders, cones - combination of two solid objects in simple vertical positions.

Perspective projection of simple solids - Prisms, pyramids and cylinders by visual ray method.

TOTAL: 75 PERIODS

TEXT BOOKS:


REFERENCE BOOKS:


Publication of Bureau of Indian Standards:


Special points applicable to End Semester Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.

2. All questions will carry equal marks of 20 each making a total of 100.

3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.

4. The examination will be conducted in appropriate sessions on the same day.

13GE102: COMPUTER PROGRAMMING  
(Common to all UG Programmes)

Course Objectives:

- To gain knowledge on the basic concepts of a computer system
- To get acquainted with the method of number system conversion
- To learn how to write modular and readable C program
- To learn to use pointers for storing data in the main memory efficiently
- To exploit the notion of derived data types

Course Outcomes:

At the end of the course students are able to
• Extrapolate the basics about computer
• Recognize different types of number systems as they relate to computers.
• Develop modular C programs for a given problem
• Explicitly manage memory using pointers
• Capable of grouping different kinds of information related to a single entity
• Store a large homogeneous data and record like data
• Process a text data
• Store the data for future use in structured and unstructured format

UNIT I COMPUTER FUNDAMENTALS

UNIT II C – DATATYPES AND STATEMENTS
Structure of a ‘C’ program, compilation and linking processes - C Tokens: Constants, Variables - DataTypes: Primitive Data Types, Type Definition, Enumeration, Qualifiers, Storage classes - Operators and Expressions - Managing Input and Output operations - Decision Making: Branching statements, Looping statements - Problem Solving with Basic statements

UNIT III ARRAYS AND STRINGS
Arrays: Declaration, Initialization, One dimensional, Two dimensional, and Multidimensional arrays - String: String operations - Manipulating String Arrays - Problem Solving with Arrays and Strings

UNIT IV FUNCTIONS AND POINTERS
Function: Declaration, Definition, Parameter passing methods, Recursion - Pointers: Declaration, Definition, Pointers and Functions, Pointer arithmetic, Pointer to an Array, Array of Pointers, Pointer to Pointer, Pointer to Void (generic pointer), Pointer to function - Dynamic Memory Allocation - Problem Solving with Functions and Pointers
UNIT V STRUCTURES, UNIONS AND FILE HANDLING

Structure: Need for Structure, Declaration, Definition, Array of Structures, Pointer to Structure, Structure within a Structure, Structures and functions, Bit fields in Structure - Structures and Union - Files: File Management functions, Working with Text Files, and Binary Files - Preprocessor directives - Problem Solving with Structures, Unions and Files

TOTAL: 45 PERIODS

TEXT BOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

1. www.w3schools.in/c-programming-language


13BS151: PHYSICS AND CHEMISTRY LAB (Common to all UG Programmes)
(Classes on Alternate Weeks for Physics and Chemistry Laboratory)

Course Objectives:
- To have a study on determination of rigidity modulus and Young's modulus
- To be familiar with finding thickness of a thin paper
- To deal with the determination of ultrasonic velocity
- To have a study on estimation of hardness and alkalinity of water
- To deal with Conductometric titration and Potentiometric titration

Course Outcomes:
At the end of the course students are able to
- Find moment of inertia of disc and rigidity modulus of wire
- Determine thickness of a thin sheet of paper
- Find thermal conductivity of bad conductor
- Estimate hardness and alkalinity of water sample
- Do conductometric titration and Potentiometric titration
- Find corrosion rate

LIST OF EXPERIMENTS FOR PHYSICS LAB (Any FIVE Experiments)
1. Torsional pendulum – Determination of rigidity modulus of wire and moment of inertia of disc
2. Non-uniform bending- Young's modulus determination
3. Air-wedge- Determination of thickness of a thin sheet of paper
4. Spectrometer- Determination of wavelength of Hg spectrum using grating
5. Viscosity of liquids- Determination of co-efficient of viscosity of a liquid by Poiseuille’s method
6. Lee’s disc-Determination of thermal conductivity of bad conductor

89

REFERENCE

1. Physics Laboratory Manual, Department of Physics, Mepco Schlenk Engineering College, Sivakasi.

LIST OF EXPERIMENTS FOR CHEMISTRY LAB (Any FIVE Experiments)

1. Estimation of hardness of water by EDTA method
2. Estimation of alkalinity of water sample
3. pH-metric titration (acid & base)
4. Conductometric titration (strong acid vs strong base)
5. Conductometric titration (mixture of acids vs strong base)
6. Potentiometric titration between ferrous ion and potassium dichromate
7. Determination of corrosion rate by weight loss method

REFERENCES


TOTAL: 45 PERIODS

13GE151: ENGINEERING PRACTICES LAB  LT PC  0 0 3 2
(Common to all UG Programmes)

Course Objectives:

- To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.
• To have a study and hands-on-exercise on plumbing and carpentry components.
• To have a practice on gas welding, foundry operations and fitting
• To have a study on measurement of electrical quantities, energy and resistance to earth.
• To have a practice on soldering

Course Outcomes:
At the end of the course students are able to
• Do pipe connections with different joining components.
• Create joints for roofs, doors, windows and furniture
• Prepare square fitting and vee fitting models
• Do residential house wiring
• Measure energy and resistance to earth of an electrical equipment
• Apply soldering

GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE 9

Buildings:
Study of plumbing and carpentry components of residential and industrial buildings, Safety aspects.

Plumbing Works:
1. Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, and elbows in household fittings.
2. Study of pipe connections requirements for pumps and turbines.
3. Preparation of plumbing line sketches for water supply and sewage works.

5. Demonstration of plumbing requirements of high-rise buildings.

**Carpentry using Power Tools only:**

1. Study of the joints in roofs, doors, windows and furniture.
2. Hands-on-exercise: Wood work, joints by sawing, planning and cutting.

II **MECHANICAL ENGINEERING PRACTICE**

**Welding:**

Preparation of arc welding of butt joints, lap joints and tee joints.

**Basic Machining:**

1. Simple Turning, Step turning
2. Drilling Practice using drilling machine.

**Sheet Metal Work:**

1. Forming & Bending:
2. Model making – Trays, funnels, etc.
3. Different type of joints.

**Machine assembly practice:**

1. Study of centrifugal pump
2. Study of air conditioner

**Demonstration on:**

1. Gas welding practice
2. Smithy operations, upsetting, swaging, setting down and bending. Example – Exercise – Production of hexagonal headed bolt.
3. Foundry operations like mould preparation for gear and step cone pulley.

**GROUP B (ELECTRICAL AND ELECTRONICS)**

**III ELECTRICAL ENGINEERING PRACTICE**

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

**IV ELECTRONICS ENGINEERING PRACTICE**

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

**TOTAL: 45 PERIODS**
REFERENCE BOOKS:


SEMESTER EXAMINATION PATTERN

The Laboratory examination is to be conducted for Group A & Group B, allotting 90 minutes for each group, with a break of 15 minutes. Both the examinations are to be taken together in sequence, either in the FN session or in the AN session. The maximum marks for Group A and Group B lab examinations will be 50 each, totaling 100 for the Lab course. The candidates shall answer either I or II under Group A and either III or IV under Group B, based on lots.

List of equipment and components
(For a Batch of 30 Students)

CIVIL ENGINEERING

1. Assorted components for plumbing consisting of 15 Sets.
   metallic pipes, plastic pipes, flexible pipes, couplings, unions, elbows, plugs and other fittings.

2. Carpentry vice (fitted to work bench) 15 Nos.

4. Models of industrial trusses, door joints, furniture joints 5 each

5. Power Tools:
   (a) Rotary Hammer 2 Nos.
   (b) Demolition Hammer 2 Nos.
   (c) Circular Saw 2 Nos.
   (d) Planer 2 Nos.
   (e) Hand Drilling Machine 2 Nos.
   (f) Jigsaw 2 Nos.

6. Arc welding transformer with cables and holders 5 Nos.

7. Welding booth with exhaust facility 5 Nos.

8. Welding accessories like welding shield, chipping hammer, wire brush, etc. 5 Sets.

9. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit. 2 Nos.

10. Centre lathe 10 Nos.

11. Drilling machine 2 Nos.

12. Hearth furnace, anvil and smithy tools 2 Sets

13. Moulding table, foundry tools 2 Sets


**MECHANICAL ENGINEERING**

1. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit. 2 Nos.

2. Centre lathe 10 Nos.

3. Drilling machine 2 Nos.

4. Hearth furnace, anvil and smithy tools 2 Sets

5. Moulding table, foundry tools 2 Sets

10. Study-purpose items: centrifugal pump, air-conditioner

**ELECTRICAL**

1. Assorted electrical components for house wiring 10 Sets
2. Electrical measuring instruments 15 Sets.
3. Study purpose items: Iron box, fan and regulator, emergency lamp 1 each
4. Megger (250V/500V) 1 No.
5. Power Tools: (a) Range Finder 2 Nos.
6. (b) Digital Live-wire detector 2 Nos.

**ELECTRONICS**

1. Soldering guns 10 Nos.
2. Assorted electronic components for making circuits 50 Nos.
3. Small PCBs 10 Nos.
5. Study purpose items: Telephone, FM radio, low-voltage power supply 2 Nos.

---

**13GE152: COMPUTER PRACTICES LAB**

(Common to all UG Programmes)

**Course Objectives:**

- To develop C programs using conditional and looping statements
• To expertise in arrays and strings
• To build modular programs
• To explicitly manage memory using pointers
• To group different kinds of information related to a single entity
• To visualize and present data using office packages

Course Outcomes:
At the end of the course students are able to

• Implement program using control statements
• Handle arrays and strings
• Develop reusable modules
• Store data in main memory effectively using pointers
• Form heterogeneous data using structures
• Use office packages for documentation and presentation

SYLLABUS FOR THE LABORATORY:
1. Programs using simple statements
2. Programs using decision making statements
3. Programs using looping statements
4. Programs using one dimensional and two dimensional arrays
5. Solving problems using string functions
6. Programs using user defined functions and recursive functions
7. Programs using pointers
8. Programs using functions and pointers
9. Programs using structures and unions
10. Word Processing
• Document Creation, Text Manipulation with Scientific Notation
• Table creation, Table formatting and Conversion.
• Mail merge and Letter preparation.
• Drawing - Flow Chart

11. Spread Sheet
• Chart - Line, XY, Bar and Pie.
• Formula - formula editor.
• Inclusion of object, Picture and graphics, protecting the document and sheet.

12. Power Point Presentation- Slides preparation using templates and animation

TOTAL: 45 PERIODS

REFERENCE BOOKS:

WEB REFERENCES:
1. http://www.w3schools.in/c-programming-language

List of Sample Exercises

1. A company XYZ pays their employers on a monthly basis. It pays their employers with DA=50% of BP, HRA=10% of BP, allowance=Rs.1000. The company needs to automate the salary computation based on the basic pay. Develop an application to compute the gross salary of an employee given their basic pay.

2. Collecting money becomes increasingly difficult during periods of recession, so companies may tighten their credit limits to prevent their accounts receivable (money owed to them) from becoming too large. In response to a prolonged recession, one company has cut its customers’ credit limits in half. Thus, if a particular customer had a credit limit of $2000, it’s now $1000. If a customer had a credit limit of $5000, it’s now $2500. Write a program that analyzes the credit status of a customer. For each customer you’re given:
   - The customer’s account number
   - The customer’s credit limit before the recession
   - The customer’s current balance (i.e., the amount the customer owes the company).

   Your program should calculate and print the new credit limit for the customer and should determine and print whether customer has current balance that exceeds their new credit limits.

3. A right triangle can have sides that are all integers. The set of three integer values for the sides of a right triangle is called a Pythagorean triple. These three sides must satisfy the relationship that the sum of the squares of two of the sides is equal to the square of the hypotenuse. Find all Pythagorean triples for side1, side2, and the hypotenuse all no larger than 500. Use a triple-nested for loop that simply tries all possibilities. ($hypotenuse^2 = side1^2 + side2^2$)
4. Write a program that simulates the rolling of two dice. The program should use rand to roll the first die, and should use rand again to roll the second die. The sum of the two values should then be calculated. [Note: Since each die can show an integer value from 1 to 6, then the sum of the two values will vary from 2 to 12]. Your program should roll the two dice 1,000 times. Store the numbers of times each possible sum appears and print the results in a tabular format.

5. Dates are commonly printed in several different formats in business correspondence. Two of the more common formats are 07/21/2003 and July 21, 2003. Write a program that reads a date in the first format and prints it in the second format.

6. A banking application need to be developed for a bank. The operational features contain a list of the transactions that can be performed. These transactions are as follows:
   - Deposit funds to an account (required info.: checking/savings, amount)
   - Withdraw funds from an account (required info.: checking/savings, amount)
   - Transfer funds from one account to another (required info.: checking/savings, amount, other account number, other checking/savings)
   - Query the balance of any account (required info.: checking/savings)

   Develop an application to automate the above operational features.

7. A class contains a total strength of 50 in which there 20 girls and 30 boys. The department needs to assign roll number for the students based on their names in alphabetical order. Develop a software to automate the task.
8. A journal publication company wants to automate the review process. The software should check for the number of prepositions and conjunctions. If the count exceeds 30% of the content then it should reject the paper. Develop the software.

9. A telephone directory contains information such as name, phone number and address. For advertising a product a company needs software to get the phone number of the people in a specific location and display their name and phone number in sorted order.

10. **Word:**

   i) Create a new word document named ‘Student Record’ and
   - Set left margin at 1.8” and right margin at 1.3”.
   - Your heading should be in Times New Roman, Bold and Italic with size 12.
   - Include the Page number at the top of every page
   - Type your personal details.
   - Table with details of 10 students with the following fields: Student name, Department, Internal, External, total, result, Examination held.

   ii) Create a word document named “Scientific Notation” and type one paragraph about the Equation editor with font size 10, and in ‘Calibri’ format. Apply page set up with line spacing of 1 and type the following equations

   \[ x = \frac{B \pm \sqrt{B^2 - 4a} \cdot 4t}{2t} \]

   \[ \int x^2 dx = \frac{x^{n+1}}{n+1} \]

   iii) Create an interview call letter as the main document and create 10 records for 10 persons. Use mail merge to create letters for the 10 persons
Draw the flowchart using Open Office Write for checking whether the given number is Armstrong or not and to find the product of digits of a number

11. Excel

The following table shows the average number of vehicles per hour for a week. Create Bar Graph, 3D and Pie Chart for the following:

<table>
<thead>
<tr>
<th>Day</th>
<th>Cars</th>
<th>Buses</th>
<th>Two-Wheelers</th>
<th>Other Vehicles</th>
</tr>
</thead>
<tbody>
<tr>
<td>Monday</td>
<td>1486</td>
<td>700</td>
<td>595</td>
<td>2100</td>
</tr>
<tr>
<td>Tuesday</td>
<td>1210</td>
<td>575</td>
<td>423</td>
<td>1821</td>
</tr>
<tr>
<td>Wednesday</td>
<td>1197</td>
<td>562</td>
<td>456</td>
<td>1731</td>
</tr>
<tr>
<td>Thursday</td>
<td>1234</td>
<td>432</td>
<td>500</td>
<td>1927</td>
</tr>
<tr>
<td>Friday</td>
<td>1372</td>
<td>628</td>
<td>512</td>
<td>2021</td>
</tr>
<tr>
<td>Saturday</td>
<td>1637</td>
<td>843</td>
<td>612</td>
<td>2348</td>
</tr>
<tr>
<td>Sunday</td>
<td>1747</td>
<td>917</td>
<td>770</td>
<td>2538</td>
</tr>
</tbody>
</table>

Create a sheet in EXCEL as shown below

<table>
<thead>
<tr>
<th>Roll</th>
<th>Name</th>
<th>M1</th>
<th>M2</th>
<th>M3</th>
<th>M4</th>
<th>Total</th>
<th>Percentage</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Maximum | | | | | | |
| Minimum | | | | | | |

Validate the columns M1, M2, M3 and M4 so that the marks lie in the range 0-100 and enter the roll number of the students using auto fill.

Calculate Total = sum of M1, M2, M3 and M4 and it should appear at the center of the cell.

Percentage = Total / 3 and format these cell values so that all the values got 2 digits after the decimal point.
Status = “pass”, if M1, M2, M3 and M4 >=50
= “fail”, otherwise

12. Create a power point presentation about your school using animation, design template and effective presentation

13HS201: TECHNICAL ENGLISH –II

(Common to all UG Programmes)

Course Objectives:

- To make the students of Engineering and Technology to enhance their communicative skills
- To strengthen LSRW skills
- To boost up creative and critical thinking
- To master the skills of writing
- To face the challenges of the competitive world

Course Outcomes:

At the end of the course students are able to

- Enhance LSRW skills
- Enrich their creative and critical thinking
- Face the challenges of the competitive world

UNIT I Language Focus

Vocabulary for engineers - word formation - synonym - match the following - article - preposition - phrasal verbs - reported speech - extended definitions - numerical adjectival expressions - concord - cause and purpose expressions - same word in different parts of speech - editing
UNIT II  Listening  
Comprehensive listening - listening to native accent - listening to telephonic conversations - listening to short and long conversations from different domain activities - listening to various recorded conversations - speeches of great leaders - cricket commentaries - TV and radio news etc., phonetic sounds

UNIT III  Speaking  
Reviews of books & media - sharing of own thoughts – discussing various current issues-group discussions - task based speeches - giving instructions - role play on various themes - individual & groups - narrating stories - formal and informal speeches - reporting various incidents - apprising strength and weakness of a friend - suggestions & solutions for various problematic situations - pronunciation skills - stress and intonation

UNIT IV  Reading  
Skimming and scanning - understanding logic and sequencing in reading - inferring the exact meaning of text - making out meaning of pictorial representations - concentrated reading - reading science fictions and other literary pieces - on the spot reading

UNIT V  Writing  
Checklist - itinerary - paragraph writing - process description - Letter writing - job application with CV – business correspondence-calling for quotations - placing order - complaint letters - preparing a memo - notice and e-mail - e-mail etiquette - report writing-characteristics - structure - types - format and application - essay writing

TOTAL: 45 PERIODS
TEXTBOOKS:


REFERENCE BOOKS:


Extensive reading:


13BS201: MATHEMATICS –II  L T P C
(Common to all UG Programmes)  3 1 0 4

Course Objectives:

- To make the student acquire sound knowledge of techniques in solving ordinary differential equations obtained from engineering problems
- To acquaint the student with the concepts of vector calculus that is needed for problems in engineering disciplines
• To know the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow of electric current

• To make the student for appreciating the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated

Course Outcomes:

At the end of this course, the students are able to

• Apply different techniques to solve ordinary differential equations
• Reduce order of differential equations
• Solve engineering problems using vector calculus
• Use complex variable theory for applications like heat conduction, fluid dynamics etc.
• Transform given problem to a new domain for solving it efficiently

UNIT 0  (Not for Examination)  5+0

Reviews of integration concepts

UNIT I  DIFFERENTIAL EQUATIONS  9+3

Method of variation of parameters - Method of undetermined coefficients - Homogenous equation of Euler’s and Legendre’s type - System of Simultaneous linear differential equations with constant coefficients - Reduction of order.

UNIT II  VECTOR CALCULUS  9+3

Gradient and directional derivative - Divergence and Curl - Irrotational and Solenoidal vector fields - Line integral over a plane curve - Surface Integral and Volume Integral - Green’s, Gauss divergence and Stoke’s theorems - Verification and Application in evaluating line, surface and
volume integrals

**UNIT III ANALYTIC FUNCTION**

9+3

Analytic functions - Necessary and sufficient conditions for analyticity - Properties - Harmonic conjugates - Construction of analytic function - Conformal Mapping - Mapping by functions w= z + c, az, 1/z, z^2, e^z - Bilinear transformation

**UNIT IV COMPLEX INTEGRATION**

9+3

Line Integral - Cauchy’s theorem and integral formula - Taylor’s and Laurent’s Series - Singularities - Residues - Residue theorem - Application of Residue theorem for evaluation of real integrals - Use of circular contour and semicircular contour with no pole on real axis

**UNIT V LAPLACE TRANSFORMS**

9+3

Existence conditions - Transforms of elementary functions - Basic properties - Transforms of derivatives and integrals – Initial and Final value theorems - Inverse transforms - Convolution theorem - Transform of periodic functions - Application to solution of linear ordinary differential equations with constant coefficients

**TOTAL: 65 PERIODS**

**TEXT BOOKS:**


**REFERENCE BOOKS:**


13BS202: ENVIRONMENTAL SCIENCE
(Common to all UG Programmes)

Course Objectives:

- To understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity.

- To know the role of government and non-government organizations in environment management.

Course Outcomes:

At the end of the course the student will be able to

- Understand the basic concepts of environment studies and natural resources.

- Get the thorough knowledge about ecosystem and biodiversity.

- Have an elaborate knowledge about causes, effects and control measures of various types of pollution.

- Understand the social issues and various environmental acts.
- Know the relationship between the human population and environment.

