# ANNA UNIVERSITY, CHENNAI
**AFFILIATED INSTITUTIONS REGULATIONS - 2013**
**B. TECH. HANDLOOM AND TEXTILE TECHNOLOGY I – VIII SEMESTERS CURRICULUM AND SYLLABUS**

## SEMESTER - I

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>HS6151</td>
<td>Technical English - I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>MA6151</td>
<td>Mathematics – I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>PH6151</td>
<td>Engineering Physics – I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>CY6151</td>
<td>Engineering Chemistry – I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>GE6151</td>
<td>Computer Programming</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>GE6152</td>
<td>Engineering Graphics</td>
<td>2</td>
<td>0</td>
<td>3</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>GE6161</td>
<td>Computer Practices Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>GE6162</td>
<td>Engineering Practices Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>GE6163</td>
<td>Physics and Chemistry Laboratory - I</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>17</td>
<td>2</td>
<td>11</td>
<td>26</td>
</tr>
</tbody>
</table>

## SEMESTER – II

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>HS6251</td>
<td>Technical English - II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>MA6251</td>
<td>Mathematics - II</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>3.</td>
<td>PH6251</td>
<td>Engineering Physics - II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>CY6251</td>
<td>Engineering Chemistry - II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>GE6252</td>
<td>Basic Electrical and Electronics Engineering</td>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>6.</td>
<td>GE6253</td>
<td>Engineering Mechanics</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>GE6261</td>
<td>Computer Aided Drafting and Modeling Laboratory</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>GE6262</td>
<td>Physics and Chemistry Laboratory - II</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>GE6263</td>
<td>Computer Programming Laboratory</td>
<td>0</td>
<td>1</td>
<td>2</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>19</td>
<td>5</td>
<td>6</td>
<td>27</td>
</tr>
</tbody>
</table>
### SEMESTER III

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>MA 6468</td>
<td>Probability and Statistics</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>TT 6303</td>
<td>Technology of Pre Weaving Process</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>TT 6304</td>
<td>Technology of Pre Spinning Process</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>HT 6301</td>
<td>Textile Physics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>HT 6302</td>
<td>Fabric Structure-I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>HT 6303</td>
<td>Handloom Weaving Technology</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>HT 6311</td>
<td>Textile Design and Colour Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>HT 6312</td>
<td>Handloom Weaving Laboratory</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>1</td>
<td>5</td>
<td>22</td>
</tr>
</tbody>
</table>

### SEMESTER IV

<table>
<thead>
<tr>
<th>S. No</th>
<th>COURSE CODE</th>
<th>COURSE TITLE</th>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>MA 6459</td>
<td>Numerical Methods</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>2.</td>
<td>GE 6351</td>
<td>Environmental Science and Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>CE 6460</td>
<td>Solid Mechanics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>TT 6403</td>
<td>Technology of Yarn Spinning</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>HT 6401</td>
<td>Fabric Structure-II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>HT 6402</td>
<td>Fabric Manufacture-I</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>HT 6411</td>
<td>Yarn Process Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>HT 6412</td>
<td>Cloth Analysis Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>2</td>
<td>6</td>
<td>24</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></td>
<td></td>
<td><strong>THEORY</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>1.</td>
<td>HT6501</td>
<td>Advanced Fabric Structure</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>TT6502</td>
<td>Quality Evaluation of Fibres and Yarns</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>TT6503</td>
<td>Knitting Technology</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td>4.</td>
<td>TT6504</td>
<td>Chemical Processing of Textile Materials I</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>TT6505</td>
<td>Technology of Manufactured Fibre Production</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6.</td>
<td>GE6562</td>
<td>Employability Skills</td>
<td>0</td>
<td>0</td>
<td>2</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>HT6511</td>
<td>Weaving Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>HT6512</td>
<td>Chemical Processing Laboratory I</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>9.</td>
<td>TT6512</td>
<td>Fibre and Yarn Quality Evaluation Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>15</td>
<td>1</td>
<td>11</td>
<td>23</td>
</tr>
</tbody>
</table>

# 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>HT6601</td>
<td>Fabric Manufacture II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>TT6601</td>
<td>Fabric Quality Evaluation</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>TT6602</td>
<td>Financial Management for Textile and Apparel Industries</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>TT6604</td>
<td>Mechanics of Textile Machinery</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</td>
<td>TT6605</td>
<td>Chemical Processing of Textile Materials II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>6.</td>
<td>TT6606</td>
<td>Garment Manufacturing Technology</td>
<td>3</td>
<td>1</td>
<td>0</td>
<td>4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>PRACTICAL</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>7.</td>
<td>HT6611</td>
<td>Chemical Processing Laboratory II</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td>8.</td>
<td>TT6611</td>
<td>Fabric Quality Evaluation Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>18</td>
<td>1</td>
<td>6</td>
<td>23</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>HT6701</td>
<td>Mechanics of Yarn and Fabrics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>TT6701</td>
<td>Total Quality Management for Textile Industry</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>TT6702</td>
<td>Operations Research for Textile Industry</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>4.</td>
<td>TT6703</td>
<td>Clothing Comfort</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>5.</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>6.</td>
<td>HT6711</td>
<td>Garment Construction Laboratory</td>
<td>0</td>
<td>0</td>
<td>3</td>
<td>2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>15</td>
<td>0</td>
<td>3</td>
<td>20</td>
</tr>
</tbody>
</table>

### SEMESTER VIII

<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></td>
<td>Elective II</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td></td>
<td>Elective III</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>3.</td>
<td>HT6811</td>
<td>Project Work</td>
<td>0</td>
<td>0</td>
<td>12</td>
<td>6</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>TOTAL</strong></td>
<td>6</td>
<td>0</td>
<td>12</td>
<td>12</td>
</tr>
</tbody>
</table>

### LIST OF ELECTIVES

#### ELECTIVE I

<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>GE6075</td>
<td>Professional Ethics in Engineering</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>TC6010</td>
<td>Home Textiles</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>TC6001</td>
<td>Eco Friendly Dyes, Chemicals and Processing</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
### ELECTIVE 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>FT6605</td>
<td>Industrial Engineering in Apparel Industry</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>TT6004</td>
<td>Apparel Production Machinery</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>FT6606</td>
<td>Apparel Marketing and Merchandising</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>

### ELECTIVE – 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>TT6006</td>
<td>Supply Chain Management for Textile Industry</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>2.</td>
<td>TT6603</td>
<td>Technology of Bonded Fabrics</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
<tr>
<td>3.</td>
<td>TC6004</td>
<td>Technical Textiles</td>
<td>3</td>
<td>0</td>
<td>0</td>
<td>3</td>
</tr>
</tbody>
</table>
OBJECTIVES:

- To enable learners of Engineering and Technology develop their basic communication skills in English.
- To emphasize specially the development of speaking skills amongst learners of Engineering and Technology.
- To ensure that learners use the electronic media such as internet and supplement the learning materials used in the classroom.
- To inculcate the habit of reading and writing leading to effective and efficient communication.

UNIT I

9+3

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

9+3

Listening - Listening and responding to video lectures / talks; Speaking - Describing a simple process (filling a form, etc.) - Asking and 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 – Instructions; Grammar - Use of imperatives - Subject-verb agreement;
Vocabulary - Compound words - Word Association (connotation); E-materials - Interactive exercises for Grammar and Vocabulary - Listening exercises with sample telephone conversations / lectures – Picture-based activities.

UNIT III

9+3

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 and effect / compare and 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 9+3
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 and acronyms; E-materials - Interactive exercises for Grammar and Vocabulary - Sample interviews - film scenes - dialogue writing.

UNIT V 9+3
Listening - Listening to different accents, Listening to Speeches/Presentations, Listening to broadcast and telecast from Radio and 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 and Vocabulary - Sending emails with attachment – Audio / video excerpts of different accents - Interpreting posters.