UNIT I  INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES

Definition, scope and importance - Need for public awareness - Forest resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people - Water resources: Use and over-utilization of surface and ground water, floods, drought, conflicts over water, dams - benefits and problems - Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies - Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer, pesticide problems, water logging, salinity, case studies - Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies - Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification - Role of an individual in conservation of natural resources - Equitable use of resources for sustainable lifestyles

UNIT II  ECOSYSTEMS AND BIODIVERSITY

Concept of an ecosystem - Structure and function of an ecosystem – Producers, consumers and decomposers - Energy flow in the ecosystem - Ecological succession - Food chains, food webs and ecological pyramids - Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) - Introduction to Biodiversity - Definition: genetic, species and ecosystem diversity - Biogeographical classification of India - Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values - Biodiversity at global, National and local levels – India as a mega-diversity nation - Hot-spots of biodiversity -
Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts - Endangered and endemic species of India - Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

UNIT III ENVIRONMENTAL POLLUTION

Definition - Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards - Solid waste Management: Causes, effects and control measures of urban and industrial wastes - Role of an individual in prevention of pollution - Pollution case studies - Disaster management: floods, earthquake, cyclone and landslides.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT


UNIT V HUMAN POPULATION AND THE ENVIRONMENT


TOTAL: 45 PERIODS
TEXT BOOKS:


REFERENCE BOOKS:

Course Objectives:

- To introduce the essential principles of physics for information science and related Engineering applications.
- To transform the basic principles and concepts to understand the utility of Engineering Materials operating electrical core devices in terms of their structure and properties.
- To identify the fleet of scientific channels exploring the generation of high-tech electrical engineering materials.

Course Outcomes:
At the end of the course students are able to

- The students are able to understand the electrical properties of the materials.
- The students will acquire knowledge about semiconducting materials.
- The students will acquire knowledge about the magnetic properties and optical properties of materials.
- The students will acquire knowledge about the applications of the magnetic materials, optical devices and nano devices.

UNIT I  ELECTRICAL PROPERTIES OF MATERIALS  9
Classical free electron theory for electrical and thermal conductivity - Wiedemann - Franz law - Draw backs of classical free electron theory - Quantum free electron theory (qualitative) - Schrodinger wave equation - time independent and time dependent wave equations - Particle in a one dimensional Box - Fermi function - Density of energy states - Carrier concentration in metals - Expression for Fermi energy.
UNIT II SEMICONDUCTORS AND TRANSPORT PHYSICS

Direct and indirect bandgap semiconductors - Intrinsic Semiconductors - Carrier concentration - Determination of bandgap energy - Extrinsic semiconductor - Carrier concentration in n type and p type semiconductors - Energy band diagram of an intrinsic and extrinsic semiconductor - Variation of Fermi energy level with temperature and impurity concentration - Hall effect - Determination of Hall coefficient - carrier transport in semiconductors: Drift, Mobility and diffusion.

UNIT III MAGNETIC PROPERTIES OF MATERIALS


UNIT IV OPTICAL PROPERTIES OF MATERIALS AND OPTICAL DEVICES

Classification of optical materials - Absorption in metals, insulators & semiconductors - LED's - Organic LED's - Polymer light emitting materials - Plasma light emitting devices - LCD's - Laser diodes - Optical data storage techniques (including DVD, Blue ray disc, holographic data storage).

UNIT V NANO DEVICES

Quantum confinement - quantum structures - metal - to insulator transition - Confining excitons - Bandgap of nanomaterials - Tunneling - Resonant tunneling diode (RTD) - Single electron phenomenon - Single electron transistor - Quantum cellular automata (QCA). Carbon nano tubes - Molecular electronics structures - Spintronics

TOTAL: 45 PERIODS
TEXT BOOKS:


REFERENCE BOOKS:


13GE203 : BASIC CIVIL AND MECHANICAL ENGINEERING

(Common to EEE / ECE )

Course Objectives:

- To introduce the essential principles of surveying and construction materials
- To make students understand the above principles applied to Building sciences.
- To introduce the essential principles of energy sciences
- To make students understand functioning of fundamental prime movers & machines
Course Outcomes:
At the end of the course students are able to

- Understand the methods of surveying and evaluate areas
- Acquire knowledge about construction materials & methods applicable to several structures.
- Acquire knowledge on traditional & new energy sources and understand the functioning of basic energy conversion devices.
- Understand the construction and functioning of critical appliances like IC engines, refrigerator and air-conditioner.
- Acquire knowledge on basic power plant engineering

PART A – CIVIL ENGINEERING

UNIT I  SURVEYING AND CIVIL ENGINEERING MATERIALS  15

UNIT II  BUILDING COMPONENTS AND STRUCTURES  15
PART B – MECHANICAL ENGINEERING (QUALITATIVE TREATMENT ONLY)

UNIT III ENERGY SOURCES, BOILERS AND TURBINES

Conventional and New & Renewable sources of energy, Indian and global energy scenario, Principle and operation of: Boilers-fire tube and water tube (one example for each type), Hydraulic, Steam, and Gas turbines

UNIT IV IC ENGINES, REFRIGERATOR & AIR CONDITIONER

Four stroke and two stroke IC engine cycles, functioning of petrol and Diesel Engines - Comparisons, simple vapour compression refrigerator and window air conditioner

UNIT V POWER PLANTS

Principle of operation, construction and working of: Hydel, Steam, Diesel, Gas and Nuclear power plants along with accessories – Selection, comparison, merits and demerits

TOTAL: 60 PERIODS

TEXTBOOKS:


REFERENCE BOOKS:


13EE202: ELECTRIC CIRCUITS AND MACHINES

Course Objectives:
- To impart the concept of the basic laws and of series & parallel, mesh current, nodal voltage.
- To understand the concept of basic network theorems and transient response of series and parallel RL, RC and RLC circuits.
- To know the constructional details, principle of operation, speed control of D.C. machines and principle of operation, performance of transformers.
- To know the constructional details and principle of operation, Regulation of alternators and principle of operation Induction motor.

Course Outcomes:
At the end of the course students are able to
- Understand the basic laws and techniques for circuit analysis.
- Understand the voltage and current division, source transformation mesh current, nodal voltage, the concepts of series & parallel for solving circuit problems.
- Understand the basic network theorems used for solving network problems with DC inputs.
- Understand the transient response of series and parallel RL, RC and RLC circuits using Laplace transforms with both DC & AC inputs.
- Understand the construction of DC machine, EMF and torque Equation characteristics of DC machine.
- Describe the constructional details, working principle of a single phase Transformer, Transformer on no load & with load – Regulation.
UNIT I BASIC CIRCUITS ANALYSIS


UNIT II NETWORK THEOREMS

Thevenin’s and Norton’s Theorem – Superposition and Substitution Theorem – Maximum power transfer theorem – Reciprocity Theorem and Tellegen’s Theorem for D.C. Circuits.

UNIT III TRANSIENT RESPONSE

Transient response of RL, RC and RLC Circuits using Laplace transform for DC input and A.C. with sinusoidal input.

UNIT IV D.C. MACHINES AND TRANSFORMERS

(qualitative treatment only).


UNIT V INDUCTION MOTORS & SYNCHRONOUS MACHINES

(qualitative treatment only)

Construction of synchronous machines-types – Induced emf – Voltage regulation; emf and mmf methods


TOTAL: 45 PERIODS
TEXTBOOKS:

REFERENCE BOOKS:
5. K. Murugesh Kumar, “Electric Machines”, Vikas publishing house Pvt Ltd.

13BS251 : APPLIED PHYSICS AND ENVIRONMENTAL CHEMISTRY LAB
(Common to EEE/ ECE/ CSE/ MECH/ IT/ Bio-Tech)
(Laboratory classes on alternate weeks for Physics and Environmental Lab)

Course Objectives:
- To determine particle size and wavelength
- To determine thermal conductivity of a wire
- To find properties of a prism
- To determine DO and Chloride in water
- To determine chromium, sodium etc using various methods

**Course Outcomes:**
At the end of the course students are able to
- Use Post Office Box to determine band gap of a semiconductor
- Use Carey Foster Bridge to determine thermal conductivity of a wire
- Use spectrometer to find dispersive power of a prism
- Use Winkler’s method to determine DO in water
- Use Argentometric method to estimate chloride in water
- Use flame photometry to estimate presence of sodium

**PHYSICS LAB**

**List of Experiments** (Any FIVE Experiments)
1. Laser-Particle size and wavelength determination
2. Post Office Box-Determination of band gap of a semiconductor
3. Indexing of Powder Diffraction Pattern
4. Characteristics of a photodiode
5. Carey Foster Bridge- Determination of unknown resistance of a coil of wire and hence to find the thermal conductivity of the wire using Wiedemann-Franz law
6. Uniform bending- Young’s modulus determination
7. Spectrometer-Dispersive power of the prism

**REFERENCE**
1. Physics Laboratory Manual, Department of Physics, Mepco Schlenk Engineering College, Sivakasi
ENVIRONMENTAL CHEMISTRY LAB

List of Experiments (Any FIVE Experiments)
1. Determination of DO in water by Winkler’s method
2. Estimation of Chloride in water sample by Argentometric method
3. Determination of COD value of industrial effluents
4. Estimation of chromium in tannery wastes
5. Estimation of available chlorine in bleaching powder
7. Estimation of sodium by flame photometry
8. Determination of suspended solids and dissolved solids in water

REFERENCES

13EE252: ELECTRIC CIRCUITS AND MACHINES LAB

Course Objectives:
- To expose the students to apply the basic laws, network theorems for circuit solving the transient response of RC and RLC circuits with DC input and give them experimental skill.
- To expose the students to the operation of DC Machines, transformer, synchronous machines and induction motors and give them experimental skill.
Course outcomes:

At the end of the course students are able to

- Understand and apply the basic laws for circuit solving more effectively
- Understand and use the network theorems for solving DC circuits
- Understand and apply mesh current and nodal voltage method for efficient solving of circuit problems
- Understand, perform and obtain the transient response of RC and RLC circuits with DC input
- Obtain the speed control of DC shunt motor and Efficiency by Swinburne’s test
- Obtain the No load and load characteristics of self excited DC shunt generators
- Calculate the performance of single phase transformer by conducting load test
- Obtain the load characteristics of DC shunt Motor.

LIST OF EXPERIMENTS

1. Verification of Kirchhoff’s voltage and current laws
2. Verification of Thevenin’s, Norton’s and maximum power transfer Theorems
3. Verification of Superposition and Reciprocity theorems.
4. Determination of time constant of series R-C electric circuits.
5. Determination of frequency response of RLC series circuits.
6. Study of CRO and measurement of sinusoidal voltage, frequency and power factor.
7. Swinburne's Test
8. Speed Control of D.C. Shunt Motor
9. Open Circuit and load characteristics of self excited D.C. shunt generator
10. Load Test on Single phase transformer
11. Load Test on three phase squirrel cage induction motor.
12. Predetermination of regulation of alternator by EMF and MMF methods.

TOTAL: 45 PERIODS

13CS251: LINUX COMMANDS AND SHELL PROGRAMMING LAB
(Common to EEE/ ECE/ CSE/ IT/ Bio-Tech)

Course Objectives:

- To motivate the students to develop programs with dynamic memory allocation in C
- To motivate the students to explore the various techniques to handle files using C programs
- To provide a formal foundation to the Linux commands
- To realize some basic Linux commands using C
- To learn to use the primitive administrative commands (Eg. add, delete user)
- To train the students to write Linux shell programs with shell programming constructs
- To enable the students to work on power commands in Linux

Course Outcomes:

At the end of the course students are able to

- Write programs with dynamic memory allocation using pointers in C
• Handle files and manipulate them using C
• Work in the Linux environment by appropriately using the commands
• Implement some of Linux Commands using C
• Use the Linux administrative commands
• Write shell programs in Linux using the shell programming constructs
• Use the power commands for a given applications

SYLLABUS FOR THE LAB (For embedded Theory)

1. C PROGRAMMING ON LINUX
Command Line Arguments - Pointer Programming - Dynamic Memory Allocation - Generic Programming using Pointers - File Handling

2. LINUX COMMANDS

3. SHELL PROGRAMMING
Simple Shell program - Conditional Statements - Looping Statements – Command Line Arguments – Shell programs with C Executable

TEXT BOOKS:

REFERENCE BOOKS:
WEB REFERENCES:
1. www.w3schools.in/c-programming-language

List of Sample Exercises

1. Consider a department consists of two sections of students. It is required to generate a common rank list of all the students based on their CGPA. Develop a C Program for the above scenario.

2. Generate mark report for n students who passed all subjects with name, rollno, mark1, mark2, mark3, total, average. The mark details of m students who passed after revaluation can be added later.

3. A Clerk wants to generate reports of mails received based on following criteria.
   1. Sender
   2. Category (O – Official, P - Personal, C - Confidential)
   3. Size

   You are required to write a program with generic function to sort the mails based on the above said criteria.

4. Write a C program to create a file named “Data.txt”, which contains two numbers followed by an operator in each and every line. Read each line of the file, while reading it; with respect to the operator perform the operation against the numbers and store the results in another file named “Result.txt”

5. a. Create a directory “CSE”, change your working directory to ‘CSE’ and display where you are working now? Create files named “date”, “user”. Store the calendar and current date information in the file named “date” and store the login details of all users in the file “user”. Also, store the details of all active users in the same file (“user”). Finally merge the two files into a single file called “merge” and delete both the files
b. Create a file consisting of countries and corresponding continents. Display the countries which are in the continent Africa. Sort the generated list and convert them into lowercase.

6. Create a directory “Marks”, change your working directory to ‘Marks’.
   - Create 3 empty files MarkList, NameList and StudRep. Add necessary information (MarkList – Mark only, NameList – Name only, StudRep – representative Name only) to the corresponding file (minimum 15 details)
   - Merge the contents of files NameList & MarkList and store it in a file MarkDetail1 & MarkDetail2 in the following format.
     MarkDetail1       MarkDetail2
     Arun 100         Arun Bala ..... 
     Bala 98         100 98 ..... 
     .... ....
   - Copy the first 8 lines from MarkDetail1 to the new file “Mark1”. Copy the last 4 lines from the file “Mark1” to new file “Mark2”. And finally store the contents of MarkDetail1 from the line 4 to the file “Mark3”. Display the contents of “Mark3” along with line number.
   - Display which file system is mounted on your system

7. a. Create a user group called “csestudent” and rename it as “engineers”. Add 10 users to the group and rename the usernames for atleast 5 students. Delete an user from the group and finally delete the group
   b. Perform the following system administration tasks
      - Print network connections, routing tables, interface statistics, masquerade connections, and multicast memberships
      - System Load statistics
      - Report a snapshot of the current processes.
      - Report virtual memory statistics
8. Create a file which consists of menu of cuisines for a restaurant. Perform the following operations in the file.
- Change the price of the items which are 4$ to 6$
- Delete the list of items whose prices are less than 3$
- Replace the whitespaces between the items into ‘-’
- Print the list of items from 4\textsuperscript{th} to 10\textsuperscript{th} position
- List out all the cuisines of type ‘Italian’

9. Write a shell script which will accepts login name from the user as command line argument and display the message whether the user having that login name is currently logged in or not. Also enable the user to view the long list of files that end with ‘ca’ along with the count.

10. Write a shell script to store the city names of different states in different files. The file names must be in the short form of the corresponding state names (Eg: TamilNadu-TN). Accept the state name and city name from command line. Store the city name in corresponding file. If the file doesn’t exist, create the file. If the city name already exists, display the message “City already added”.

11. Generate payroll for the company with the specifications as follows.
If the employee’s basic salary is less than Rs.15000, then HRA=10% of basic salary and DA=90% of basic. If the employee’s salary is either equal to or above Rs.15000, then HRA=Rs.500 and DA=98% of basic salary. Automatically generate gross salary and net salary.
Store the details in a file. The total number of employees should be obtained from command line

12. Implement the operations of cat, cp and wc commands in Linux using C programs
13MA301 : Mathematics – III
(Common to all UG Programmes)

Course Objectives:

- To solve problems in Partial Differential Equations.
- To acquaint the student with the concepts of Fourier series that can be applied engineering problems.
- To solve boundary value problem using standard techniques.
- To solve Fourier transform problems in engineering domain.
- To make the student knowledgeable in the area of probabilistic models.

Course Outcomes:

At the end of this course students will be able to

- Solve various Partial Differential Equations having engineering applications.
- Express any periodic function as a series of well-known periodic functions sine and cosine.
- Obtain the solution of boundary value problem such as displacement of string and heat conduction.
- Use Fourier transform in engineering applications.
- Apply the concepts of probability and distributions.

UNIT I  PARTIAL DIFFERENTIAL EQUATIONS 9+3

Formation of PDE - Solutions of first order PDE - Lagrange’s linear PDE - Standard types and equations reducible to standard types - Singular solution - Classification of second order PDE - Solution of second and higher order linear homogeneous PDE with constant coefficients - Linear non-homogeneous partial differential equations with constant coefficients.
UNIT II  FOURIER SERIES  9+3

Dirichlet’s conditions - General Fourier series - Odd and even functions - Half-range Sine and Cosine series - Parseval’s identity - Harmonic Analysis - Complex form of Fourier series.

UNIT III  BOUNDARY VALUE PROBLEMS IN PDE  9+3

Method of separation of variables - Solutions of one dimensional wave equation and one dimensional heat equation - Steady state solution of two-dimensional heat equation - Fourier series solutions in Cartesian coordinates.

UNIT IV  FOURIER TRANSFORM  9+3

Fourier integral theorem - Fourier transform pair - Sine and Cosine transforms - Properties - Transform of elementary functions - Convolution theorem - Parseval’s identity.

UNIT V  PROBABILITY AND RANDOM VARIABLES  9+3

Axiomatic definition of probability - Conditional probability - Baye’s theorem - Discrete and Continuous random variables - Moments - Moment generating functions - Binomial, Poisson, Uniform, Exponential and Normal distributions

TOTAL: 60 PERIODS

TEXTBOOKS:


REFERENCE BOOKS:


13EC301 : ELECTRONIC CIRCUITS I

Course Objectives:

- To understand the operation and characteristics of Diodes and Transistors.
- To understand the different biasing concepts and the methods of biasing transistors.
- To analyze of small signal amplifier circuits.
- To analyze the design of power supplies.

Course Outcomes:

At the end of this course students will be able to

- Analyze the distribution current in diodes and transistors.
- Analyze the transistors biasing for different circuits.
- Analyze the characteristics parameter of amplifiers.
- Design the power supplies.

UNIT I  PN JUNCTION DIODE AND SPECIAL DIODES

characteristics - Breakdown in PN junction diodes and Zener Diode. Tunnel diodes, PIN diode, Varactor diode - SCR characteristics, UJT, Photodiode, phototransistor.

UNIT II TRANSISTORS

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

UNIT III TRANSISTOR BIASING AND STABILITY

BJT - Need for biasing - DC , AC Load line and quiescent point-Stability factor - Different types of biasing circuits and its comparison - Bias compensation - Diode and Thermistor compensations-Biasing the JFET.

UNIT IV LOW FREQUENCY ANALYSIS OF SMALL SIGNAL AMPLIFIERS

CE, CB and CC amplifiers with and without bypass capacitor –Hybrid model of a transistor- Method of drawing small-signal equivalent circuit – Midband analysis of various types of single stage amplifiers to obtain voltage gain, current gain, input impedance and output impedance - Miller’s theorem – CS, CG and CD (FET) amplifiers.

UNIT V RECTIFIERS AND POWER SUPPLIES

Rectifiers - Half-wave, Full-wave and Bridge rectifiers with resistive load - Ripple factor, Rectifiers with C, L, LC and CLC filters - Voltage regulators - Zener diode regulator- Regulated power supply - Over voltage protection-Switched Mode Power Supply (SMPS)- Power control using SCR.

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:


WEB REFERENCES:

1. www.diodes.com/
2. www.edutalks.org
3. www.ee.iitm.ac.in/~ani/2012/ec5135/lectures.html
4. www.ece.umassd.edu/Faculty/dSchmidlin/ECE312/notes/notes.html
5. web.iitd.ac.in/~shouri/eel204/lectures.php
6. www.stanford.edu/class/ee122/.../EE113_Course_Notes_Rev0.pdf

13EC302 : DIGITAL ELECTRONICS L T P C
3 0 0 3

Course Objectives:

- To simplify Boolean expressions reviewing basic postulates of Boolean algebra
- To synthesize the basic combinational and sequential circuits
- To synthesize combinational and sequential logic using programmable logic devices.
- To analysis the design of synchronous and asynchronous sequential circuits
Course Outcomes:
At the end of this course students will be able to
- Design and Analyze both combinational and sequential networks.
- Analyze the characteristics and structure of different memory systems and programmable logic devices.
- Synthesize digital circuits for specific applications
- Synthesize and Analyze digital circuits by using hardware description languages.

UNIT I MINIMIZATION TECHNIQUES AND LOGIC GATES
Minimization Techniques: Boolean postulates and laws – De-Morgan’s Theorem - Principle of Duality - Boolean expression - Standard Form, Canonical Form, Minimization of Boolean expressions using Boolean laws and theorem – Sum of Products (SOP) – Product of Sums (POS) – Don’t care conditions- Minimization of Boolean expressions up to 6 variables using Karnaugh map and Quine-McCluskey method.

UNIT II COMBINATIONAL CIRCUITS

UNIT III SEQUENTIAL CIRCUITS
UNIT IV  MEMORY DEVICES AND PROGRAMMABLE LOGIC DEVICES


UNIT V  SYNCHRONOUS AND ASYNCHRONOUS SEQUENTIAL CIRCUITS

Synchronous Sequential Circuits: General Model – Classification – Design – Use of Algorithmic State Machine – Analysis of Synchronous Sequential Circuits

Asynchronous Sequential Circuits: Design of fundamental mode and pulse mode circuits –Incompletely specified State Machines –races and hazards-Design of Hazard Free Switching circuits. Design of Combinational and Sequential circuits using VERILOG

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:

Course Objectives:

- To analyze fields and potentials due to static charges
- To evaluate static magnetic fields
- To visualize how materials affect electric and magnetic fields
- To relate Electric and Magnetic fields under time varying situations
- To differentiate propagation of uniform plane waves in various media.

Course Outcomes:

At the end of this course students will be able to

- Determine the static electric and magnetic fields and related parameters
- Determine the electromagnetic field strength given any charge configuration / distribution and describe the nature of the fields
- Characterize ohmic losses of conductors and Energy density of dielectrics and ferromagnetic materials
- Apply Maxwell’s equation to derive wave equation and define propagation of electromagnetic waves in different media

UNIT I  STATIC ELECTRIC FIELDS  9


Coulomb’s Law in Vector Form – Definition of Electric Field Intensity – Principle of Superposition – Electric Field due to point charges – Electric field due to continuous charge distribution - Electric Field due to charges distributed uniformly on an infinite and finite line – Electric Field on the
axis of a uniformly charged circular disc – Electric Field due to an infinite uniformly charged sheet. 

UNIT II STATIC MAGNETIC FIELDS
The Biot-Savart Law in vector form – Magnetic Field intensity due to a finite and infinite wire carrying a current I – Definition of Curl and Stokes theorem - Magnetic field intensity on the axis of a circular and rectangular loop carrying a current I – Ampere’s circuital law and simple applications. 

UNIT III STATIC ELECTRIC AND MAGNETIC FIELDS IN MATERIALS
Electric current – Current density – point form of ohm’s law – continuity equation for current. 
Electric Polarization- permittivity- Nature of dielectric materials- dielectric strength - Poisson’s and Laplace’s equation 
Capacitance – Capacitance of various geometries(Parallel plate, Cylindrical and Spherical) using Laplace’s equation –Boundary conditions for electric fields.

UNIT IV TIME VARYING ELECTRIC AND MAGNETIC FIELDS
Displacement current – Ampere’s circuital law in integral form – Modified form of Ampere’s circuital law as Maxwell’s first equation in integral form – Equation expressed in point form. Maxwell’s four equations in integral form and differential form.

UNIT V ELECTROMAGNETIC WAVES

Derivation of Wave Equation – Uniform Plane Waves – Maxwell’s equation in Phasor form – Wave equation in Phasor form – Plane waves in free space and in a homogenous material.

Wave equation for a conducting medium – Plane waves in lossy dielectrics – Propagation in good conductors – Skin effect.

TUTORIAL : 15 Hours

UNIT: 60 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:


13EC304 : NETWORK ANALYSIS AND SYNTHESIS

Course Objectives:

- To represent the network using different structures
- To analyze any given electrical network in S-domain
• To synthesize an electrical network from the given impedance/admittance function.

Course Outcomes:
At the end of this course students will be able to
• Analyze the functions of various electronic networks
• Apply the synthesis procedure of networks for the given specifications
• Design filter, attenuator and equalizer with suitable specifications for the particular applications.

UNIT I  NETWORK REPRESENTATION


Network elements, Two port networks: Parameters and transfer function- The Neper - The Decibel - Characteristic impedance of Symmetrical Networks – Current and voltage ratios - Propagation constant- Image impedance

UNIT II  ANALYSIS OF NETWORKS IN 'S' DOMAIN

Network analysis using Laplace transformation- Network functions- Concept of Complex frequency Transform Impedances- Network functions of one port and two port networks- concept of poles and zeros - properties of driving point and transfer functions- time response and stability from pole zero plot- Interconnection of two ports- Ladder and Lattice networks- T & π Representation.

UNIT III  ELEMENTS OF NETWORK SYNTHESIS

UNIT IV  PASSIVE FILTER DESIGN  

Image parameters- Butterworth and Chebyshev approximations- Normalized specifications- Frequency transformations- Frequency and impedance denormalisation- Types of frequency selective filters, Constant k filters, m derived filters- Composite filters- Characteristic impedance variation vs frequency in stop and pass band of filters- Linear phase filters- Crystal Filters

UNIT V  ATTENUATORS AND EQUALIZERS

Attenuators - T, π, Lattice and Bridged T attenuators, 1x and 10x Probes-Equalizers - inverse Networks- Series equalizers, Shunt Equalizers, Constant Resistance and Constant reactance equalizers.

Tutorials:15 Periods

TOTAL: 60 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

Course Objectives:

- To exploit the concepts of object oriented Programming in C++
- To explore the concept of extending classes and polymorphism
- To build linear and non-linear data structures efficiently
- To compute systematic way of solving sorting and searching problems

Course Outcomes:

At the end of this course students will be able to

- Apply the concept of inheritance and polymorphism
- Implement the different data structures using arrays and pointers
- Formulate the various non-linear data structures and Graph algorithms
- Explore the solutions for sorting & searching problems

UNIT I DATA ABSTRACTION & OVERLOADING 9


UNIT II INHERITANCE & POLYMORPHISM 9

Base Classes and Derived Classes – Protected Members – Casting Class pointers and Member Functions – Overriding – Public, Protected and Private Inheritance – Constructors and Destructors in derived Classes – Implicit Object Conversion – Composition Vs. Inheritance – Virtual functions – This Pointer – Abstract Base Classes and Concrete Classes – Virtual Destructors – Dynamic Binding.

UNIT III LINEAR DATA STRUCTURES 11

Asymptotic Notations: Big-Oh, Omega and Theta – Best, Worst and
Average case Analysis: Definition and an example – List, Stacks and Queues: Storage Representation - Implementation – Applications.

**UNIT IV  NON-LINEAR DATA STRUCTURES** 9


**UNIT V  INDEXING , SORTING AND SEARCHING** 7


**TOTAL: 45 Periods**

**TEXTBOOKS:**


**REFERENCE BOOKS:**


**WEB REFERENCES:**

Course Objectives:

- To obtain the characteristics of different semiconductor devices like Diode, BJT, JFET, UJT and SCR.
- To design Amplifier circuits using different biasing techniques and to measure gain, Input and output resistances.
- To design a Power supply circuit with a simple capacitor filter and verify the value of ripple factor.
- To design series and shunt regulators using transistors and determine the Line and Load regulation.

Course Outcomes:

At the end of this course students will be able to

- Analyze the characteristics of different semiconductor devices.
- Design amplifier circuits for the variety of engineering applications.
- Design the power supplies and regulators for different applications.

List of Experiments:

1. V-I Characteristics of PN Junction Diode, Photo Diode and Zener Diode.
   
i) Determine the Volt Ampere Characteristics of a PN junction diode, Photo Diode and Zener diode under forward and reverse bias conditions.

ii) Determine the Cut in Voltage, Forward and Reverse resistance of a PN Junction diode and Zener diode.
2. Input and Output Characteristics of BJT in Common Emitter Configuration.
   i) Obtain the Input and Output Characteristics of BJT in Common Emitter Configuration.
   ii) Determination of hybrid parameters from the Input and Output Characteristics.

   i) Obtain the Input and Output Characteristics of BJT in Common Base and Common Collector Configuration.
   ii) Determination of hybrid parameters from the Input and Output Characteristics.

4. Drain and Transfer Characteristics of JFET.
   i) Plot of Drain and Transfer Characteristics of JFET.
   ii) Determine the Drain resistance, Amplification factor and mutual conductance from the Characteristics of JFET.

5. Characteristics of UJT and SCR.
   i) Obtain the Characteristics of UJT and SCR.
   ii) Find the Intrinsic standoff ratio from the characteristics of UJT.
   iii) Determination of Forward break over voltage from the characteristics of SCR

6. Fixed Bias amplifier circuit using BJT
   i) Obtain the waveforms at input and output without bias.
   ii) Determination of bias resistance to locate Q-point at center of load line.
   iii) Measurement of gain.
   iv) Plot the frequency response & determination of Gain Bandwidth Product

   i) Measurement of gain.
   ii) Plot the frequency response & determination of Gain Bandwidth Product.
   i) Measurement of gain.
   ii) Plot the frequency response & Determination of Gain Bandwidth Product.

9. Power Supply circuit - Half wave rectifier and Full wave rectifier with C, L and \( \Pi \) filter.
   i) Determination of ripple factor
   ii) Plot the Load regulation characteristics using Zener diode.

10. Design of transistor Series and Shunt Regulators
    i) Determination of Line Regulation and Load Regulation.
    ii) Plot the Load regulation characteristics using Zener diode.

11. Mini Project

TOTAL: 45 PERIODS

13EC352 : DIGITAL ELECTRONICS LAB

Course Objectives:
- To design and analyze combinational circuit building blocks: multiplexers, demultiplexers, binary decoders and encoders, decoders for hexadecimal to seven-segment LED displays, code converters.
- To design Counters and shift registers using flip flops.
- To develop HDL programs for digital circuits.

Course Outcomes:
At the end of this course students will be able to
- Design combinational and sequential circuits for different applications.
- Design digital circuits using ICs with specific functions
- Simulate HDL based Digital Design using Verilog Hardware Description Language.
List of Experiments:

1. Implementation of Adder and Subtractor using basic and universal logic gates.
2. Design and implementation of code converters using logic gates.
3. Design and implementation of 4 bit binary Adder/Subtractor and BCD adder using IC 7483.
4. Design and implementation of 2 bit Magnitude Comparator using logic gates and 8 Bit Magnitude Comparator using IC 7485.
5. Design and implementation of 16 bit odd/even parity checker generator using IC74180.
6. Design and implementation of Multiplexer and De-multiplexer using logic gates and study of IC74150 and IC 74154.
7. Design and implementation of encoder and decoder using logic gates and study of IC7445 and IC74147.
8. Realization of one flip flop using other flip flops.
9. Construction and verification of 4 bit ripple counter, Mod-N Ripple counters, Shift Counter and Ring Counter.
10. Design and implementation of 3-bit synchronous up/down counter, counter to count any desired sequence.
12. Simulation of experiments 1, 6, 9 and 11 using Verilog Hardware Description Language.
13. Mini Project (To include design of asynchronous sequential circuits)

TOTAL: 45 PERIODS

13CS353 : DATA STRUCTURES & OBJECT ORIENTED PROGRAMMING LAB

Course Objectives:

- To gain expertise in the concept of object oriented programming in C++
- To develop programming skills in design and implementation of linear data structures
- To build non linear data structures such as Binary Search Tree and Graph
To design separate chaining technique to avoid collision.
To work with different sorting and searching techniques

Course Outcomes:
At the end of this course students will be able to
- Implement the object oriented Programming in C++
- Develop the various linear data structures as such as List, Stack and Queue ADTs
- Improve programming skills in design and implementation of non linear data structures
- Solve the collision problem using hashing technique
- Design the various sorting and searching techniques

SYLLABUS FOR THE LAB:
1. Constructors and destructors
2. Function overloading
3. Operator overloading.
4. Inheritance
5. Polymorphism
6. List
7. Stacks
8. Queues
9. Trees
10. Graph traversal.
11. Hashing
12. Sorting
13. Searching
14. Mini Project

TOTAL: 45 PERIODS

REFERENCE BOOKS:


WEB REFERENCES:


List of Sample Exercises:

1. Implement the basic object oriented programming concepts in C++
2. Design List ADT and implement as array storage representation in C++
3. Design List ADT and implement as linked list storage representation in C++
4. Write a C++ program for Array implementations of Stack ADT
5. Perform Queue operations in C++ using Linked List Implementation
6. Design and implement the Binary Search Tree using C++
7. Write a C++ program to perform Depth First Search
8. Implement hashing with Separate Chaining in C++
9. Write a C++ program to perform Heap Sort
10. Write a C++ program to implement Quick Sort
Course Objectives:

- To acquire skills in handling situations involving more than one random variable and functions of random variables.
- To be exposed to statistical methods designed to contribute to the process of making scientific judgments in the face of uncertainty and variation
- To familiarize the student with the concept of Linear system with random inputs

Course Outcomes:

At the end of this course students will be able to

- Analyze in Vector space concepts and its applications
- Apply the concepts of a two dimensional system to any n-dimensional system
- Analyze the relation between the random input and output signals
- Apply the appropriate transfer function for reducing noise occurred in the media

UNIT I  VECTOR SPACES


UNIT II  ORTHOGONALITY


UNIT III  TWO DIMENSIONAL RANDOM VARIABLES

Joint distributions - Marginal and conditional distributions – Covariance - Correlation and Regression - Transformation of random variables - Central limit theorem (for iid random variables)
UNIT IV  CLASSIFICATION OF RANDOM PROCESSES  9+3


UNIT V  LINEAR SYSTEMS WITH RANDOM INPUTS  9+3

Linear time invariant system - System transfer function – Linear systems with random inputs – Auto correlation and cross correlation functions of input and output – White noise.

TOTAL: 60 Periods

TEXTBOOKS:


REFERENCE BOOKS:


Course Objectives:

- To understand and apply the concept of feedback in designing amplifiers and oscillators
- To analyze Amplifier circuits at high frequencies.
- To design wave shaping circuits for different applications

Course Outcomes:

At the end of this course students will be able to

- Identify and analyze the input and output parameters of feedback amplifiers.
- Design oscillators, wave shaping circuits, multivibrators.
- Design power amplifiers for a variety of engineering applications.

UNIT I  FEEDBACK AMPLIFIERS


UNIT II  OSCILLATORS

UNIT III    POWER AMPLIFIERS AND TUNED AMPLIFIERS


UNIT IV    WAVE SHAPING AND MULTIVIBRATOR CIRCUITS


UNIT V    BLOCKING OSCILLATORS AND TIMEBASE GENERATORS


TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCE:


13EC402 : SIGNALS AND SYSTEMS L T P C

3  1  0  4

Course Objectives:

- To analyse the characteristics of continuous, discrete signals and systems.
- To characterize different transforms and their application in system analysis.

Course Outcomes:

At the end of this course students will be able to

- Employ mathematical descriptions and representations of continuous and discrete signals to build LTI Systems.
- Apply transforms techniques for the analysis of Linear Time Invariant Systems by examining their input and output signals.
UNIT I CLASSIFICATION OF SIGNALS AND SYSTEMS

Continuous time signals (CT signals), discrete time signals (DT signals) - Step, Ramp, Pulse, Impulse, Exponential - Transformation of the independent variable - Classification of CT and DT signals - CT systems and DT systems - Basic system properties - Linear Time invariant (LTI) Systems and properties.

UNIT II FOURIER SERIES REPRESENTATION AND CT FOURIER TRANSFORM


UNIT III LAPLACE TRANSFORM


UNIT IV SAMPLING AND DISCRETE-TIME FOURIER TRANSFORM

Sampling theorem - Impulse train sampling - Sampling with a zero order hold - Sampling of LP and BP signals - Reconstruction of signal from its samples - Aliasing - Discrete time processing of CT signals - Difference equation - Convolution sum - Properties - Impulse response of Interconnected systems - DTFT and properties - Analysis of LTI Systems using DTFT

UNIT V Z TRANSFORM, DFT & FFT


Tutorial: 15 Periods

TOTAL: 60 Periods
TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:


13EC403 : TRANSMISSION LINES AND WAVEGUIDES

L T P C

3 1 0 4

Course Objectives:

- To calculate the parameters of the transmission lines
- To analyze the voltage and current distribution in dissipationless lines
- To analyze the wave characterization in conductors and dielectrics
• To Analyze the characterize of TE and TM waves and evaluate the waveguide parameters

Course Outcomes:
At the end of this course students will be able to
• Perform Distributed circuit analysis using lumped circuit analysis concepts.
• Apply the knowledge gained to design various Microwave components.
• Design matching circuit using smith chart for RF and Microwave circuits.
• Determine the parameters of rectangular and circular waveguides and resonators

UNIT I TRANSMISSION LINE THEORY 9
Different types of transmission lines – Definition of Characteristic impedance – The transmission line as a cascade of T-Sections - Definition of Propagation Constant. General Solution of the transmission line – The two standard forms for voltage and current of a line terminated by an impedance – physical significance of the equation and the infinite line – The two standard forms for the input impedance of a transmission line terminated by an impedance – meaning of reflection coefficient – wavelength and velocity of propagation- Waveform distortion – distortion less transmission line – The telephone cable – Inductance loading of telephone cables. Input impedance of lossless lines – reflection on a line not terminated by Zo - Transfer impedance – reflection factor and reflection loss – T and \( \pi \) Section equivalent to lines- Open and short circuited lines, Insertion loss.

UNIT II LINE AT RADIO FREQUENCIES 9
Parameters of open wire line and Coaxial cable at RF – Line constants for dissipation - voltages and currents on the dissipation less line - standing waves – nodes - standing wave ratio - input impedance of open and short circuited lines - power and impedance measurement on lines – \( \lambda/2 \) line, Impedance matching – \( \lambda/4 \) line - single and double-stub matching- smith chart and its applications – Problem solving using Smith chart.
UNIT III GUIDED WAVES BETWEEN PARALLEL PLANES


UNIT IV RECTANGULAR WAVEGUIDES


UNIT V CIRCULAR WAVE GUIDES AND RESONATORS

Bessel functions – Solution of field equations in cylindrical co-ordinates – TM and TE waves in circular guides – wave impedances and characteristic impedance – Dominant mode in circular waveguide – excitation of modes – Microwave cavities, Rectangular cavity resonators, circular cavity resonator, semicircular cavity resonator, Q factor of a cavity resonator for TE\textsubscript{101} mode- TEM wave in coaxial lines.

TUTORIAL: 15 Periods TOTAL: 60 Periods

TEXTBOOKS:

REFERENCE BOOKS:


WEB REFERENCE:


13EC404 : LINEAR INTEGRATED CIRCUITS         L T P C
                                                  3 0 0 3

Course Objectives:

- To determine the ac and dc characteristics of op-amp
- To employ op-amp for a variety of engineering applications
- To analysis different types of analog to digital and digital to analog conversion.

Course Outcomes:

At the end of this course students will be able to

- Analyze the loop configuration of op-amp.
- Use analog multiplier and PLL for detection of modulated signals.
- Evaluate the performance of different data converters.
- Apply the circuits of wave form generators and special functions in IC.

UNIT I  IC FABRICATION AND CIRCUIT CONFIGURATION FOR LINEAR IC

Advantages of ICs over discrete components – Manufacturing process of monolithic ICs – Construction of monolithic bipolar transistor –

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, FSK modulation and demodulation and Frequency synthesizing.

UNIT IV ANALOG TO DIGITAL AND DIGITAL TO ANALOG CONVERTERS


UNIT V WAVEFORM GENERATORS AND SPECIAL FUNCTION ICs

Sine-wave generators, Multivibrators and Triangular wave generator, Saw-tooth wave generator, ICL8038 function generator, Timer IC 555, IC Voltage regulators – LM317 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, Video Amplifier, Isolation Amplifier, Opto-couplers.

TOTAL: 45 Periods
TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

1. en.wikipedia.org/wiki/Category:Linear_integrated_circuits
2. www.gobookee.org/linear-integrated-circuits-notes

13EC405 : MICROPROCESSORS AND INTERFACING

Course Objectives:

- To apply knowledge of the architecture for programming of 8085 & 8086 microprocessor.
- To develop skills in interfacing of peripheral devices with 8085 microprocessor.
**Course Outcomes:**
At the end of this course students will be able to
- To write assembly language program for 8085 & 8086 microprocessor.
- To interface peripheral devices with 8085 & 8086 microprocessor.
- To design 8085 and 8086 microprocessor based system.

**UNIT I 8085 MICROPROCESSOR ARCHITECTURE AND PROGRAMMING**

Introduction to microprocessor, Microprocessor based system, Address bus, data bus, control bus, Tristate bus – Connecting Microprocessor to I/O Devices – Data Transfer Scheme – 8085 Microprocessor Architecture – Instruction set – Assembly Language Programming – Interrupts

**UNIT II 8086 MICROPROCESSOR ARCHITECTURE AND PROGRAMMING**


**UNIT III MICROPROCESSOR PERIPHERAL INTERFACING**

Introduction to I/O Ports, Memory Interfacing, Programmable Peripheral Interface (8255), Serial Communication (8251), DMA Controller (8237), Keyboard and Display Controller (8279), Priority Interrupt Controller (8259), Programmable Interval timers (Intel 8253/8254)

**UNIT IV MULTIPROCESSOR CONFIGURATIONS**

Coprocessor Configuration – Closely Coupled Configuration – Loosely Coupled Configuration –8087 Numeric Data Processor – Data Types – Architecture - 8089 I/O Processor – Architecture – Communication between CPU and IOP.

**UNIT V SYSTEM DESIGN USING 8085 AND 8086 MICROPROCESSORS**

D-to-A converter - A-to-D converter, CRT Terminal Interface, Printer Interface, Motor Control- Relay, DC & Stepper Motor, Case studies – microprocessor based digital scale system, Temperature controller

**TOTAL: 45**
TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

1. http://www.zseries.in/classroom/courses/

13EC451 : ELECTRONICS CIRCUITS LAB – II  L T P C
0 0 3 2

Course Objectives:

- To design feedback Amplifier circuits and to measure gain, Input and output resistances and compare with and without feedback performance
- To design Oscillators, power amplifiers and wave shaping circuits and verify its outputs.

Course Outcomes:

At the end of this course students will be able to
- Design and analyze feedback Amplifiers.
- Design oscillators, wave shaping circuits, multivibrators and power amplifiers for the variety of engineering applications.
Simulate and analyze the circuits using PSPICE.

List of Experiments:

1. Voltage series Feedback amplifiers and compare the Frequency response, Input and output impedance, Gain Bandwidth product with and without Feedback amplifiers.
2. Current Shunt Feedback amplifiers and compare the Frequency response, Input and output impedance, Gain Bandwidth product with and without Feedback amplifiers.
3. RC phase shift oscillators and Wein Bridge Oscillator.
5. Class A, Class B Power Amplifier.
6. Class C Tuned Amplifier
7. RC Integrators, RC Differentiators, Clippers & Clampers.
8. Astable multivibrator and Schmitt Trigger
9. Bistable multivibrator
10. Monostable multivibrator

SIMULATION USING PSPICE:

11. Astable, Monostable and Bistable multivibrator
12. Phase shift oscillator, Wein Bridge Oscillator
13. Schmitt Trigger
14. UJT Relaxation Oscillator
15. Mini Project

TOTAL: 45 PERIODS
Course Objectives:

- To examine the ac and dc characteristics of Opamp 741.
- To practice and familiarize the different applications of IC 741 and IC 555.
- To verify the Filtering characteristics of opamp.
- To simulate the opamp applications using PSpice.