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
Learners should be able to
• speak clearly, confidently, comprehensibly, and communicate with one or many listeners using appropriate communicative strategies.
• write cohesively and coherently and flawlessly avoiding grammatical errors, using a wide vocabulary range, organizing their ideas logically on a topic.
• read different genres of texts adopting various reading strategies.
• listen/view and comprehend different spoken discourses/excerpts in different accents

TEXTBOOKS:

REFERENCES:
EXTENSIVE Reading (Not for Examination)

WEBSITES:

TEACHING METHODS:
• Lectures
• Activities conducted individually, in pairs and in groups like self introduction, peer introduction, group poster making, grammar and vocabulary games, etc.
• Discussions
• Role play activities
• Short presentations
• Listening and viewing activities with follow up activities like discussion, filling up worksheets, writing exercises (using language lab wherever necessary/possible) etc.

EVALUATION PATTERN:

Internal assessment: 20%
3 tests of which two are pen and paper tests and the other is a combination of different modes of assessment like
• Project
• Assignment
• Reviews
• Creative writing
• Poster making, etc.

All the four skills are to be tested with equal weightage given to each.
✓ Speaking assessment: Individual speaking activities, Pair work activities like role play, Interview, Group discussions
✓ Reading assessment: Reading passages with comprehension questions graded from simple to complex, from direct to inferential
✓ Writing assessment: Writing paragraphs, essays etc. Writing should include grammar and vocabulary.
✓ Listening/Viewing assessment: Lectures, dialogues, film clippings with questions on verbal as well as audio/visual content.

End Semester Examination: 80%
OBJECTIVES:
- To develop the use of matrix algebra techniques this is 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.

UNIT I MATRICES

UNIT II SEQUENCES AND SERIES

UNIT III APPLICATIONS OF DIFFERENTIAL CALCULUS
Curvature in Cartesian co-ordinates – Centre and radius of curvature – Circle of curvature – Evolutes – Envelopes - Evolute as envelope of normals.

UNIT IV DIFFERENTIAL CALCULUS OF SEVERAL VARIABLES

UNIT V MULTIPLE INTEGRALS

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
- This course equips students to have basic knowledge and understanding in one fields of materials, integral and differential calculus.
TEXT BOOKS:

REFERENCES:

PH6151 ENGINEERING PHYSICS – I  L T P C
3 0 0 3

OBJECTIVES:
- To enhance the fundamental knowledge in Physics and its applications relevant to various streams of Engineering and Technology.

UNIT I CRYSTAL PHYSICS
Lattice – Unit cell – Bravais lattice – Lattice planes – Miller indices – d spacing in cubic lattice – Calculation of number of atoms per unit cell – Atomic radius – Coordination number – Packing factor for SC, BCC, FCC and HCP structures – Diamond and graphite structures (qualitative treatment) - Crystal growth techniques –solution, melt (Bridgman and Czochralski) and vapour growth techniques (qualitative)

UNIT II PROPERTIES OF MATTER AND THERMAL PHYSICS
Elasticity- Hooke’s law - Relationship between three modulii of elasticity (qualitative) – stress -strain diagram – Poisson’s ratio –Factors affecting elasticity –Bending moment – Depression of a cantilever –Young’s modulus by uniform bending- l-shaped girders

UNIT III QUANTUM PHYSICS
independent and time dependent equations – Physical significance of wave function – Particle in a one dimensional box - Electron microscope - Scanning electron microscope - Transmission electron microscope.

UNIT IV ACOUSTICS AND ULTRASONICS
9
Production of ultrasonics by magnetostriction and piezoelectric methods - acoustic grating -Non Destructive Testing – pulse echo system through transmission and reflection modes - A,B and C – scan displays, Medical applications - Sonogram

UNIT V PHOTONICS AND FIBRE OPTICS
9
Principle and propagation of light in optical fibres – Numerical aperture and Acceptance angle - Types of optical fibres (material, refractive index, mode) – attenuation, dispersion, bending - Fibre Optical Communication system (Block diagram) - Active and passive fibre sensors- Endoscope.

TOTAL: 45 PERIODS

OUTCOMES:
• The students will have knowledge on the basics of physics related to properties of matter, optics, acoustics etc., and they will apply these fundamental principles to solve practical problems related to materials used for engineering applications.

TEXT BOOKS:
1. Arumugam M. Engineering Physics. Anuradha publishers, 2010

REFERENCES:
1. Searls and Zemansky. University Physics, 2009
5. Rajagopal K. Engineering Physics. PHI, New Delhi, 2011
OBJECTIVES:
- To make the students conversant with basics of polymer chemistry.
- To make the student acquire sound knowledge of second law of thermodynamics and second law based derivations of importance in engineering applications in all disciplines.
- To acquaint the student with concepts of important photophysical and photochemical processes and spectroscopy.
- To develop an understanding of the basic concepts of phase rule and its applications to single and two component systems and appreciate the purpose and significance of alloys.
- To acquaint the students with the basics of nano materials, their properties and applications.

UNIT I  POLYMER CHEMISTRY  9
Introduction: Classification of polymers – Natural and synthetic; Thermoplastic and Thermosetting. Functionality – Degree of polymerization. Types and mechanism of polymerization: Addition (Free Radical, cationic and anionic); condensation and copolymerization. Properties of polymers: Tg, Tacticity, Molecular weight – weight average, number average and polydispersity index. Techniques of polymerization: Bulk, emulsion, solution and suspension. Preparation, properties and uses of Nylon 6,6, and Epoxy resin.

UNIT II  CHEMICAL THERMODYNAMICS  9
Terminology of thermodynamics - Second law: Entropy - entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Clausius inequality. Free energy and work function: Helmholtz and Gibbs free energy functions (problems); Criteria of spontaneity; Gibbs-Helmholtz equation (problems); Clausius-Clapeyron equation; Maxwell relations – Van’t Hoff isotherm and isochore(problems).

UNIT III  PHOTOCHEMISTRY AND SPECTROSCOPY  9

UNIT IV  PHASE RULE AND ALLOYS  9
UNIT V  NANOCHEMISTRY 
Basics - distinction between molecules, nanoparticles and bulk materials; size-dependent properties. Nanoparticles: nano cluster, nano rod, nanotube(CNT) and nanowire. Synthesis: precipitation, thermolysis, hydrothermal, solvothermal, electrode position, chemical vapour deposition, laser ablation; Properties and applications 

TOTAL :45 PERIODS

OUTCOMES:
• The knowledge gained on polymer chemistry, thermodynamics. spectroscopy, phase rule and nano materials will provide a strong platform to understand the concepts on these subjects for further learning.

TEXT BOOKS:

REFERENCES:

GE6151  COMPUTER PROGRAMMING

OBJECTIVES:
The students should be made to:
• Learn the organization of a digital computer.
• Be exposed to the number systems.
• Learn to think logically and write pseudo code or draw flow charts for problems.
• Be exposed to the syntax of C.
• Be familiar with programming in C.
• Learn to use arrays, strings, functions, pointers, structures and unions in C.

UNIT I  INTRODUCTION
UNIT II   C PROGRAMMING BASICS

UNIT III   ARRAYS AND STRINGS

UNIT IV   FUNCTIONS AND POINTERS

UNIT V   STRUCTURES AND UNIONS
Introduction – need for structure data type – structure definition – Structure declaration – Structure within a structure - Union - Programs using structures and Unions – Storage classes, Pre-processor directives.

OUTCOMES:
At the end of the course, the student should be able to:
• Design C Programs for problems.
• Write and execute C programs for simple applications.