Course Outcomes:

At the end of this course students will be able to

- Analyze the characteristics of op-amp
- Create different applications using linear integrated circuits.
- Evaluate the performance of the filters designed using opamp.
- Design powersupplies

List of Experiments:

1. Study of Characteristics of opamp
2. Inverting, Non inverting and Differential amplifiers using IC741.
3. Integrator and Differentiator using IC741.
4. Comparator and Instrumentation amplifier using IC741
5. Active lowpass, Highpass and bandpass filters using IC741.
6. Astable & Monostable multivibrators using op-amp
7. Schmitt Trigger using op-amp.
8. Phase shift and Wien bridge oscillators using op-amp.
10. Study of PLL 565 characteristics and its use as Frequency Multiplier.
12. Simulation of Experiments 4, 5, 6, 7 and 8 using PSpice
13. Mini Project

TOTAL: 45 PERIODS

13HS451: PRESENTATION SKILLS LAB L T P C 0 0 2 1

Course Objectives:
- To hone the students' proficiency in speaking skills
- To enhance their pronouncing skills
- To help the students acquire presentation skills
- To enable the students communicate effectively

Course Outcomes:
- The students of Engineering and Technology will be able to recognize phonemes
- The students’ pronunciation will be improved
- All strategies of presentation skills will be acquired
- Interpersonal skills will be developed

Phonetic Practice

English phonemes: Vowels, Diphthongs, Consonants - Word Stress, phoneme recognizing practice

Listening Comprehension

Documentaries, Educational video clips, Oration of Great leaders, Radio & TV news, Listening to conversations, Telephone etiquette

Language Functions

Giving reasons, talking about future plans, Reporting, Comparing & Contrasting, persuasion and dissuasion, Negotiation, Making suggestions
Presentation Skills

Kinesics, slides preparation, Presentation techniques, Language Etiquette and Power dressing.

Sample topics for Presentation:
1. Space travel
2. Cloud computing
3. Biometric system
4. Touch screen technology
5. Green computing
6. Global positioning system
7. Wi-fi technology
8. Android
9. Cloning
10. Brake system
11. Bluetooth technology
12. Technology for security
13. Automated transport
14. Bio products
15. Natural calamities
16. Waste management
17. Applications of fibre optics
18. Nano mania
19. Technology in Education
20. Blogging
21. Technology in agriculture

TOTAL: 25 PERIODS

Reference Books


13EC501 : COMMUNICATION THEORY  

Course Objectives:

- To gain knowledge of analog modulation and demodulation systems.
- To evaluate the performance of analog modulated signals in presence of noise.
- To realize basic information theory with channel coding theorem

Course Outcomes:

At the end of this course students will be able to

- Compare and contrast the strengths and weaknesses of various communication systems.
- Analyze the behavior of analog systems in the presence of noise.
- Apply Shannon’s Source Coding and Channel Capacity theorems to compare the tradeoffs between using digital and analog methods for communicating information.

UNIT I  
AMPLITUDE MODULATION SYSTEMS  

Review of Spectral Characteristics of Periodic and Non-periodic signals; Need for modulation - Generation and Demodulation of AM, DSBSC, SSB and VSB Signals - Spectrum, Power relations, Comparison of various Amplitude Modulation Systems - Frequency Translation - FDM.
UNIT II   ANGLE MODULATION SYSTEMS  8

UNIT III  NOISE THEORY  8

UNIT IV  PERFORMANCE OF CW MODULATION SYSTEMS  10

UNIT V  INFORMATION THEORY & SOURCE CODING  9
TECHNIQUES

Tutorial : 15 Periods     TOTAL: 60 Periods

TEXTBOOKS:

REFERENCE BOOKS:


WEB REFERENCE:


13EC502 : ANTENNA AND WAVE PROPAGATION L T P C

3 0 0 3

Course Objectives:

- To analyze the antenna characteristics and working principles of various types of antenna.
- To be aware of various techniques involved in various antenna parameter measurements.
- To appreciate the radio wave propagation in the atmosphere

Course Outcomes:

At the end of this course students will be able to

- Distinguish the properties and parameters of antenna such as radiation pattern, radiation impedance, directivity, antenna gain, effective area
- Apply various numerical techniques for analysis of different antennas
- Analyze and Measure the radiation parameters
- Design array antenna systems from specifications.
- Identify the mechanism of the atmospheric effects on radio wave propagation

UNIT I ELECTROMAGNETIC RADIATION AND ANTENNA FUNDAMENTALS

Review of electromagnetic theory- Vector potential- Solution of wave equation- retarded vector and scalar potential- Hertzian dipole- Antenna
characteristics- Radiation pattern, Beam solid angle, Directivity, Gain, Input impedance, Polarization, Beam width, Bandwidth, Reciprocity - Equivalence of Radiation patterns, Equivalence of Impedances, Effective aperture - Effective length - Antenna temperature.

UNIT II  WIRE ANTENNAS AND ANTENNA ARRAYS


UNIT III  APERTURE ANTENNAS


UNIT IV  SPECIAL ANTENNAS AND ANTENNA MEASUREMENTS


UNIT V  RADIO WAVE PROPAGATION


TOTAL: 45 Periods
TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCES:
1. http://www.authorstream.com/Presentation/Ani_Kate-508171-wave-propagation/
2. http://classes.soe.ucsc.edu/cmpe123a/Fall07/doc/AntBrief123A12-6-07.ppt
3. http://muse.widener.edu/~rpj0001/courses/ENGR647/ClassNotes/LECT04.ppt

13EC503 : DIGITAL SIGNAL PROCESSING L T P C
3 0 0 3

Course Objectives:
- To introduce various design techniques for digital filters
- To be aware of the finite word length effects in signal processing
- To gain insight of the architectural features of digital signal processors TMS 320C50
Course Outcomes:
At the end of this course students will be able to
- Design different types of filters
- Analyze the finite word length effects in signal processing
- Write programmes in DSP processor TMS 320C50

UNIT I INFINITE IMPULSE RESPONSE DIGITAL FILTERS 9

UNIT II FINITE IMPULSE RESPONSE DIGITAL FILTERS 9

UNIT III FINITE WORD LENGTH EFFECTS 9
Fixed point and floating point number representations – Comparison – Truncation and Rounding errors - Quantization noise – derivation for quantization noise power – coefficient quantization error – Product quantization error - Overflow error – Round off noise power - limit cycle oscillations due to product round off and overflow errors – signal scaling

UNIT IV MULTIRATE SIGNAL PROCESSING 9
Decimation by a factor D – Interpolation by a factor I – Filter Design and implementation for sampling rate conversion: Direct form FIR filter structures – Polyphase filter structure.

UNIT V DIGITAL SIGNAL PROCESSORS 9
DSP architecture – Harvard architecture - Dedicated MAC unit - Multiple ALUs, Advanced addressing modes, Pipelining, Overview of instruction set of TMS320C50

TOTAL: 45 Periods
TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCES:

13EE506 : CONTROL SYSTEMS L T P C
3 1 0 4

Course Objectives:
• To understand the open loop and closed loop (feedback) systems and their transfer function representation.
• To estimate the time domain and frequency domain specification of control systems and their stability analysis.
• To design the controller and compensator.
• To apply the state space analysis technique of control system.

Course Outcomes:

At the end of this course students will be able to

• Apply Mathematical modeling technique and representation of physical systems using transfer function approach.

• Estimate the Time domain specification of the systems with standard test signals and Design of P, PI, PID controllers to achieve the desired performance from the systems.

• Estimate the frequency domain specification using various plots and Design of Lag, Lead Compensators to achieve the desired performance from the systems.

• Analyze the stability of systems using various approaches and familiarize with the basics of State Space analysis of control system and Digital control systems.

UNIT I SYSTEM MODELLING AND REPRESENTATION

Open loop and closed loop systems - Elements of closed loop systems - Transfer function Modeling of physical systems - Mechanical systems - Translational and Rotational systems, Electrical networks and Analog circuits - Block diagram – Signal flow graph - Mason's gain formula. Transfer function of DC generator - DC servomotor.

UNIT II TIME DOMAIN RESPONSE AND ANALYSIS


UNIT III FREQUENCY DOMAIN RESPONSE AND ANALYSIS

Frequency domain specifications - peak resonance, resonant frequency, bandwidth and cut-off rate - Estimation for second order systems - correlation between time and frequency response for second order systems. Polar plot, Bode plot – Gain Margin and Phase Margin, Lead, lag and Lead lag compensation using Bode Plot.
UNIT IV STABILITY ASSESSMENT


UNIT V STATE SPACE ANALYSIS

Introduction to state space analysis - Phase variable and canonical forms - State transition matrix - Solutions to state space equation - Controllability and Observability of systems - State space representation for Discrete time systems - Sampled Data control systems – Effect of Sampling in controllability and observability.

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:

Course Objectives:

- To understand the organization and operation of a digital computer.
- To design algorithms for the Arithmetic Functions with Fixed and Floating Point Numbers
- To Create Control Units for the system in soft and hard programming.

Course Outcomes:

At the end of this course students will be able to

- Design algorithms required for efficient datapath and control design.
- Create an efficient memory and I/O organization.
- Write a program to control the system using hard and soft wires.

UNIT I COMPUTING ELEMENTS & DATA REPRESENTATION

Computing and Computers, System Design- Gate Level, Register Level, PLD Processor Level, Components AND Design -CPU Organization, Data Representation, Fixed – Point Numbers, Floating Point Numbers, Instruction Formats, Instruction Types, Addressing Modes.

UNIT II DATA PATH DESIGN

Fixed Point Arithmetic - Addition, Subtraction, Multiplication and Division- Combinational and Sequential ALUs- Carry look ahead adder, Robertson algorithm, booth’s algorithm, non-restoring division algorithm- FloatingPoint Arithmetic, Pipeline Processing, Pipeline Design, Modified booth’s Algorithm

UNIT III CONTROL DESIGN

Hardwired Control – Classical Method, One-hot method – Encoding Methods, Microprogrammed Control, Multiplier Control Unit, CPU Control Unit, Pipeline Control, Instruction Pipelines, Pipeline
Performance, Superscalar Processing, Nano Programming.

**UNIT IV MEMORY & I/O ORGANIZATION**

Multilevel memories, Cache & Virtual Memory, Memory Allocation, Direct Associative Mapping, Set Associative mapping.


**UNIT V SYSTEM SOFTWARE**


**TOTAL:** 45 Periods

**TEXTBOOKS:**


**REFERENCE BOOKS:**


WEB REFERENCES:

13EC505 : EMBEDDED PROCESSORS AND APPLICATIONS

Course Objectives:
- To gain knowledge in 8051 and PIC architecture and Programming
- To develop advanced skills in the ARM Processor architecture and Programming
- To develop DSP applications using ARM Processor

Course Outcomes:
At the end of this course students will be able to
- Apply 8051 and PIC microcontroller in Embedded domain
- Develop ARM based DSP Applications
- Design ARM based and 8051 based Embedded Systems

UNIT I 8051 MICROCONTROLLER
Introduction to Micro-controller, Architecture, Memory organization, Special Function Registers, Port Operation, Memory Interfacing, I/O Interfacing, Programming 8051 resources, interrupts, Programmer’s model of 8051, Operand types, Operand addressing, Instruction Set, Assembly Language Programming
UNIT II PIC MICROCONTROLLER


UNIT III EMBEDDED COMPUTING AND ARM PROGRAMMING

Embedded Systems - Complex systems and Microprocessors - Embedded system design process - ARM Processor- CPU Architecture – Design Philosophy -Systems Hardware - Systems Software - ARM processor families. ARM Instruction Set - The Thumb Instruction Set- Assembly Language Programming- Exception and Interrupt handling

UNIT IV ARM DSP

ARM Digital Signal Processing - Introduction to DSP on the ARM - FIR - IIR - OFT Exception and Interrupt Handling ARM Memory Managements Unit

UNIT V EMBEDDED APPLICATIONS DEVELOPMENT

Embedded programming in C - RTC (DS12887) based control, PWM based DC motor control, Embedded ARM Applications- GSM Chip – FOSS Tools for embedded system development. Open Source Hardware Platforms, Arduino Boards, Beagle Boards, OMAP based Boards

TOTAL: 45

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:


13EC551 : DIGITAL SIGNAL PROCESSING LAB L T P C
0 0 3 2

Course Objectives:

- To implement the IIR and FIR filter using MATLAB.
- To implement the signal processing techniques using the instructions of TMS320C5x.

Course Outcomes:

At the end of this course students will be able to

- Apply the different tool boxes in MATLAB into matlab programming for Signal processing applications
- Implement signal processing algorithm in DSP processors

List of Experiments:

USING MATLAB

1. Generation of Signals
2. Linear and circular convolution of two sequences
3. Sampling, effect of aliasing and multirate signal processing
4. Design of FIR filters
5. Design of IIR filters
6. Calculation of FFT of a signal

**USING TMS320C5X**

7. Study of various addressing modes of DSP using simple programming examples
8. Sampling of input signal and display
9. Implementation of FIR filter
10. Calculation of FFT

Mini project

**TOTAL: 45 PERIODS**

---

**13EC552 : MICROPROCESSORS AND EMBEDDED LAB**

**L T P C**

0 0 3 2

**Course Objectives:**

- To develop advanced skills using 8086 microprocessor and to program it for various control applications
- To develop Embedded C programming skills using 8051 Microcontroller for various embedded applications
- To develop necessary skills using ARM Processor for various embedded applications

**Course Outcomes:**

At the end of this course students will be able to

- Design 8086 microprocessor based systems
- Gain Expertise in Embedded C programming
- Use 8051microcontroller for various Embedded Applications
- Use ARM Processor for various Embedded Applications
List of Experiments:

1. 16 bit Addition, Subtraction, Multiplication and Division (8085 & 8086)
2. Program for Sorting and Searching (8086)
3. Interfacing ADC and DAC ICs (8086)
4. Communication between two μP kits using 8255 (8086)
5. Interfacing Keyboard/Display Controller (8279) (8086)
6. Interfacing Programmable Interrupt Controller (8259) (8086)
7. Interfacing Programmable Interval Timer (8253) (8086)
8. Interfacing stepper motor and DC motor (8086)
9. Arithmetic expressions and Code conversion (8051) (Assembly/Embedded C)
10. Programming and verifying timer / UART / Interrupts (8051) (Assembly/Embedded C)
11. Interfacing LCD and Matrix Keyboard using 8051 (Embedded C)
12. Interfacing LED / LCD 7 Segment display devices using ARM Processor (Assembly/Embedded C)
13. Mini Project

TOTAL: 45 PERIODS

13HS551 : PROFESSIONAL COMMUNICATION SKILLS LAB

Course Objectives:

- To enable the students of engineering and technology attain effective professional communication skills
- To train the aspirants to get through interviews successfully
- To make them successful corporates
- To upgrade the language proficiency level of engineering students
Course Outcomes:
At the end of this course students will be able to
- Attain effective communication skills
- Enhance their business communication
- Acquire language proficiency
- Face interviews effectively

Vocabulary Building 5
Synonyms & antonyms, grammar: error spotting exercise, listening exercise, reading comprehension exercises, sequencing the jumbled sentences, cloze test

Speech Practice 5
Introducing all phonemes, consonants, vowels, diphthongs, stress pattern, sound recognition exercises

Business Correspondence 10
Nuances of effective presentation, corporate etiquette, body language, team skills, power dressing, writing memos, notice, agenda, circular, itinerary, ESP (speeches on special occasions: master of ceremony, welcome address etc.)

Interview Skills 10
Group Discussion, persuasive skills, negotiating skills, successful interview skills, resume designing, mock interviews, E-mail etiquette, drafting E-mail

TOTAL: 30 PERIODS

REFERENCE BOOKS

13EC601: DIGITAL COMMUNICATION

Course Objectives:

- To get acquainted with the process of sampling, quantization and coding.
- To understand baseband and band pass signal transmission and reception techniques.
- To learn various spread spectrum techniques.

Course Outcomes:

At the end of this course students will be able to

- Compare and contrast of different waveform coding Techniques
- Apply Digital communication technologies in a variety of engineering applications
- Implement Error control coding and Digital modulation techniques in MATLAB

UNIT I: SAMPLING AND WAVEFORM CODING

Sampling - Impulse sampling, Natural Sampling, Sampler Implementation - Quantisation - Uniform and Non-uniform - Encoding Techniques for Analog Sources - Temporal waveform encoding, Spectral waveform encoding, Model-based encoding - Comparison of speech encoding methods.

UNIT II: BANDLIMITED SIGNALLING

Power Spectra of PAM signals - Inter symbol Interference - ideal Nyquist channel - raised cosine channels - correlative coding and precoding - eye patterns and equalization techniques.
UNIT III DIGITAL MODULATION TECHNIQUES


UNIT IV CHANNEL CODING

Error control coding – Rationale for coding and types of codes –Linear blockcodes – cyclic codes – convolutional codes – Maximum Likelihood Decoding of convolutional codes – Viterbi decoding

UNIT V SPREAD SPECTRUM SYSTEMS


TOTAL: 45 Periods

TEXTBOOK:


REFERENCE BOOKS:


WEB REFERENCES:

1. www.cs.duke.edu/courses/spring10/cps296.3/ecc4.ppt
Course Objectives:

- To learn basic fundamentals parameters for mobile and wireless communication technologies and its applications
- To understand traffic theory
- To make the student familiar with the transceivers for wireless channels.

Course Outcomes:

At the end of this course students will be able to

- Characterize interference between mobiles and base stations that affect the capacity of cellular systems knowing the cellular radio concepts such as frequency reuse, handoff
- Identify the techno-political aspects of wireless and mobile communications such as the allocation of the limited wireless spectrum by government regulatory agencies.
- Describe how to measure and model the impact that signal bandwidth and motion have on the instantaneous received signal through the multipath channel understanding propagation effects such as fading, time delay spread, and Doppler spread
- Describe and evaluate receiver and transmitter diversity techniques

UNIT I SERVICES AND TECHNICAL CHALLENGES  9

Types of Services - Requirements for the services - Multipath propagation - Spectrum allocation for various types of services and Spectrum Limitations - Noise and Interference limited systems - Principles of Cellular networks - Multiple Access Schemes.
UNIT II TRAFFIC ENGINEERING AND WIRELESS CHANNELS

Trunked system Erlang B system - capacity calculation - Propagation Mechanisms (Qualitative treatment) - Propagation effects with mobile radio - Channel Classification - Link calculations - Narrowband and Wideband models.

UNIT III WIRELESS TRANSCEIVERS

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.

UNIT IV SIGNAL PROCESSING IN WIRELESS SYSTEMS

Principle of Diversity - Macrodiversity - Microdiversity - Signal Combining Techniques - Transmit diversity - Equalisers - Linear and Decision Feedback equalisers, Wireless Channel coding and Speech coding techniques

UNIT V ADVANCED TRANSCEIVER SCHEMES

Spread Spectrum Systems - Principle, Power control - Effects of multipath propagation on Code Division Multiple Access - Orthogonal Frequency Division Multiplexing – Principle, Cyclic Prefix, Transceiver implementation - Second Generation(GSM, IS–95) and Third Generation Wireless Networks and Standards

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

2. http://webmail.aast.edu/~khedr/Courses/Graduate/Wireless%20Communications_F08/Lecture%20four%20channel%20II.pdf

13EC603 : OPTICAL COMMUNICATION AND NETWORKS

Course Objectives:

- To determine optical fiber transmission link, fiber modes Configurations and structures.
- To calculate different kinds of losses, signal distortion in optical wave guides
- To analyze optical network architectures.

Course Outcomes:

At the end of this course students will be able to

- Evaluate different kind of losses and other signal degradation factors.
- Analyze the various optical source materials and LED structures
- Analyze fiber connectors and WDM connections.
UNIT I  OPTICS AND OPTICAL FIBERS


UNIT II  TRANSMISSION CHARACTERISTICS OF OPTICAL FIBERS


UNIT III  OPTICAL SOURCES AND DETECTORS


UNIT IV  FIBER OPTIC RECEIVER AND MEASUREMENTS


UNIT V  OPTICAL NETWORKS

Basic Networks - SONET / SDH - Broadcast and select WDM Networks - Wavelength Routed Networks - Non linear effects on Network performance - Performance of WDM + EDFA system - Solitons - Optical CDMA - Ultra High Capacity Networks, OTDR.

TOTAL: 45 Periods
TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCES:
1. en.wikipedia.org/wiki/Optical_communication
2. www.thefoa.org/tech/ref/basic/nets.html

13EC604 : TELECOMMUNICATION SWITCHING SYSTEMS    L T P C
                                      3 0 0 3

Course Objectives:
• To introduce switching systems applied with the telecommunication systems
• To derive mathematical models for the analysis of telecommunication traffic

Course Outcomes:
At the end of this course students will be able to
• Apply Traffic theory to understand the characteristics of the telephone systems
• Analyze the processes and performance of a digital telephone switching systems
• Perform network synchronization and network management

UNIT I EVOLUTION OF SWITCHING SYSTEMS 9

Four wire systems - digital transmission - Frequency division multiplexing - Time division multiplexing, message switching, circuit switching - packet switching - manual switching system – trunking - Strowger step by step system, Electronic switching, digital switching, control of switching systems

UNIT II DIGITAL SWITCHING 9

Switching Functions- Space Division Switching- Time Division Switching- two-dimensional Switching- STS Switching, TST Switching - No.4 ESS Toll Switch- Digital Cross-Connect Systems-Digital Switching in an Analog Environment- Elements of SS7 signaling.

UNIT III NETWORK SYNCHRONIZATION CONTROL AND MANAGEMENT 9


UNIT IV DIGITAL SUBSCRIBER ACCESS 9

UNIT V TRAFFIC ANALYSIS


TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

1. http://iete-elan.ac.in/SolnQPJun2013/AE64.pdf
2. http://www.netlab.tkk.fi/opetus/s38120/k02/LecturesEn/120L2-1e.pdf
Course Objectives:

- To analyze the delay models and interconnects in CMOS circuits
- To evaluate the characteristics of CMOS power and clock systems
- To analyze the CMOS data path design

Course Outcomes:

At the end of this course students will be able to

- Analyze the characteristics of CMOS transistor
- Design combinational and sequential circuits
- Analyze the methods to test the CMOS circuits
- Synthesize the combinational and sequential circuits using Verilog HDL

UNIT I  CMOS TECHNOLOGY

MOS transistor, Ideal I-V characteristics, C-V characteristics, Non ideal I-V effects, DC transfer characteristics - CMOS technologies, Layout design Rules-Stick Diagram-CMOS process enhancements- Design rule checking and circuit extraction.

UNIT II  CIRCUIT CHARACTERIZATION AND SIMULATION

Delay estimation- Logical effort and Transistor sizing- Power dissipation, Interconnect- Design margin- Reliability- Scaling- SPICE tutorial- Device models- Device characterization- Circuit characterization

UNIT III  COMBINATIONAL AND SEQUENTIAL CIRCUIT DESIGN

Circuit families –Low power logic design – comparison of circuit families – Sequencing static circuits, circuit design of latches and flip flops, Static sequencing element methodology – synchronizers – Introduction to VHDL
UNIT IV CMOS TESTING

Need for testing- Testers, Text fixtures and test programs- Logic verification- Silicon debug principles- Manufacturing test – Design for testability – Boundary scan test.

UNIT V SYSTEM DESIGN USING VERILOG HDL

Basic concepts- identifiers- gate primitives- gate delays- operators- timing controls- procedural assignments-conditional statements- Design of combinational and sequential circuits using Data flow- structural gate level- switch level modeling and Behavioral modeling-Test benches.

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

1. www.ustudy.in
2. www.rulabinsky.com
Course Objectives:

- To design various analog and digital communication systems
- To Implement Error control coding and Digital modulation techniques in MATLAB

Course Outcomes:

At the end of this course students will be able to

- Analyze analog and Digital communication systems
- Analyze the different Error control coding techniques used in Digital communication systems

List of Experiments:

1. Amplitude modulation and Demodulation
   i. Full AM using IC AD633 and demodulation using Envelope detector
   ii. DSB modulation using Ring modulator
2. Frequency Modulation and Demodulation
   i. Frequency Modulation using VCO IC and IC 8038
   ii. Frequency Demodulation using PLL
4. Pulse Amplitude Modulation and demodulation
5. Pulse Width Modulation and Pulse Position Modulation using LM555
6. Pulse code modulation
7. Delta Modulation
8. Time Division Multiplexing
10. Error Control Coding using hardware.
11. Digital Modulation & Demodulation - ASK, PSK, QPSK, FSK (Hardware & MATLAB)
12. Mini Project

TOTAL: 45 PERIODS
Course Objectives:

- To Synthesize and simulate the combinational and sequential circuits in Behavioral, Structural and Data flow Modeling.
- To Design and Simulate the DC and Transient Characteristics of Digital and Analog Circuits in transistor level.

Course Outcomes:

At the end of this course students will be able to

- Implement the combinational and sequential circuits in FPGA.
- Analyze the performance parameters of the digital circuit design.
- Analyze the characteristics of Current source, Current Mirrors and Differential Amplifier.
- Create and analyze the characteristics of Layout in Digital Circuits

List of Experiments:

1. Design Entry, simulation and synthesis of 8 bit adders and 4 bit multipliers.
2. Design Entry, simulation and synthesis address decoders, multiplexers, and comparators.
3. Design Entry, simulation and synthesis of Counters and Shift registers.
4. Design Entry, simulation and synthesis PRBS generators and accumulators.
5. Design of Memory module
6. Design, simulate and implement a 8bit Simple processor.
7. Design, simulate and implement IIR and FIR filters.
8. Schematic Entry and TANNER simulation of CMOS inverter, NAND, NOR and XOR gates and determine the Power.
9. Schematic Entry and TANNER simulation of MOS differential amplifier, Determination of gain, bandwidth, output impedance and CMRR.
10. Schematic Entry and TANNER simulation Current source and Current Mirror.
11. Layout of a simple CMOS inverter, parasitic extraction and simulation using lambda based design rules.
12. Mini Project

TOTAL: 45 PERIODS

13EC701 : ANALOG VLSI DESIGN  L T P C
                                           3 0 0 3

Course Objectives:

- To determine characteristics of MOS devices.
- To analyze operation of CMOS amplifiers
- To impart in-depth knowledge about ADCs and DACs.

Course Outcomes:

At the end of this course students will be able to

- Analyze the characteristics of MOS transistors
- Analyze the performance of Analog CMOS circuits.
- Design mixed-signal integrated circuits such as ADC and DACs

UNIT I  BASIC MOS DEVICES  9


UNIT II  CMOS AMPLIFIERS and BIASING CIRCUITS  9

UNIT III OPERATIONAL AMPLIFIER


UNIT IV COMPARATORS AND SWITCHED CAPACITOR CIRCUITS

Characterization of a Comparator -two-Stage Open-Loop Comparators - Improving the Performance of Open-Loop Comparators-Discrete-Time Comparators - High-Speed Comparators- Switched Capacitor Circuits - Switched Capacitor Amplifiers - Switched Capacitor Integrators

UNIT V A/D AND D/A CONVERTERS

Characterization of D/A converters- Parallel D/A converters-extending the resolution of parallel D/A converters-Serial D/A converters- Characterization of A/D converters-Serial A/D converters- Medium and high speed A/D converters

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:

WEB REFERENCES:
1. www.analog.com
2. www.vlsi-india.org

13EC702: RF AND MICROWAVE ENGINEERING     L T P C
                                                 3 0 0 3

Course Objectives:
- To analyze multi-port RF networks and RF transistor amplifiers.
- To acquire knowledge on passive microwave components and their S-Parameters.
- To be aware of working of Microwave semiconductor devices.

Course Outcomes:
At the end of this course students will be able to
- Design active and passive microwave components.
- Utilize Smith Chart to perform impedance matching in advanced microwave/RF system.
- Perform measurements using VNA.

UNIT I   TWO PORT RF NETWORKS-CIRCUIT REPRESENTATION

Importance of Radio frequency design, Frequency Spectrum, RF behavior of passive components - wire, resistor, capacitor and inductor, chip components and circuit board considerations - Scattering matrix - Concept of N port scattering matrix representation - S matrix formulation of two-port junction - Properties of S parameters- Reciprocal and lossless networks, transmission matrix, applications of RF.

UNIT II   RF TRANSISTOR AMPLIFIER DESIGN AND MATCHING NETWORKS

Amplifier power relation - stability considerations, gain considerations, noise figure, impedance matching networks, frequency response - T and \( \pi \) matching networks - microstripline matching networks
UNIT III  MICROWAVE PASSIVE COMPONENTS

Microwave frequency range - significance of microwave frequency range - important properties & applications of microwaves. Microwave junctions -Tee junctions -Magic Tee - Rat race - Corners - bends and twists - Directional couplers - two hole directional couplers- Ferrites - Termination - Gyrator- Isolator - Circulator - Attenuator - Phase changer – S Matrix for microwave components – Cylindrical cavity resonators. Filter design by insertion loss method-Butterworth and Chebyshev Filters.

UNIT IV  MICROWAVE SEMICONDUCTOR DEVICES


UNIT V  MICROWAVE TUBES AND MEASUREMENTS

Microwave tubes- High frequency limitations - Principle of operation of Multicavity Klystron, Reflex Klystron, Traveling Wave Tube, Magnetron. Microwave measurements– power, wavelength, impedance, SWR, attenuation, Q and Phase shift.

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:

13EC703 : SATELLITE COMMUNICATION SYSTEMS

Course Objectives:

- To Determine look angle of earth station antenna.
- To calculate sub satellite point.
- To analyze subsystem configuration

Course Outcomes:

At the end of this course students will be able to

- Apply Kepler's laws to satellite orbital paths
- Create a link-budget for satellite communication
- Analyze subsystem configuration
- Evaluate the performance of satellite access systems

UNIT I  SATELLITE ORBITS


UNIT II  SPACE SEGMENT AND SATELLITE LINK DESIGN

Spacecraft Technology- Structure, Primary power, Attitude and Orbit control, Thermal control and Propulsion, communication Payload and supporting subsystems - Telemetry, Tracking and command - Satellite uplink and downlink Analysis and Design - link budget, E/N calculation-
performance impairments - system noise, inter modulation and interference - Propagation Characteristics and Frequency considerations - System reliability and design lifetime.

UNIT III  SATELLITE ACCESS  9


UNIT IV  EARTH SEGMENT  9

Earth Station Technology - Terrestrial Interface, Transmitter and Receiver - Antenna Systems TVRO, MATV, CATV, Test Equipment Measurements on G/T, C/No, EIRP, Antenna Gain.

UNIT V  SATELLITE APPLICATIONS  9

INTELSAT Series, INSAT, VSAT, Mobile satellite services: GSM, GPS, INMARSAT, LEO, MEO - Satellite Navigational System - Direct Broadcast satellites (DBS)- Direct to home Broadcast (DTH), Digital audio broadcast (DAB), Specialized services: Remote sensing

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:
2. en.wikipedia.org/wiki/Satellite

13EC704 : COMPUTER COMMUNICATION NETWORKS

Course Objectives:
- To understand the fundamental concepts of computer networking.
- To Enumerate the layers of the OSI and TCP/IP model and explain the functions of each layer.
- To gain expertise in some specific areas of networking such as design and maintenance of individual networks.

Course Outcomes:
At the end of this course students will be able to
- Exploit modularity of the layering concept in OSI and TCP / IP models and encapsulation
- Employ multiple access mechanisms and connecting devices as per requirement
- Recognize the need for supporting protocols to assist IP
- Identify the causes and effects of congestion and suggest control measures
- Apply Cryptographic services and mechanisms for network security
UNIT I  PHYSICAL LAYER

Data Communications - Networks - Networks models - OSI model - Layers in OSI model - TCP / IP protocol suite - Addressing - Guided and Unguided Transmission media - Switching: Circuit switched networks - Data gram Networks - Virtual circuit networks Cable networks for Data transmission: Dialup modems - DSL - Cable TV - Cable TV for Data transfer.

UNIT II  DATA LINK LAYER


UNIT III  NETWORK LAYER


UNIT IV  TRANSPORT LAYER


UNIT V  APPLICATION LAYER


TOTAL: 45 Periods
TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:


13EC751: OPTICAL & MICROWAVE LAB L T P C
0 0 3 2

Course Objectives:

• To develop skill on using various microwave passive components and active devices.

• To apply semiconductor theory to understand characteristics of photo diode and LED.

• To compare analog and digital optical link along with losses associated on them.
Course Outcomes:
At the end of this course students will be able to
- Design RF circuit using passive microwave components for given specifications.
- Design and test optical link with minimum loss.
- Perform microwave measurements

List of Experiments:

MICROWAVE EXPERIMENTS:
1. Mode characteristics of Reflex Klystron.
2. Characteristics of Gunn Diode.
3. VSWR, Frequency and Wave Length Measurement of microwave signal within waveguide.
5. S-parameter measurement of Isolator and Circulator.
7. Antenna Gain Measurement

OPTICAL EXPERIMENTS:
8. DC characteristics of LED and PIN Photo Diode.
10. Study of Fiber Optic Analog and Digital Link.
11. Numerical Aperture Determination for Fibers
12. Attenuation Measurement in Fibers

Mini Project

TOTAL: 45 PERIODS
Course Objectives:

- To simulate different protocols belonging to different layers using LAN Trainers.
- To conduct experiments on different topologies, ARQ schemes, medium access mechanisms and encryption techniques.
- To configure gateways to connect different sub networks / networks.

Course Outcomes:

At the end of this course students will be able to

- Demonstrate and visualize the protocols of physical, datalink, network and transport layer using Tetcos Trainer.
- Analyze the effect of parameters like inter packet delay, window size, packet size, time out, token holding time in MAC and LLC protocols using Benchmark Trainer.
- Build a network application using socket programming concepts, practice subnetting, simulate routing protocols and apply encryption and decryption.

List of Experiments:

1. Serial and Parallel Communication between PCs.
5. Simulation and Analysis of TOKEN RING Protocol.
6. Wireless LAN protocols - To create scenario and study the performance of network with CSMA / CA protocol and compare with CSMA/CD protocols.
8. Implementation of Distance Vector routing algorithm.
10. Implementation of Data encryption and decryption.
11. Transfer of files from PC to PC using Windows / Unix socket processing.
12. Subnetting and Configuring a Gateway
13. Mini Project

TOTAL: 45 PERIODS

13EC753 : COMPREHENSIVE SKILL DEVELOPMENT

COURSE OBJECTIVES:

- To learn strategies for improving comprehension and study habits.
- To develop reading skills by familiarizing with different types of reading strategies.
- To communicate effectively by reflecting one’s own reading process through writing.
- To equip students with writing skills needed for academic as well as workplace contexts.
- To know the importance of interview process.

COURSE OUTCOMES:

At the end of this course students will be able to

- Do fluent reading and writing.
- Read different genres of texts, infer implied meanings and critically analyze and evaluate them for ideas as well as for method of presentation.
- Listen / view and comprehend different spoken excerpts critically and infer unspoken and implied meanings.
- List questions to ask themselves after the interview to evaluate their success and identify areas in which they can improve.
Have a thorough knowledge about interview process.

UNIT I  READING AND WRITING COMPREHENSION  10

Verbal Ability - Getting the main idea, identifying fact and opinion, making inference, comparing and contrasting, sequencing and drawing conclusions - Speed Reading - Logical Reasoning - Verbal Reasoning - Non Verbal Reasoning - Writing formal letters, quotations, clarification, complaint – Letter seeking permission for Industrial visits– job application with CV designing - Writing analytical paragraphs on different debatable issues - E-mail etiquette, drafting E-mail.

UNIT II  GENERAL APTITUDE AND PROGRAMMING  10

Analytical ability - Arithmetic Aptitude - Data Interpretation - C Programming - Data structures and Object Oriented Programming in C++.

UNIT III  GENERAL PLACEMENT SKILLS  10


TOTAL: 30 PERIODS

REFERENCE BOOKS:


WEB LINKS:

3. www.aptitude-test.com/
4. www.pskills.org/
6. www.techgig.com/
Course Objectives:

- To interpret the methods of recording various bio potentials and measure biochemical and various physiological information.
- To recognize the working of Cardiac care units and the use of radiation for diagnosis and therapy.
- To identify the the working of different physiological assist devices and the need and technique of electrical safety in Hospitals.

Course Outcomes:

At the end of this course students will be able to

- Evaluate the methods of recording various biopotentials and measurement of Biochemical and various physiological information.
- Illustrate the working of Cardiac care units and different physiological assist devices.
- Realize the recent trends in Medical Instrumentation and the techniques used for electrical safety in Hospitals.

UNIT I ELECTRO-PHYSIOLOGY AND BIO-POTENTIAL RECORDING

Bio-potentials - Biopotential electrodes- Biological amplifiers - ECG, EEG, EMG, PCG, EOG, lead systems and recording methods, typical waveforms and signal characteristics.

UNIT II BIO-CHEMICAL AND NON ELECTRICAL PARAMETER MEASUREMENT

Colorimeter, Photometer, Auto analyzer, Blood Flow meter, Cardiac Output Measurement, Respiratory Measurement, Blood Pressure,
Temperature Measurement and Blood Cell Counters.

UNIT III RADIOLOGICAL EQUIPMENTS AND ASSIST DEVICES


UNIT IV CARDIAC CARE UNITS AND TELEMETRY


UNIT V RECENT TRENDS IN MEDICAL INSTRUMENTATION

Principles and application of Thermograph-Endoscopy Unit-Laser in Medicine - Diathermy Units - MRI and CT Scans -4D Doppler Scans - Electrical Safety in Medical Equipment.

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:

3. Webster J.G, “Medical Instrumentation application and design”, John
WEB REFERENCES:

1. www.biomed.engr.sc.edu/bme_lab/.../29)%20BioPotential%20Basics.pdf
2. www.egr.msu.edu/classes/ece445/mason/Files/7-BioAmps.pdf
4. www.pierce.ctc.edu/staff/.../lecture_notes/Lecture%202021%20notes.htm
5. www.winthropendoscopy.org/
6. www.biomedikal.in/2010/04/lecture-notes-on-medical-electronics

13EC903 : MEASUREMENTS AND INSTRUMENTATION

Course Objectives:

- To understand the fundamental concepts of electronic measurements.
- To elucidate signal generators and signal analyzers in measurements.
- To explore the significance of digital instruments in measurements.
- To discover the need for data acquisition systems and measurement techniques in optical domains.
Course Outcomes:
At the end of this course students will be able to
- Apply measurements concepts to instruments design
- Analyze the analog and digital instruments to select appropriate instrument for the measurement requirements.
- Select the required signal generators and Analyzers for the design of the Measurement Process and maintenance of equipments.
- Construct an automated data acquisition system for computer controlled measurement in modern wire and wireless domain.

UNIT I  BASIC MEASUREMENT CONCEPTS  9

UNIT II  BASIC ELECTRONIC MEASUREMENTS  9

UNIT III  SIGNAL GENERATORS AND ANALYZERS  9

UNIT IV  DIGITAL INSTRUMENTS  9

UNIT V  DATA ACQUISITION SYSTEMS AND FIBER OPTIC MEASUREMENTS  9
and System Loss – Optical Time Domains Reflectometer.

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCE:

13EC904 : MULTICORE PROGRAMMING      L T P C
                                           3 0 0 3

Course Objectives:
- To develop the skills in writing code for the multi-core architectures
- To acquire essential knowledge about Open MP and parallel programming
- To apply skills of using efficient Message Passing algorithms in parallel processing
- To develop software for these multi-core architectures
Course Outcomes:

At the end of this course students will be able to

- Write an efficient parallel algorithm to solve problems related to Multicore architectures
- Implement Parallel Programming using Open MP
- Develop Message Passing algorithms and implement using MPI Programming
- Develop efficient software for these multi-core architectures

UNIT I  MULTIPROCESSORS AND SCALABILITY

ISSUES


UNIT II  PARALLEL PROGRAMMING

Fundamental concepts - Shared Memory Parallelism - Distributed Memory Parallelism - Designing for threads - Functional Decomposition - Scheduling - Threading and parallel programming constructs - Synchronization - Critical sections – Deadlock. Threading APIs.

UNIT III  OPEN MP PROGRAMMING

Open MP - Threading a loop - Thread overheads - Performance issues - Library functions. Solutions to parallel programming problems - Data races, deadlocks and livelocks - Non-blocking algorithms - Memory and Cache Related Issues.

UNIT IV  MPI PROGRAMMING

MPI Model - Collective Communication - Data Decomposition - Communicators and Topologies - Point-to-Point Communication – MPI Library - MPI Message Passing Routine Arguments - Blocking Message
UNIT V MULTITHREADEDAPPLICATION DEVELOPMENT


TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCES:

13EC905 : INTERNET AND JAVA

L T P C
3 0 0 3

Course Objectives:

• To develop the ability to be expertise in core Java Programming
To acquire essential skills in event handling in Java
To make use of Java for developing Networking application
To acquire essential skills in the concepts of WWW, HTML and XML.

Course Outcomes:

At the end of this course students will be able to
- Develop Core Java Programs using JDK
- Write applets and swing for event handling in Java.
- Develop Java codes for Network applications
- Develop Interactive web pages using HTML and XML

UNIT I  INTRODUCTION TO JAVA

The Java programming environment- JDK, Netbeans IDE, Fundamental Programming structures, Objects and Classes, Inheritance, Interfaces and Implementations, Exceptions and Debugging, Multithreading.

UNIT II  EVENT-DRIVEN PROGRAMMING USING JAVA

Applet Programming – Components, Basics of event handling, AWT event hierarchy. Introduction to Java Swing – Model-View-Controller, Swing Components, Buttons, Layout Management, Menu & Tool Bars

UNIT III  NETWORK PROGRAMMING IN JAVA

Networking with Java – URL classes, UDP datagrams, Sockets Programming – Transfer of Data from and to the server – configuring the connection, Telnet application, Java Message services – Remote Method Invocation.

UNIT IV  ADVANCED JAVA PROGRAMMING

Java and XML, Creating Packages, JAR files, Annotations, JavaBeans, JDBC - Databases Applications using JDBC
UNIT V    WORLD WIDE WEB

HTTP Protocol, Web browsers, Web site and Web page design, Introduction to Silver light, HTML, Dynamic HTML - CSS, Java Script; CGI Script, PHP

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCE:
Course Objectives:

- To develop the skills for working in Real Time Systems
- To acquire essential skills about various real time models
- To develop skills in working of μC/OS-II RTOS
- To apply concepts of RTOS to real life problems

Course Outcomes:

At the end of this course students will be able to

- Schedule tasks in real time models using RTOS
- Perform inter task communication in μC/OS-II RTOS
- Perform time and memory management using μC/OS-II RTOS
- Develop various RTOS based applications

UNIT I REAL TIME SYSTEMS

Issues in real time computing - Structure of a real time system - Task classes - Performance measures for real time systems - estimating program run times - Task assignment and scheduling - Classical uniprocessor scheduling algorithms - Uniprocessor scheduling of IRIS tasks - Task assignment - Mode changes - Fault tolerant scheduling

UNIT II REAL TIME MODELS

UNIT III  RTOS CONCEPTS
Foreground/Background process - Resources - Tasks - Multitasking - Priorities - Schedulers -Kernel - Exclusion - Intertask communication - Interrupts - Clock ticks - µC/OS- II Kernel structure -µC/OS- II Initialisation Starting µC/OS- II.