TEXTBOOKS:

REFERENCES:
OBJECTIVES:
- To develop in students, graphic skills for communication of concepts, ideas and design of Engineering products.
- To expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (Not for Examination)
Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

UNIT I  PLANE CURVES AND FREE HAND SKETCHING  5+9
Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

UNIT II  PROJECTION OF POINTS, LINES AND PLANE SURFACES  5+9
Orthographic projection- principles-Principal planes-First angle projection-projection of points. Projection of straight lines (only First angle projections) 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 rotating object method.

UNIT III  PROJECTION OF SOLIDS  5+9
Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to one of the principal planes by rotating object method and auxiliary plane method.

UNIT IV  PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES  5+9
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 section. Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes

UNIT V  ISOMETRIC AND PERSPECTIVE PROJECTIONS  6+9
Principles of isometric projection – isometric scale –Isometric projections of simple solids and truncated solids - Prisms, pyramids, cylinders, cones- combination of two solid objects in simple vertical positions and miscellaneous problems. Perspective projection of simple solids-Prisms, pyramids and cylinders by visual ray method.
COMPUTER AIDED DRAFTING (Demonstration Only)

Introduction to drafting packages and demonstration of their use.

TOTAL : 75 PERIODS

OUTCOMES:
On Completion of the course the student will be able to

• perform free hand sketching of basic geometrical constructions and multiple views of objects.
• do orthographic projection of lines and plane surfaces.
• draw projections and solids and development of surfaces.
• prepare isometric and perspective sections of simple solids.
• demonstrate computer aided drafting.

TEXT BOOK:

REFERENCES:

Publication of Bureau of Indian Standards:

Special points applicable to University 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

GE6161 COMPUTER PRACTICES LABORATORY L T P C
0 0 3 2

OBJECTIVES:
The student should be made to:
- Be familiar with the use of Office software.
- Be exposed to presentation and visualization tools.
- Be exposed to problem solving techniques and flow charts.
- Be familiar with programming in C.
- Learn to use Arrays, strings, functions, structures and unions.

LIST OF EXPERIMENTS:
1. Search, generate, manipulate data using MS office/ Open Office
2. Presentation and Visualization – graphs, charts, 2D, 3D
3. Problem formulation, Problem Solving and Flowcharts
4. C Programming using Simple statements and expressions
5. Scientific problem solving using decision making and looping.
6. Simple programming for one dimensional and two dimensional arrays.
7. Solving problems using String functions
8. Programs with user defined functions – Includes Parameter Passing
9. Program using Recursive Function and conversion from given program to flow chart.
10. Program using structures and unions.

OUTCOMES:
At the end of the course, the student should be able to:
- Apply good programming design methods for program development.
- Design and implement C programs for simple applications.
- Develop recursive programs.

LIST OF EQUIPMENTS FOR A BATCH OF 30 STUDENTS:
Standalone desktops with C compiler 30 Nos.
(or)
Server with C compiler supporting 30 terminals or more.

TOTAL : 45 PERIODS
OBJECTIVES:
- To provide exposure to the students with hands on experience on various basic engineering practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP A (CIVIL & MECHANICAL)

I CIVIL ENGINEERING PRACTICE

Buildings:
- (a) Study of plumbing and carpentry components of residential and industrial buildings. Safety aspects.

Plumbing Works:
- (a) Study of pipeline joints, its location and functions: valves, taps, couplings, unions, reducers, elbows in household fittings.
- (b) Study of pipe connections requirements for pumps and turbines.
- (c) Preparation of plumbing line sketches for water supply and sewage works.
- (d) Hands-on-exercise:
  - Basic pipe connections – Mixed pipe material connection – Pipe connections with different joining components.
- (e) Demonstration of plumbing requirements of high-rise buildings.

Carpentry using Power Tools only:
- (a) Study of the joints in roofs, doors, windows and furniture.
- (b) Hands-on-exercise:
  - Wood work, joints by sawing, planing and cutting.

II MECHANICAL ENGINEERING PRACTICE

Welding:
- (a) Preparation of arc welding of