UNIT IV  RTOS FUNCTIONS
Task Management - Time management - Semaphore management - Mutual exclusion - Event Management – Message management - Memory management – Porting µC/OS- II.

UNIT V  RTOS APPLICATIONS

TOTAL: 45 Periods

REFERENCE BOOKS:

WEB REFERENCES:
1. http://micrium.com/rtos/ucosii/overview/
Course Objectives:

- To become acquainted with important topics in computational electromagnetics, including finite difference, finite element, and integral equation methods.
- To formulate and solve practical engineering problems in electromagnetics using the numerical methods presented.

Course Outcomes:

At the end of this course students will be able to

- Apply the numerical methods for various EM problems and program for the same
- Determine and explain different numerical method's trade-offs.

UNIT I  SOLVING EM PROBLEMS USING NUMERICAL METHODS


UNIT II  VARIATIONAL METHODS


UNIT III  FINITE DIFFERENCE METHODS

Finite Differencing of Parabolic PDEs, Hyperbolic PDEs and Elliptic PDEs, Accuracy and Stability of FD Solutions, Practical Applications

UNIT IV MOMENT METHODS 9
Integral Equations, Connection Between Differential and Integral Equations, Greens Functions - For Free Space, For Domain with Conducting Boundaries, Applications- Scattering Problems - Scattering by Conducting Cylinder, Scattering by an Arbitrary Array of Parallel Wires, EM Absorption in the Human Body.

UNIT V FINITE ELEMENT METHOD 9
Typical finite elements, Solution of Laplace's Equation, Solution of Poissons Equation, Solution of Wave Equation, Automatic Mesh Generation - Rectangular Domains, Arbitrary Domains- Definition of Blocks, Subdivision of Each Block, Connection of Individual Blocks, Higher Order Elements- Pascal Triangle, Local Coordinates, Shape Functions, Fundamental Matrices.

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:
2. David B. Davidson, “Computational Electromagnetics for RF and

WEB REFERENCE:
http://matematicas.uc3m.es/dpto-docs/colloquiumcarlosiii.pdf

13EC908 : ARTIFICIAL INTELLIGENCE AND ROBOTICS

Course Objectives:
- To acquire essential skills in using Robot anatomy for various operations
- To develop the ability to make use of end effectors, sensors, vision systems, kinematics of Robots
- To develop application in Artificial Intelligence and programming of Robots

Course Outcomes:
At the end of this course students will be able to
- Control Robot links and joints
- Integrate Robotic vision and gripping in its control
- Analyze using Translational Transformation
- Program Robots and make its application in Artificial Intelligence

UNIT I ARTIFICIAL INTELLIGENCE ALGORITHMS
Introduction to Artificial Intelligence - Search strategies, Graph based search, Heuristic search, Rule based problem solving - Logic and
inference - Probabilistic reasoning - Knowledge Representation – Learning

**UNIT II  ARTIFICIAL INTELLIGENCE IN ROBOTICS  9**
Probability Thoery - Monte-Carlo localization - Gaussians and continuous probability - Tracking with Kalman filters - Planning and search – Computer vision in robotics - Robot Path Planning - Controls

**UNIT III  TRANSFORMATIONS AND KINEMATICS  9**

**UNIT IV  ROBOT SENSORS AND ACTUATORS  9**

**UNIT V  ROBOT PROGRAMMING  9**

**TOTAL: 45 Periods**

**TEXT BOOKS:**


REFERENCE BOOKS:

WEB REFERENCES:
1. http://www.galileo.org/robotics/

13EC909 : HIGH SPEED NETWORKS L T P C
3 0 0 3

Course Objectives:

- To provide with an up-to-date survey of developments in High Speed Networks.
- To be aware of techniques involved to support real-time traffic and congestion control.
- To provide with different levels of quality of service (QoS) to different applications.
Course Outcomes:
At the end of this course students will be able to

- Analyze queuing models and do queuing analysis
- Realize the inadequacy of conventional congestion control schemes in high speed architectures
- Differentiate the architecture of Integrated and Differentiated Services
- Describe the protocols for QoS support

UNIT I    HIGH DATA RATE ARCHITECTURES
The Need for Speed and Quality of Service in computer Networks, Frame Relay Networks – Asynchronous transfer mode – ATM Protocol Architecture, ATM logical Connection, ATM Cell – ATM Service Categories – AAL, High Speed LANs: The Fast Ethernet, Emergence of High-Speed LANs ,Gigabit Ethernet, Fiber Channel – Wireless LANs: applications, requirements – Architecture of 802.11a,b,g&n

UNIT II    CONGESTION AND TRAFFIC MANAGEMENT

UNIT III   TCP AND ATM CONGESTION CONTROL

UNIT IV    INTEGRATED AND DIFFERENTIATED

SERVICES

UNIT V PROTOCOLS FOR QoS SUPPORT

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCES:
2. http://web.iiit.ac.in/~bezawada/CN/
13EC910 : SOFT COMPUTING  L T P C
3 0 0 3

Course Objectives:

- To determine the deviation between target and output in neural networks.
- To calculate fuzzy memberships.
- To determine fuzzy inferences.
- To model the neuro fuzzy system.

Course Outcomes:

At the end of this course students will be able to

- Analyze Artificial Neural networks for unsupervised learning.
- Create fuzzy reasoning.
- Apply Optimization techniques in solving highly complex problems
- Apply neuro fuzzy modeling for solving real world problems.

UNIT I  NEURAL NETWORKS  9


UNIT II  FUZZY SET THEORY  10


UNIT III  NEURO FUZZY MODELING  9

UNIT IV OPTIMIZATION TECHNIQUES


UNIT V APPLICATIONS OF NEURAL NETWORKS AND FUZZY LOGIC


TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:

3. S. Rajasekaran and G.A.V.Pai, “Neural Networks, Fuzzy Logic and

WEB REFERENCE:
1. www.slideshare.net/ankush281290/introduction-to-soft-computing

13EC911 : PARALLEL AND DISTRIBUTED PROCESSING

Course Objectives:
- To provide students with contemporary knowledge in parallel and distributed computing;
- To equip students with skills to design and analyze parallel and distributed Applications
- To equip students with Debugging techniques of a parallel program

Course Outcomes:
At the end of this course students will be able to
- Analyse parallel and distributed architectures and their functions
- Apply parallel and distributed algorithms in problem solving
- Apply parallel and distributed programs skills to measure the performance.

UNIT I  INTRODUCTION TO PARALLEL PROCESSING AND PARALLEL ARCHITECTURES

Need and definition of parallel processing - shared memory multiprocessing - Distributed memory - using parallelism - tools and languages - Parallelism in sequential machines - Multiprocessor architecture – Pipelining - Array processors.
UNIT II SHARED MEMORY PROGRAMMING AND THREAD BASED IMPLEMENTATION

Shared Memory Programming and its general model - Process model under UNIX - Thread management - Example with threads - Attributes of Threads - Mutual Exclusion with threads and Thread implementation.

UNIT III DEBUGGING PARALLEL PROGRAMS AND OTHER PARALLELISM PARADIGMS

Debugging Techniques - Debugging Message passing parallel programs and shared memory parallel programs – Dataflow computing - systolic architectures - functional and logic paradigms - distributed shared memory.

UNIT IV DISTRIBUTED COMPUTING – MESSAGE PASSING AND RPC MODEL

Message-passing model - General model - programming model - Parallel Virtual machine - Remote procedure calls (RPC) - Parameter passing - JAVA Remote Method Invocation - Distributed computing environment(DCE) - Developing Applications in DCE.

UNIT V DISTRIBUTED DATABASES AND DISTRIBUTED OPERATING SYSTEMS

Objectives of distributed databases - Distributed DBMS Architecture - Distributed Database Design - Query Processing - Transaction Management - Distributed Concurrency Control - Distributed DBMS Reliability - Parallel Database Systems concurrency control - DDBMS structure - Need for Distributed operating systems - network operating systems - distributed OS.

TOTAL: 45 Periods
TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

1. http://www.cs.iit.edu

2. http://www.cfd-online.com

13EC912 : DIGITAL IMAGE PROCESSING L T P C

3 0 0 3

Course Objectives:

- To analyze the mathematical transforms necessary for image processing.
- To be aware of different image enhancement techniques
- To analyze image restoration procedures.
- To analyze the image segmentation techniques.
- To analyze the image compression procedures.
Course Outcomes:

At the end of this course students will be able to

- Simulate basic image processing algorithms
- Develop algorithms for image enhancement and compression
- Develop algorithms for image restoration and segmentation
- Implement the algorithms for image compression applications

UNIT I DIGITAL IMAGE FUNDAMENTALS

Elements of digital image processing systems, Elements of visual perception, brightness, contrast, hue, saturation, mach band effect, Color image fundamentals - RGB, HSI models, Image sampling, Quantization, dither, Two-dimensional mathematical preliminaries, 2D transforms - DFT, DCT, KLT, SVD.

UNIT II IMAGE ENHANCEMENT


UNIT III IMAGE RESTORATION

Image Restoration - degradation model, Inverse filtering- Wiener filtering, constrained filtering Geometric transformations-spatial transformations

UNIT IV IMAGE SEGMENTATION

UNIT V IMAGE COMPRESSION

Need for data compression- Huffman, Run Length Encoding, Shift codes, Arithmetic coding, Vector Quantization, Transform coding, JPEG standard, MPEG.

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCE:

1. www.digitalimageprocessingplace.com

13EC913 : STATISTICAL DIGITAL SIGNAL PROCESSING 

L T P C

3 0 0 3
Course Objectives:

- To expose to different parametric methods for power spectrum estimation.
- To equip with adaptive filtering techniques using LMS algorithm.
- To be aware of multirate signal processing fundamentals.
- To analyse speech signals.
- To introduce the student to wavelet transforms.

Course Outcomes:

At the end of this course students will be able to

- Know the different power spectrum estimation methods
- Implement linear prediction circuits
- Apply LMS algorithm and to study the applications of adaptive filtering.
- Process the speech signals
- Employ wavelet transforms for different applications

UNIT I  PARAMETRIC METHODS FOR POWER SPECTRUM ESTIMATION


UNIT II  LINEAR ESTIMATION AND PREDICTION

Forward and Backward linear prediction, Filtering - FIR Wiener filter- Filtering and linear prediction, non-causal and causal IIR Wiener filters, Discrete Kalman filter.

235
UNIT III ADAPTIVE SIGNAL PROCESSING


UNIT IV SPEECH SIGNAL PROCESSING


UNIT V ADVANCED TRANSFORM TECHNIQUES


TOTAL: 45 Periods

TEXTBOOK:


REFERENCE BOOKS:

Brooks/Cole, 2004


WEB REFERENCES:


13EC914 : ADVANCED ELECTRONIC SYSTEM DESIGN

Course Objectives:

- To operate RF components such as resonator, filter, transmission lines and to design RF amplifiers using transistors.
- To design modern Power Supplies using SCR and SMPS technology
- To employ signal shielding & grounding techniques, High Speed A/D and D/A Converters and CAD for fabrication of PCBs.

Course Outcomes:

At the end of this course students will be able to

- Design RF filters & amplifiers and analyse the performance
- Design SMPS and data acquisition system
- Design computer aided PCB layout for any circuit

UNIT I INTRODUCTION TO RF DESIGN

RF behaviour of passive components - Chip components and circuit board considerations - Review of transmission lines - Impedance and admittance transformation - Parallel and series connection of networks - ABCD and scattering parameters - Analysis of amplifier using scattering
UNIT II    RF TRANSISTOR AMPLIFIER DESIGN

Impedance matching using discrete components - Microstrip line matching networks - Amplifier classes of operation and biasing networks - Amplifier power gain - Unilateral design ($S_{12}=0$) - Simple input and output matching networks - Bilateral design - Stability circle and conditional stability - Simultaneous conjugate matching for unconditionally stable transistors - Broadband amplifiers - High power amplifiers and multi stage amplifiers.

UNIT III    DESIGN OF POWER SUPPLIES

DC power supply design using transistors and SCRs - Design of crowbar and foldback protection circuits - Switched mode power supplies - Forward, flyback, buck and boost converters, Design of transformers and control circuits for SMPS - UPS.

UNIT IV    DESIGN OF DATA ACQUISITION SYSTEMS

Amplification of Low level signals - Grounding - Shielding and Guarding techniques - Dual slope, quad slope and high speed A/D converters, Microprocessors Compatible A/D converters, Multiplying A/D converters and Logarithmic A/D converters - Sample and Hold - Design of two and four wire transmitters.

UNIT V    DESIGN OF PRINTED CIRCUIT BOARDS

Introduction to technology of printed circuit boards (PCB), General lay out and rules and parameters, PCB design rules for Digital, High Frequency, Analog, Power Electronics and Microwave circuits- Computer Aided design of PCBs.

TOTAL: 45 Periods

TEXTBOOKS:

1. Reinhold Ludwig and Pavel Bretchko, "RF Circuit Design – Theory


REFERENCE BOOKS:


WEB REFERENCES:


13EC915 : MULTIRATE SIGNAL PROCESSING L T P C

3 0 0 3

Course Objectives:

- To understand the sampling process and sampling rate conversion
- To design the digital filters for decimation and interpolation
- To analyze the multistage implementation of sampling rate conversions.
- To analyze the Multirate implementations of signal processing
operations using filter banks

Course Outcomes:
At the end of this course students will be able to
- Design FIR Decimators and interpolators
- Design IIR Decimators and interpolators
- Implement multi stage sampling rate convertors
- Design multirate based simple filtering applications
- Analyse short time Fourier spectrum

UNIT I BASIC PRINCIPLES OF SAMPLING AND SAMPLING RATE CONVERSION
Uniform sampling and sampling theorem-Sampling rate conversion-analog interpretation and digital interpretation- decimation and interpolation of bandpass signals- Structures for FIR decimators and interpolators - Structures for IIR decimators and interpolators

UNIT II DESIGN OF DIGITAL FILTERS FOR DECIMATION AND INTERPOLATION
Filter specifications for sampling rate changing systems- Filter design for FIR decimators and interpolators- Filter design for IIR decimators and interpolators- Comparisons of IIR and FIR design for decimators and interpolators.

UNIT III MULTIRATE IMPLEMENTATIONS OF BASIC SIGNAL PROCESSING OPERATIONS
Multirate implementations of low pass filters - Multirate implementations of band pass filters- phase shifter design by Multirate concepts - Multirate implementations of Hilbert transformer-narrow band high resolution spectral analysis - sampling rate conversions between systems.

UNIT IV MULTISTAGE IMPLEMENTATION OF
SAMPLING RATE CONVERSIONS
Requirements for multi stage design- Multistage FIR design based on the optimization procedure – Multistage structure based on Halfband FIR filters – Multistage decimators and interpolators based on IIR filter design – consideration in the Multistage decimators and interpolators implementation.

UNIT V MULTIRATE TECHNIQUES IN FILTER BANKS
General issues – uniform DFT filter banks - Short time Fourier spectrum analyzers and synthesizers- Filter design criteria for DFT filters – Filter bank based on cascaded realization and tree structures- quadrature mirror filters.

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCE:
1. www.cs.tut.fi/~ts

13EC916 : AVIONICS

Course Objectives:
- To develop understanding of aerodynamics.
- To acquire knowledge on navigation at Radio frequencies.

241
To understand principle of aircraft displays.

Course Outcomes:
At the end of this course students will be able to

- Apply knowledge on aerodynamics to understand the working of modern Aircrafts.
- Apply knowledge on IC technology for avionic system integration.
- Be aware of modern aircraft display technologies.
- Know the significance modern autopilot system.

UNIT I ROLE OF AVIONIC SYSTEMS IN AIRCRAFTS

UNIT II RADIO NAVIGATION
Short Range Navigation Aids- Automatic Direction Finder (ADF), Distance Measuring Equipment(DME), VHF Omni-Directional Range (VOR)
Approach-Landing Navigation Aids- Instrument Landing System (ILS), Microwave landing System (MLS)

UNIT III INERTIAL AND SATELLITE NAVIGATION SYSTEMS

UNIT IV AIR DATA SYSTEMS AND AUTOPILOT
Air data quantities – Altitude, Airspeed, Mach no., Vertical speed, Total Air temperature, Stall warning, Altitude warning. Aircraft dynamics-lift &

242

**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.

**TOTAL: 45 Periods**

**TEXTBOOKS:**


**REFERENCE BOOKS:**


**WEB REFERENCE:**

1. www.researchgate.net/publication/Avionics

**13EC917 : TELEVISION AND VIDEO ENGINEERING**

**L T P C**

3 0 0 3

**Course Objectives:**
• To understand the construction details of TV Receiver Picture Tubes, Television Camera Tubes and Composite Video Signal details
• To familiarize principles of operation of Monochrome Television Transmitter and Receiver systems.
• To know PAL Color Television system operation.

Course Outcomes:
At the end of this course students will be able to
• Analyze the transmission of video signals
• Understand the importance of various television standards
• Analyze the functioning of circuits related to broadcasting applications

UNIT I FUNDAMENTALS OF TELEVISION


UNIT II MONOCHROME TELEVISION TRANSMITTER AND RECEIVER

UNIT III PRINCIPLES OF COLOUR TELEVISION


UNIT IV COLOUR TELEVISION SYSTEMS


UNIT V ADVANCED TELEVISION SYSTEMS

Domestic Broadcast System - Cable TV - Cable Signal Sources-Cable Signal Processing, Distribution & Scrambling-DVB - Video Recording-Video Disc recording and playback - Digital television - Transmission and reception – Projection television-Flat panel display TV receivers- Digital TV - LCD and Plasma screen receivers – LEDTV, 3DTV, EDTV, IPTV - Ultra HDTV-Smart TV

TOTAL: 45 Periods

TEXT BOOKS:


REFERENCE BOOKS:

WEB REFERENCES:

13EC918 : MOBILE ADHOC NETWORKS L T P C
3 0 0 3

Course Objectives:
- To understand fundamental concepts and design issues of Ad Hoc Wireless Networks
- To be exposed to the architectures and protocols of Ad Hoc Wireless Networks
- To be familiarize with different MAC, routing and transport layer protocols of adhoc networks.

Course Outcomes:
At the end of this course students will be able to
- Describe the unique issues in ad-hoc wireless networks
- Analyze the design issues, goals and classifications of protocols in
different network layers.

- Analyze the QoS issues in the mobile adhoc networks.
- Discuss about the issues in QoS solutions and Energy Management Schemes in Ad Hoc Wireless Networks.

UNIT I  MOBILE ADHOC NETWORKS AND IEEE STANDARDS 802.11

Adhoc networks - Introduction - definition - general and design Issues - applications. Characteristics of Wireless channel - Comparison of OSI Reference Model - TCP/IP Reference Model and ATM Reference Model - IEEE 802.11 standards: 802.11a, 802.11b, 802.11g, 802.15, HIPERLAN.

UNIT II  MEDIUM ACCESS PROTOCOLS

MAC Protocols: design issues, goals and classification - Contention based protocols with reservation - scheduling algorithms - protocols using directional antennas.

UNIT III  NETWORK PROTOCOLS


UNIT IV  END-END DELIVERY AND SECURITY


UNIT V  QUALITY OF SERVICE AND ENERGY MANAGEMENT SCHEMES

Introduction - Issues and Challenges in Providing QoS in Ad Hoc Wireless Networks - Classifications of QoS Solutions. MAC Layer

TOTAL: 45 Periods

TEXT BOOKS:


REFERENCE BOOKS:


WEB REFERENCES:


13EC919 : WIRELESS SENSOR NETWORKS L T P C

3 0 0 3

Course Objectives:

- To be aware of the Challenges and architecture of Wireless Sensor Networks.
- To get familiarized with different MAC protocols and network components in Wireless Sensor Networks.
To provide advanced knowledge of wideband wireless communication techniques

**Course Outcomes:**

At the end of this course students will be able to

- Realize the significances of sensor network mechanisms
- Evaluate the performances of mobility models

**UNIT I  OVERVIEW OF WIRELESS SENSOR NETWORKS  8**

Wireless sensor networks: definition, advantages, characteristics features, applications, constraints and challenges, required mechanisms - Field uses - enabling technologies, Characteristics of Wireless channel

**UNIT II  WIRELESS SENSOR NETWORK  9**

ARCHITECTURES


**UNIT III  COMMUNICATION PROTOCOLS  10**


**UNIT IV  LOCALIZATION AND POSITIONING  9**

UNIT V TRANSPORT LAYER AND QUALITY OF SERVICE 9
Coverage and deployment - Reliable data transport - Single packet delivery - Block delivery - Congestion control and rate control, Advanced application support, Security and Application-specific support

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCE

13EC920 : TOTAL QUALITY MANAGEMENT L T P C
3 0 0 3

Course Objectives:
- To Identify the purpose and need for TQM activities
- To develop an insight and understanding of Strategic Management
- To develop quality assessment skills.
Course Outcomes:
At the end of this course students will be able to
- Assess the quality of products and services.
- Handle Quality Function Deployment
- Prepare for accreditation by NBA, NACC.

UNIT I  NEED FOR QUALITY MANAGEMENT  9

UNIT II  TQM PRINCIPLES  9
Quality statements - Customer focus – Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward, Performance appraisal - Continuous process improvement – PDSA cycle, 5s, Kaizen - Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III  TQM TOOLS & TECHNIQUES  9

UNIT IV  TQM PERFORMANCE  9

UNIT V  QUALITY SYSTEMS  9
Requirements and Benefits – Case studies of TQM implementation in manufacturing and service sectors including IT, NBA, NAAC, 

TOTAL: 45 Periods

TEXTBOOK:

REFERENCE BOOKS:

WEB REFERENCES:
3. www.naac.gov.in

13EC921 : REMOTE SENSING

L T P C
3 0 0 3

Course Objectives:

- To familiarize the principles of Remote Sensing
- To be aware of the fundamental aerial photogrammetry techniques
- To interpret and analyse Multispectral, Hyperspectral, RADAR and
LIDAR images and data

Course Outcomes:

At the end of this course students will be able to

- Apply the knowledge of Electromagnetic Radiation Principles for Remote Sensing Applications
- Analyse imaging systems
- Apply the concepts of detection and ranging for remote sensing applications
- Interpret SAR, Multispectral and Hyperspectral data for Land cover/ Land use studies
- Classify the data for application specific analysis

UNIT I PHYSICS OF REMOTE SENSING 9


UNIT II DATA ACQUISITION 9

Types of Platforms – different types of aircrafts-Manned and Unmanned spacecrafts – sun synchronous and geo synchronous satellites – Types and characteristics of different platforms LANDSAT, SPOT, IRS, INSAT, IKONOS, QUICKBIRD etc –B/W, Colour, Colour IR film and their characteristics – resolving power of lens and film - Opto mechanical & electro optical sensors – across track and along track scanners – multi spectral scanners and thermal scanners – geometric characteristics of scanner imagery - calibration of thermal scanners.

UNIT III RADAR BASED REMOTE SENSING 9

Microwave Scatterometry – types of RADAR – SLAR – resolution -
range and azimuth – real aperture and synthetic aperture RADAR. Characteristics of Microwave images topographic effect - different types of Remote Sensing platforms – airborne and space borne sensors – ERS, JERS, RADARSAT, RISAT - Scatterometer, Altimeter- LiDAR remote sensing, principles, applications.

UNIT IV THERMAL AND HYPER SPECTRAL REMOTE SENSING

Sensors characteristics - principle of spectroscopy - imaging spectroscopy – field conditions, compound spectral curve, Spectral library, radiative models, processing procedures, derivative spectrometry, thermal remote sensing – thermal sensors, principles, thermal data processing, Hyperspectral Sensors & Imaging, spectral data, applications.

UNIT V DATA ANALYSIS


TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

1. http://www.itc.nl/~bakker/rs.html
2. rst.gsfc.nasa.gov
3. www.isprs.org
4. www.nrsa.gov.in

13EC922 : WIRELESS NETWORKS

Course Objectives:

- To differentiate between different types of personal, local, wide, and metropolitan area wireless networks including bluetooth, 802.11 LANs, cellular, and WiMAX networks
- To be aware of physical and wireless MAC layer alternatives
techniques.

- To be exposed advances in wireless networks

**Course Outcomes:**

At the end of this course students will be able to

- Realize the Challenges in Wireless Networks.
- Analyze different wireless networking standards.
- Explain network protocols associated with ad hoc and sensor networks, wireless MANs, LANs and PANs

**UNIT I  CHALLENGES IN WIRELESS NETWORKS**  9

Medium Access Alternatives- Fixed Assignment for Voice Oriented Networks Random Access for Data Oriented Networks-Handoff and Roaming Support- Security and Privacy

**UNIT II  WIRELESS PANS AND LANS**  9

Introduction to wireless PANs and LANs - IEEE 802.11 WLAN – Architecture and Services, physical Layer- MAC sublayer- MAC Management Sublayer – Installation of WLAN- Other IEEE 802.11 standards, HIPERLAN, Wi-Fi and WiMax standards.

**UNIT III  WIRELESS WANS**  9


**UNIT IV  ADHOC AND SENSOR NETWORKS**  9


**UNIT V  ADVANCES IN WIRELESS NETWORKS**  9

Bluetooth - ZigBee- Ultra wide Band Radio communication - Wireless Fidelity Systems and Optical wireless Networks - Software Defined
Radio - Cognitive Radio

TOTAL: 45 Periods

**TEXTBOOKS:**

**REFERENCE BOOKS:**

**WEB REFERENCES:**

**13EC923 : ADVANCED WIRELESS SYSTEMS**

**Course Objectives:**
- To aware of UWB radio and Adaptive reconfigurable software radio.
- To focus on the system elements that provide adaptability and re-configurability
Course Outcomes:
At the end of this course students will be able to
- Analyze the performance of the advanced wireless systems.
- Develop enabling technologies such as adaptive coding and modulation
- Compute the reconfiguration efficiency of adaptive 4G networks

UNIT I ULTRA WIDE BAND RADIO 9
UWB multiple access in a Gaussian channel- UWB system with $M$-ary modulation - $M$-ary PPM UWB multiple access - $M$-ary PPM UWB multiple access - Multiuser detection in UWB radio - UWB with space-Beam forming for UWB radio

UNIT II ADAPTIVE RECONFIGURABLE SOFTWARE 9 RADIO
Energy efficient adaptive radio- A software radio architecture for linear multiuser detection - A low-power DSP core based software radio architecture - A Software radio architecture with smart antennas - Software realization of a GSM base station - Software realization of WCDMA (FDD) downlink in base station systems

UNIT III NETWORK OVERLAY AND USER LOCATION IN 4G 9
Adaptive self reconfigurable interference suppression schemes for CDMA wireless networks - Multilayer LMS interference suppression algorithms for CDMA wireless networks- Basic Location Technologies - Network synchronization

UNIT IV CHANNEL MODELING AND MEASUREMENTS 9 FOR 4G
Macro cellular environments (1.8 GHz)- Urban spatial radio channels in macro/microcell (2.154 GHz)- MIMO channels in microcell and Pico-cell environments (1.71/2.05 GHz)- Outdoor mobile channel (5.3 GHz)- Outdoor mobile channel (5.3 GHz)- Wireless MIMO LAN environments (5.2 GHz)- Indoor WLAN channel (17 GHz)- Indoor WLAN channel (60
UNIT V ADAPTIVE 4G NETWORKS

Adaptive 4G Networks requirements - Minimum energy peer-to-peer mobile wireless networks-Least resistance routing in wireless networks-Power optimal routing in wireless networks for guaranteed TCP layer QoS

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCES:

13EC924 : TELECOMMUNICATION SYSTEM MODELING AND SIMULATION

Course Objectives:
- To simulate random process using various simulation techniques for telecommunication system
- To analyze digital communication, optical communication and satellite communication techniques as case studies through simulation

**Course Outcomes:**

At the end of this course students will be able to

- Implement various simulation methodologies and do performance evaluation
- Realise the random signal generation and processing
- Evaluate the simulated model of radio communication channels

**UNIT I  MODELING OF COMMUNICATION SYSTEM  9 BLOCKS**

Systems modeling- Analog and Digital signals- Transmitters and Receivers sub systems-Communication channel models: Free space channels, Multipath channel and discrete channel noise and interference.

**UNIT II  SIMULATION METHODOLOGY  9**

Aspects of methodology- Performance Estimation- Low pass equivalent models for band pass signals- multicarrier signals- Non-linear and time varying systems- Post processing- Basic Graphical techniques and estimations

**UNIT III  SIMULATION PROCESS  9**

Generation of random numbers and sequence- Gaussian and uniform random numbers Correlated random sequences- Testing of random numbers generators- Stationary and uncorrelated noise- Goodness of fit test.

**UNIT IV  ESTIMATION OF PARAMETERS  9**
Quality of estimator- Estimation of SNR- Probability density function and bit error rate- Monte Carlo method- Tail extrapolation- Importance of sampling method- Extreme value theory- visual indicator of performance.

UNIT V EVALUATION

Simulation environment and software issues- Modeling considerations- Performance evaluation techniques- error source simulation- Validation of devices and sub system models, random process models and system model.

TOTAL: 45 Periods

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

13EC925 : RADAR AND NAVIGATIONAL AIDS    L T P C
                                                3 0 0 3

Course Objectives:

- To be exposed to radar fundamentals and various types of RADARS
- To understand the operations and functions of various navigational aids

Course Outcomes:

At the end of this course students will be able to

- Gain a knowledge of radar fundamentals and various types of RADARS
- Get acquainted with navigational aids

UNIT I  PRINCIPLES OF RADAR          10


UNIT II ANTENNAS FOR RADAR & NAVIGATION AND CW & FM RADAR

UNIT III MTI & PULSE DOPPLER RADAR AND TRACKING & IMAGING RADAR

Delay line Cancellers - Multiple or staggered Pulse Repetition Frequencies - Range gated Doppler Filters - Block Diagram of Digital Signal Processor - Example of MTI radar Processor - Pulse Doppler Radar - Non coherent MTI-MTI from moving platform - Other types of MTI - Airborne radar - Tracking with radar - Monopulse tracking - Conical scan and sequential lobing - Low angle tracking - Air Surveillance Radar - Introduction to Synthetic aperture radar (SAR).

UNIT IV NAVIGATIONAL SYSTEMS


UNIT V MODERN NAVIGATION


TOTAL: 45 Periods

TEXTBOOKS:

2. N.S.Nagaraja, "Elements of Electronic Navigation Systems", Tata 263
Course Objectives:

- To analyze EMI Sources, EMI problems
- To analyze methods in PCB level / Subsystem and system level design
- To measure the emission, immunity level from different systems
- To analyze various testing equipments and compare prescribed EMC standards

Course Outcomes:

At the end of this course students will be able to

- Design TV and other household articles radiation hazard free and compliant to EMI / EMC standards.
- Perform EMI measurements
- Apply the concepts of EMI Coupling in cables and other equipments
- Apply techniques for reducing the cross talk.

UNIT I PRINCIPLES OF EMI AND EMC

Definition of EMI and EMC with examples - Classification of EMI/EMC - CE, RE, CS, RS - Units of Parameters - Sources of EMI - EMI coupling
modes - CM and DM - ESD Phenomena and effects - Transient phenomena and suppression.

UNIT II  EMI MEASUREMENTS  9
Basic principles of RE, CE, RS and CS measurements - EMI measuring instruments - Antennas – LISN - Feed through capacitor - current probe-EMC analyzer and detection technique open area site - shielded anechoic chamber - TEM cell.

UNIT III  EMC STANDARD AND REGULATIONS  8

UNIT IV  EMI CONTROL METHODS AND FIXES  10
Shielding - Theory and materials, Grounding, Bonding - general procedure and guidelines, Filtering-Characteristics of filters - Power line filter - filter evaluation and filter installation, EMI gasket, Isolation transformer, opto isolator

UNIT V  EMC DESIGN AND INTERCONNECTION TECHNIQUES  9
Cable routing and connection - Component selection and mounting-PCB design - Trace routing, Impedance control, decoupling, Zoning and grounding-general guidelines - EMC Specifications and PCB Guidelines for SMPS Devices - EMC Improvement Guidelines

TOTAL: 45 Periods

TEXTBOOKS:
REFERENCE BOOKS:

WEB REFERENCE:

13EC927 : TELEMEDICINE

Course Objectives:
- To make the students to recognize the scope, benefits and types of communication and network.
- To manipulate the students with the knowledge of Telemedical standards, Mobile Telemedicine and the recent trends in Telemedicine with its application.

Course Outcomes:
At the end of this course students will be able to
- Apply Technologies in the telemedicine communication network and standards.
- Employ recent trends in Telemedicine to Medical Information Management

UNIT I PRINCIPLES OF TELEMEDICINE
History and Evolution of telemedicine- Functional diagram of telemedicine system-Telemedicine, Tele health, Tele care, Organs of telemedicine- Global and Indian scenario-Ethical and legal aspects of
Telemedicine - Social and legal issues-Safety and regulatory issues-Advances in Telemedicine.

UNIT II TELEMEDICAL TECHNOLOGY 9

UNIT III MEDICAL INFORMATION AND MANAGEMENT 9
Medical information storage and management for telemedicine- patient information-medical history, test reports, medical images diagnosis and treatment.- Hospital information- Doctors, paramedics, facilities available - Pharmaceutical information-Real-time Telemedicine integrating doctors / Hospitals, Clinical laboratory data, Radiological data and other clinically significant biomedical data.

UNIT IV MOBILE TELEMEDICINE 9
Tele radiology: Definition, Basic parts of teleradiology system: Image Acquisition system, Display system, Tele pathology, multimedia databases, color images of sufficient resolution, Dynamic range, spatial resolution, compression methods, Interactive control of color-Cyber laws related to telemedicine.

UNIT V RECENT TRENDS IN TELEMEDICINE 9
Telemedicine access to health care services - Health education and self care - Introduction to robotics surgery, Telesurgery. Telecardiology, Teleoncology, Telemedicine in neurosciences - Electronic Documentation - e-health services security and interoperability-
Business aspects - Project planning and costing - Telesurgery - Use of RFID in telemedicine - Case studies in Telemedicine.

TOTAL: 45 Periods

TEXTBOOK:

REFERENCE BOOKS:

WEB REFERENCES:
Course Objectives:

- To determine the sparse representation.
- To calculate uncertainty in sparsity.
- To determine pursuit and iterative-shrinkage for sparsity.
- To analyze the performance of different algorithms in sparse representation.

Course Outcomes:

At the end of this course students will be able to

- Apply sparse representation.
- Analyze the uniqueness and uncertainty principles of sparsity.
- Analyze the performance of sparse representation algorithms.
- Perform analysis of approximate solutions

UNIT I SPARSE REPRESENTATION 9

Sparsity, Sparsity Terminologies, Underdetermined Linear Systems – Regularization – Convexity – $l_1$ Minimization – Moving to Sparse Solutions - The $l_0$ Norm and Implications - The $P_0$ Problem in sparse signal processing.

UNIT II UNIQUENESS AND UNCERTAINTY 9

Uncertainty Principle for two-ortho case - Uncertainty of Redundant Solutions - From Uncertainty to Uniqueness - Uniqueness via the Spark - Uniqueness via the Mutual-Coherence - Uniqueness via the Babel Function - Upper-Bounding the Spark - Constructing Grassmannian Matrices

UNIT III PURSUIT ALGORITHMS 10

Greedy Algorithms – Core Idea - The Orthogonal-Matching-Pursuit – Normalization - Rate of Decay of the Residual in Greedy Methods - Thresholding Algorithm - Numerical Demonstration of Greedy Algorithms, Convex Relaxation Techniques- Relaxation of the $l_0$ Norm -

**UNIT IV ITERATIVE-SHRINKAGE ALGORITHMS**

The Unitary Case - Shrinkage For the Unitary case - The BCR Algorithm and Variations, Developing Iterative-Shrinkage Algorithms - Surrogate Functions and the Prox Method - EM and Bound-Optimization Approaches - An IRLS-Based Shrinkage Algorithm - The Parallel-Coordinate-Descent (PCD) Algorithm - StOMP: A Variation on Greedy Methods - Bottom Line – Iterative-Shrinkage Algorithms - Acceleration Using Line-Search and SESOP.

**UNIT V PERFORMANCE ANALYSIS**


**TOTAL: 45 Periods**

**TEXTBOOKS:**


**REFERENCE BOOKS:**


**WEB REFERENCES:**
Course Objectives:

- To impart knowledge on fundamentals of key intelligent systems technologies including knowledge-based systems, neural networks, fuzzy systems, and evolutionary computation.
- To understand how to practice the integration of intelligent systems technologies for engineering applications.

Course Outcomes:

At the end of this course students will be able to

- Implement neural networks, genetic algorithms, and other computational intelligence and machine learning algorithms.
- Apply computational intelligence and machine learning techniques to classification, prediction, pattern recognition, and optimization problems.

UNIT I  COMPUTATIONAL INTELLIGENCE  7

Primary classes of problems for CI Techniques – Neural Networks – Fuzzy systems – Evolutionary Computing – Swarm Intelligence – Other Paradigms – Hybrid Approaches – Relationship with other paradigms – Challenges to Computational Intelligence

UNIT II  COMPUTATIONAL SWARM INTELLIGENCE  10

Basic Particle Swarm Optimization - Social Network Structures - Basic Variations - Basic PSO Parameters - Single - Solution Particle Swarm Optimization - Advanced Topics - Constraint Handling Approaches - Multi - Objective Optimization - Dynamic Environments - Niching PSO-
Applications - Neural Networks - Architecture Selection - Game Learning.

UNIT III SUPPORT VECTOR MACHINES


UNIT IV KERNEL BASED CLUSTERING TECHNIQUES


UNIT V EMERGING AREAS AND APPLICATIONS OF COMPUTATIONAL INTELLIGENCE


TOTAL: 45 Periods

TEXTBOOKS:

2. S.Sumathi and Surekha Paneerselvam, “Computational Intelligence Paradigms: Theory & Applications using MATLAB”,
 CRC Press 2010.


REFERENCE BOOKS:


WEB REFERENCES:

1. http://cs.armstrong.edu/saad/csci8100/


13EC930 : CRYPTOGRAPHY AND NETWORK SECURITY L T P C

3 0 0 3

Course Objectives:

- To understand fundamentals of secret and public key cryptography
- To be exposed to network security threats, network security tools
and applications.

- To be aware of the importance of information security.

**Course Outcomes:**

At the end of this course students will be able to

- Apply symmetric and asymmetric ciphers to encrypt data.
- Derive digest for the purpose of authentication.
- Identify the common network vulnerabilities and design the defense mechanisms.

**UNIT I   SYMMETRIC KEY CRYPTOGRAPHY**


**UNIT II   PUBLIC KEY CRYPTOGRAPHY**

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

**UNIT III   AUTHENTICATION AND HASH FUNCTION**


**UNIT IV   SYSTEM LEVEL SECURITY**


**UNIT V   NETWORK SECURITY**

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCE:

13EC931 : MULTIMEDIA COMPRESSION AND COMMUNICATION  L T P C  3 0 0 3

Course Objectives:
- To build a knowledge foundation in the areas of multimedia compression and communication.
To represent and process multimedia data such as audio, text, image and video.

**Course Outcomes:**

At the end of this course students will be able to

- Apply the concepts of compression and decompression techniques to multimedia data
- Realize the concepts of encoding and decoding of digital data streams.
- Evaluate the generation of these codes.

**UNIT I  MULTIMEDIA COMPONENTS**

Introduction to various multimedia communication techniques, applications and networks - Multimedia information representation – Digitization principles, Text, sound, images, graphics, video.

**UNIT II  TEXT AND IMAGE COMPRESSION**


**UNIT III  AUDIO AND VIDEO COMPRESSION**


**UNIT IV  VoIP TECHNOLOGY**

Basics of IP transport, VoIP challenges, H.323/ SIP – Network Architecture, Protocols, Call establishment and release, VoIP and SS7, Quality of Service - CODEC Methods- VoIP applicability

**UNIT V  MULTIMEDIA NETWORKING**

Multimedia networking applications - Streaming stored audio and video - Making the best of Best Effort service - Protocols for real time interactive applications - Distributing multimedia - Beyond best effort service - Scheduling and policing mechanisms - Integrated services and
differentiated Services-RSVP.

TOTAL: 45 Periods

TEXTBOOKS:

REFERENCE BOOKS:

WEB REFERENCES:
1. www.cosy.sbg.ac.at/~uhl/ctmdf.pdf
2. ce.sharif.ir/courses/84-85/.../Multimedia/215814-%20Chapter%206.pdf

13EC932 : ENGINEERING ACOUSTICS L T P C
3 0 0 3

Course Objectives:
- To get acquainted with the physics of acoustic wave propagation,
human hearing system and acoustic waves characteristics

- To familiarize architectural acoustics, noise control, environmental standards
- To be aware of the transducers used for acoustic signals

**Course Outcomes:**

At the end of this course students will be able to

- Analyze the linear acoustic wave equation and evaluate the parameters related to acoustic wave propagation
- Design architectures with specified acoustic levels.
- Analyze the operation of loudspeakers and microphones.

**UNIT I  ACOUSTIC WAVES**


Reflection and Transmission: Transmission from one fluid to another normal and oblique incidence – method of images.

**UNIT II  RADIATION AND RECEPTION OF ACOUSTIC WAVES**


**UNIT III  HEARING MECHANISMS, PIPES, RESONATORS AND FILTERS**


Resonance in pipes - standing wave pattern -absorption of sound in pipes – long wavelength limit – Helmholtz resonator - acoustic impedance - reflection and transmission of waves in pipe - acoustic
filters – low pass, high pass and band pass.

UNIT IV  ARCHITECTURAL ACOUSTICS

Sound in enclosure – A simple model for the growth of sound in a room – reverberation time - Sabine, sound absorption materials – measurement of the acoustic output of sound sources in live rooms – acoustics factor in architectural design.

Environmental Acoustics:
Weighted sound levels speech interference – highway noise – noise induced hearing loss – noise and architectural design specification and measurement of some isolation design of portions- Acoustic chambers

UNIT V  TRANSDUCTION OF ACOUSTIC SIGNALS


TOTAL: 45 Periods

TEXT BOOKS:


REFERENCE BOOKS:


WEB REFERENCES:


Course Objectives:
- To understand the concepts of advanced programming in C
- To learn advanced OOP concepts
- To learn the advanced data structures and Linux Programming

Course Outcomes:
- Develop modular C programs using pointers and preprocessors
- Develop advanced OOP in C++ and Java
- Develop applications using Data Structures
- Write a variety of applications using standard Linux system calls and library functions.

UNIT I  ADVANCED C CONCEPTS  9
Preprocessor Directives - operators - Conditional Compilation - define, undef, line, error, pragma directives, Command Line Arguments

UNIT II  ADVANCED POINTERS IN C LANGUAGE  9
Arrays with negative indexes - Pointers to Pointers - Using const in pointer declarations - void pointers - NULL Pointers - Expires Pointers - Pointers to functions - Reallocation - Pointer to structures

UNIT III  ADVANCED OOP CONCEPTS  9

UNIT IV  ADVANCED DATA STRUCTURE  9
UNIT V  LINUX KERNEL PROGRAMMING
Programming under Linux - Files - Signals - Timers - Process -Threads -
Resorce Usage - Inter Process Communication - Synchronization
Mechanisms - Sockets - Devices

TOTAL: 45 Periods

TEXT BOOKS:
2. Timothy Budd, “Understanding Object-oriented programming with
   Professional, 3rd Edition, 2002

REFERENCE BOOKS:
2. Daoqi Yang, “C++ and Object-Oriented Numeric Computing for
   Scientists and Engineers”, Springer, 2001

WEB REFERENCES:
4. https://sites.google.com/site/linuxlabjntu09/solutions

13EC934: ELECTRONIC PRODUCT DEVELOPMENT        L T P C
                                                 3 0 0 3

Course Objectives:
- To make systematic just-in-time transfer of state-of-the-art
knowledge derived from the latest research results

- To understand Electronics Packaging with Emphasis on solids, thermal engineering and mechanics of materials
- To understand different types of Electronic Product development lifecycle

**Course Outcomes:**
After the completion of this course, students will be able to

- Synthesize the electronic products with the help of interdisciplinary knowledge from many diverse sources: electrical, mechanical, thermal, materials, manufacturing and business.
- Build reliable electronic products
- Effectively communicate (verbally and in writing), as well as be adept at working on teams

**UNIT I   ELECTRONIC PRODUCT DEVELOPMENT LIFE CYCLE**
Different types of Electronic Product development (Using Modules, Customizing Reference design, Custom Board development, Board development with new ASIC developed); Product volume and its effect on the type of product development; Different types of ASIC development – FPGA, Gate Array, Standard Cell; Product level Life Cycle & Stage gates; Generic Electronic Product Organization structure; Documentation control and stake holders

**UNIT II   DESIGN MANAGEMENT**
Product costing variables and their control, Technology risks in electronic development, Quality function deployment, Methods of idea generation, Requirements Management, Development process - V model; Computer Tools used in design (Computer Aided Analysis [CAA], Computer Aided Simulation/Modeling, Computer Aided Design[CAD], Product Lifecycle Management[PLM], tools); Product characteristics for different domains; Regulated industry (Medical/Aerospace/Functional Safety) design controls.
UNIT III BUILDING RELIABLE PRODUCTS

Safety in circuits – Intrinsic safety; Product Reliability curve (Bath tub curve); MTBF prediction by Part count method and Part stress method; Reliability Testing methods like ESS, HASS, HALT; Component failures of common discrete, Component De-rating; Introduction to Failure Mode & Effect Analysis (FMEA); Reliability Block Diagram of a Circuit; FMEA Analysis of a simple Circuit; Worst Case Circuit analysis (WCA) of simple circuits;

UNIT IV BEYOND DESIGN

PCB Layout; PCB Fabrication technology for Single and Multilayer PCBs; PCB Assembly process; Signal Integrity and High speed digital circuit challenges; Cable harness development; Design Validation Testing; Certification Testing (FCC & CE); Production/Manufacturing testing – PCBA level and full assembly level


UNIT V ELECTRONIC PACKAGING

Component packages : Discrete Component Packages, Standard IC Packages, Ball Grid Array (BGA) Package types, Advances in Package technology, Package on Packages (POP), Multichip packages (MCP), and other recent advances

Rack systems – 19 rack systems; VME racks; DIN Rail system; VXI chassis;

Indoor / Outdoor Enclosures - NEMA enclosures, Ingress protection (IP) enclosures, Explosive proof enclosures

Thermal elements used in Electronics - Heat sinks, Heat pipe, Fan - Airflow, Coolant circulation, Thermo Electric Cooler (TEC); Design of Heat sink.
TOTAL: 45 PERIODS

TEXT BOOKS:

REFERENCE BOOKS:

WEB REFERENCES:

Open Electives

13MA901 – OPERATIONS RESEARCH
L T P C
3 0 0 3

284
COURSE OBJECTIVES:

- To identify the objective and constraints and make the given problem as a suitable model and to it.
- To acquire a knowledge to solve the decision making problem
- To have some ideas in decision trees
- To understand how to model and solve problems using dynamic programming
- To know to obtain project scheduling
- To learn optimality conditions for single- and multiple-variable unconstrained and constrained non-linear optimization problems, and corresponding solution methodologies

COURSE OUTCOMES:

At the end of the course, the students are able to

- Model the $n$ jobs through $m$ machine
- Optimize the Decision trees
- Know the Maximum likelihood criterion
- Solve $n$-person zero sum games
- Find critical path and duration of the project scheduling
- Solve the DP and NLP problems

UNIT I  Sequencing Models  9

Sequencing Problems – Assumptions in sequencing problems – processing $n$ jobs through one machine - processing $n$ jobs through two machines - processing two jobs through $m$ machines – problems related to sequencing.

UNIT II  Decision Theory  9

UNIT III  Game Theory


UNIT IV  Network Techniques


UNIT V  Dynamic and Non-Linear Programming Problem


TOTAL: 45 PERIODS

Note: Use of approved statistical table is permitted in the examination.

TEXTBOOKS:


REFERENCE BOOKS:


13EE901 : PROFESSIONAL ETHICS IN ENGINEERING  L T P C

3 0 0 3

COURSE OBJECTIVES:

- To stimulate critical and responsible reflection on moral issues surrounding engineering practice.
- To provide the conceptual tools necessary for pursuing those issues.
- To make the students aware of the different ethical issues, codes of conduct for engineers in the society and moralities in an organization.

COURSE OUTCOMES:

At the end of the course, the students are able to

- Obtain awareness on Engineering Ethics, Human Values & instil moral values, social values and loyalty.
- Appreciate the rights of others
- Practice the codes of conduct for engineers in the society,
- Realize their responsibilities, professional rights and moralities for the enhancement of an organization.

UNIT I   Human Values and Engineering Ethics  10

Morals, Values and Ethics- Work Ethic - Team work - Service Learning - Respect for Others- Living Peacefully- Honesty- Courage - Valuing Time - Co-operation - Commitment- Self-Confidence - Customs and religion-Senses of Engineering Ethics- Variety of moral issues -Types of
inquiry, Moral dilemmas and Moral Autonomy - Kohlberg’s Theory- Gilligan's Theory- Theories about right action- Use of Ethical Theories, Case studies and moral stories.

UNIT II Engineering as Social Experimentation

Engineering as experimentation-Engineers as responsible experimenters- Codes of ethics-Sample code of conduct (Specific to a particular engineering discipline)- A balanced outlook on Law- The Challenger case study.

UNIT III Responsibilities and Rights


UNIT IV Safety and risk


UNIT V Global Issues

Multinational corporations-Environmental Ethics-Computer Ethics Weapons Development- Engineers as Managers and Consulting Engineers- Engineers as Expert Witnesses and Advisors- Moral Leadership- Case studies.

TOTAL: 45 PERIODS

TEXTBOOKS:


REFERENCE BOOKS:


WEB REFERENCES:

1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org
Course Objectives:
- To understand the operation of automotive sub systems
- To learn about sensors in automotive systems and vehicle development process
- To develop skills in using software and programming the automotive systems

Course Outcomes:
At the end of this course students will be able to
- Analyse the operation of automotive sub system
- Interface and control various sensors and actuators in automotive systems
- Establish communication between various electronic peripherals in automobiles.
- Make vehicle motion control development using automotive sub systems

UNIT I  FUNDAMENTALS OF AUTOMOTIVE SUB-SYSTEMS  9

UNIT II  AUTOMOTIVE SENSORS & ACTUATORS  9
(QUANTITATIVE TREATMENT ONLY)
Actuators. BLDC Motors & Drive amplifiers, MEMS based Sensors and Actuators.

UNIT III AUTOMOTIVE COMMUNICATIONS AND DIAGNOSTICS
RS 232, RS 422, Class 2, Keyword, CAN, GMLAN, BCAN, LIN, I2C & Flexray, Diagnostics: Calibrations, Diagnostics codes & Freeze Frames, Automotive Diagnostics, On-board Diagnostics, Off-board Diagnostics

UNIT IV AUTOMOTIVE INSTRUMENTATION

UNIT V VEHICLE MOTION CONTROL
Cruise Control Configuration, Digital Cruise Control, Stepper Motor-Based Actuator, Vacuum-Operated Actuator, Antilock Braking System, Electronic Suspension System, Electronic Steering Control

TOTAL: 45 Periods

TEXT BOOKS:

REFERENCE BOOKS:

WEB REFERENCES
Course Objectives:

- To introduce cryptographic mechanisms
- To survey the attack techniques used in Cyberspace
- To explore the origin and propagation of malicious code
- To introduce cyber forensics methodology
- To understand management of cyber threats using available tools

Course Outcomes:

At the end of this course students will be able to

- Work with encryption and decryption techniques
- Identify the vulnerabilities and attacks in cyberspace
- Analyze the origin and behaviour of malicious code
- Detect web threats and intruders
- Analyze data for anomaly detection

UNIT I    CYBER SECURITY FUNDAMENTALS  9
Network and security concepts - Information assurance fundamentals - Basic cryptography - Symmetric encryption - Public key encryption - Domain name system security - Firewalls - Virtualization - Radio frequency identification

UNIT II    ATTACK TECHNIQUES       9
Use of proxies - Tunneling techniques - Fraud techniques - Threat techniques - Shell code - Integer overflow vulnerabilities - Buffer overflow vulnerabilities - Format string vulnerabilities - SQL injection - Malicious PDF files - Race conditions - Web exploit tools - DoS
conditions - Brute force and dictionary attacks - Misdirection, Reconnaissance and Disruption methods

UNIT III MALICIOUS CODE
Self replicating malicious code – Worms – Viruses - Evading detection and elevating privileges –Obfuscation - Virtual machine obfuscation - Persistent software techniques – Rootkits – Spyware - Attacks against user accounts - Token kidnapping - Virtual machine detection - Stealing information and exploitation - Form grabbing – Man in the middle attacks - DLL injection - Browser helper objects

UNIT IV DEFENSE AND ANALYSIS TOOLS
Memory forensics – Honey pots - Malicious code naming - Automated malicious code analysis systems - Intrusion detection systems - Managing threats to web databases - Cyber forensics - Mining data for investigation

UNIT V MANAGING CYBER THREATS
Analysis of computer attacks - Anomality detection - Analysis of alert data - Aggregation and cluster analysis for summarization - Analysis of computer attack vulnerability - Intrusion detection infrastructures - Alert management systems

TOTAL: 45 PERIODS

TEXTBOOKS:


REFERENCE BOOKS:

WEB REFERENCES:

13ME901 : INDUSTRIAL SAFETY ENGINEERING  L  T  P  C
3 0 0 3

COURSE OBJECTIVES:
- To achieve an understanding of principles of safety engineering.
- To enable the students to learn about various functions and activities of safety department.
- To have knowledge about various hazard identification and risk assessment techniques.
- To familiarize students with evaluation of safety performance.
- To provide wide exposure to the students about various legislations applicable to an industrial unit.

COURSE OUTCOMES:
At the end of this course students will be able to
- To understand the functions and activities of safety engineering department.
- To prepare an accident investigation report.
- To estimate the accident cost using supervisors report and data.
• To evaluate the safety performance of an organization from accident records.
• To list out requirements mentioned in factories act for the prevention of accidents.

UNIT I CONCEPTS OF SAFETY MANAGEMENT AND ACCIDENT PREVENTION


UNIT II HAZARD IDENTIFICATION, RISK ASSESSMENT AND CONTROL


UNIT III SAFETY IN ENGINEERING INDUSTRY

Safety in use of machinery - turning machines, boring machines, milling machine, planning machine and grinding machines, CNC machines, wood working machinery-Principles of machine guarding -Guarding during maintenance, zero mechanical state (ZMS), definition, policy for ZMS– safety in welding and gas cutting- safety in cold forming and hot working of metals- safety in finishing, inspection and testing- occupational diseases -Lead – Nickel, Chromium and Manganese toxicity.
UNIT IV  SAFETY PERFORMANCE MONITORING

ANSI (Z16.1) Recommended practices for compiling and measuring work injury experience – permanent total disabilities, permanent partial disabilities, temporary total disabilities - Calculation of accident indices, frequency rate, severity rate, frequency severity incidence, incident rate, accident rate, safety “t” score, safety activity rate –Total Injury illness incidence rate, Lost workday cases – Incidence rate (LWDI ), Number of lost workdays rate–problems-safety audit.

UNIT V  SAFETY AND HEALTH REGULATIONS


TOTAL: 45 PERIODS

TEXT BOOKS:


REFERENCE BOOKS:


6. “Safe use of wood working machinery”, HSE, UK, 2005


13ME902: NANO MATERIALS

COURSE OBJECTIVES:

- To understand the evolution of nano materials.
- To acquire knowledge about theories behind the interaction of nanoparticles.
- To understand the exotic properties of nanostructured materials at nano scale lengths.
- To acquire knowledge about the porous nanomaterials.

COURSE OUTCOMES:

At the end of this course students will be able to

- Gain knowledge on basic science behind nanotechnology.
- Capable of interpreting the nano scale phenomena of particles.
- Ability to diagnose and use the exact nanomaterial for needed
applications.

- Acquire knowledge about the various properties of nano materials.

UNIT I  INTRODUCTION, CLASSIFICATION AND NOMENCLATURE OF NANO MATERIALS

Background to nano technology - scientific revolutions - basic principles of nano scale materials - nano sized metals and alloys, semiconductors, ceramics. Comparison with respective bulk materials; Organic semiconductors, carbon nanotubes; zero, one, two, and three dimensional nanostructures – quantum dots, quantum wells, quantum rods, quantum wires, nano composites consisting of organic, inorganic and biomaterials; self-assembly.

UNIT II  THEORIES OF NANO SIZED MATERIALS

Transition metal sols, origin of plasmon band, Mie theory, influence of various factors on the plasmon absorption; Surface energy – chemical potential as a function of surface curvature - electrostatic stabilization - surface charge density - electric potential at the proximity of solid surface - Zeta potential - Interaction between two particles: DLVO theory.

UNIT III  NOVEL PROPERTIES OF NANOMATERIALS

Surface area and aspect ratio - size and shape dependent optical, emission, electronic, transport, photonic, refractive index, dielectric, mechanical, magnetic, non-linear optical properties; Catalytic and photo catalytic properties.

UNIT IV  NANOPARTICLE AND NANOSTRUCTURED MATERIALS

Preparation of nanoparticle - metal particles: Thermal decomposition of metal carbonyls, semiconductors, zeolites, inverse micelles, Gels, phosphates and polymers. Ceramic nano particles: Sol-gel - aerosols and xerogels, precipitation and digestion. Physical and chemical
properties: Metallic behavior - magnetic behavior - binding energies and melting points - optical and electronic properties - NLO properties - metals and semiconductors.

**UNIT V   NANOPOROUS MATERIALS**


**TOTAL: 45 PERIODS**

**TEXTBOOKS:**

**REFERENCE BOOKS:**

**13IT901: INTELLECTUAL PROPERTY RIGHTS**

**COURSE OBJECTIVES:**
- Understand the basic types of Intellectual property
• Recognize the relevant criteria for generating and protecting intellectual works
• Understand the relevance and impact of IP Law on academic/scientific works/studies
• Recognize the intellectual property likely to be produced in the academic and professional environment

COURSE OUTCOMES:
At the end of this course students will be able to
• Infer the fundamental legal principles relating to patents
• Express the use of copyrights and trademarks
• Interpret the laws of trade secrets and unfair competition
• Paraphrase the procedures for filing patents
• Analyze the different forms of Intellectual property using case Studies

UNIT I INTRODUCTION

UNIT II THE LAW OF TRADEMARK AND COPYRIGHT
Introduction to Trade mark – Trade mark Registration Process – Post registration Procedures – Trade mark maintenance - Transfer of Rights - Inter partes Proceeding- Infringement - Dilution of Trade mark – Trademarks claims - International Trade mark Law - Introduction to Copyrights - Principles of Copyright -The subjects Matter of Copy right - The Rights Afforded by Copyright Law - Copy right Ownership, Transfer and duration - International Copyright Law

UNIT III THE LAW OF TRADE SECRETS AND
UNFAIR COMPETITION


UNIT IV  PATENT AND INTERNATIONAL CONVENTION


UNIT V  NEW DEVELOPMENTS IN COPYRIGHT LAW


TOTAL: 45 PERIODS

TEXTBOOK:


REFERENCE BOOKS:


WEB REFERENCES:
2. www.wipo.int/ebookshop

13BA901 : ENGINEERING ENTREPRENEURSHIP   L   T   P   C
   3  0  0  3

COURSE OBJECTIVES:
- To understand the process of Entrepreneurship
- To explore the engineering ideas for creation of enterprises
- To prepare Business plans and evaluating risk
- To understand the various Influences of Government, Culture and Society.

COURSE OUTCOMES:
At the end of this course students will be able to
- Ability to estimate the level of knowledge required to be an entrepreneur
- Working Knowledge of drawing Business plans
• Ability to measure the challenges to be faced due to legal systems, culture and other aspects of the Society.

UNIT I  INTRODUCTION TO ENGINEERING AND ENTREPRENEURSHIP  9

Definition of an Entrepreneur, Entrepreneurial Traits, Entrepreneur vs. Manager, Entrepreneur vs Intrapreneur, Engineer as an Entrepreneur
The Entrepreneurial decision making process - Role of Entrepreneurship in Economic Development- Ethics and Social responsibility of Entrepreneurs - Opportunities for Entrepreneurs in India and abroad-Woman as Entrepreneurs

UNIT II  CREATING AND STARTING THE VENTURE  9

Sources of new Ideas, Methods of generating ideas from Engineering and technology Concepts - creative problem solving, product planning and development process.

UNIT III  MANAGING THE NEW VENTURE  9

Financing - Sources of capital - Record keeping , Production Management–process control, material and inventory control , Human resources - recruitment - motivating and leading teams – labour legislations, Marketing and sales - online marketing, Management of Information – ERP

UNIT IV  NEW VENTURE EXPANSION STRATEGIES AND ISSUES  9

Features and evaluation of joint ventures- acquisitions - mergers - franchising. Public issues - rights issues-bonus issues and stock splits

UNIT V  INSTITUTIONAL SUPPORT TO  9
ENTREPRENEURSHIP

Role of Directorate of Industries- District Industries Centres (DICs)- Industrial Development Corporation-(IDC), State Financial corporation (SFCs)- Small Scale Industries Development Corporations (SSIDCs) - Khadi and village Industries Commission (KVIC) - Technical consultancy Organisation (TCO) - Small Industries Service Institute (SISI) - National Small Industries Corporation (NSIC) - Small Industries Development Bank of India(SIDBI)

TOTAL: 45 PERIODS

TEXTBOOKS:

REFERENCE BOOKS:
COURSE OBJECTIVES:

- This course will help the student to understand about ergonomics and Human behaviour.
- To know the importance of anthropometry and designing the machine for man.

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

- Student will have a deep understanding about ergonomics, anthropometry, designing a job for the worker.
- Student will have a deep knowledge about human behaviour.

UNIT I  ERGONOMICS AND ANATOMY  9

Introduction to ergonomics: The focus of ergonomics, ergonomics and its areas of application in the work system, a brief history of ergonomics, attempts to humanize work, modern ergonomics, future directions for ergonomics Anatomy, Posture and Body Mechanics: Some basic body mechanics, anatomy of the spine and pelvis related to posture, posture stability and posture adaptation, low back pain, risk factors for musculoskeletal disorders in the workplace, behavioural aspects of posture, effectiveness and cost effectiveness, research directions.

UNIT II  HUMAN BEHAVIOR  9

Individual differences, Factors contributing to personality, Fitting the man to the job, Influence of difference on safety, Method of measuring characteristics, Accident Proneness. Motivation, Complexity of motivation, Job satisfaction. Management theories of motivation, Job
enrichment theory. Frustration and Conflicts, Reaction to frustration, Emotion and Frustration. Attitudes-Determination of Attitudes, Changing attitudes Learning, Principles of Learning, Forgetting, Motivational requirements.

UNIT III ANTHROPOMETRY AND WORK DESIGN
FOR STANDING AND SEATED WORKS

Designing for a population of users, percentile, sources of human variability, anthropometry and its uses in ergonomics, principals of applied anthropometry in ergonomics, application of anthropometry in design, design for everyone, anthropometry and personal space, effectiveness and cost effectiveness Fundamental aspects of standing and sitting, an ergonomics approach to work station design, design for standing workers, design for seated workers, work surface design, visual display units, guidelines for design of static work, effectiveness and cost effectiveness, research directions.

UNIT IV MAN - MACHINE SYSTEM AND REPETITIVE WORKS AND MANUAL HANDLING TASK

Applications of human factors engineering, man as a sensor, man as information processor, man as controller – Man vs Machine. Ergonomics interventions in Repetitive works, handle design, key board design measures for preventing in work related musculoskeletal disorders (WMSDs), reduction and controlling, training Anatomy and biomechanics of manual handling, prevention of manual handling injuries in the work place, design of manual handling tasks, carrying, postural stability.

UNIT V HUMAN SKILL AND PERFORMANCE AND DISPLAY, CONTROLS AND VIRTUAL ENVIRONMENTS

A general information-processing model of the users, cognitive system, problem solving, effectiveness. Principles for the design of visual displays- auditory displays- design of controls combining displays and
controls- virtual (synthetic) environments, research issues.

TOTAL: 45 PERIODS

TEXTBOOK:


REFERENCE BOOKS: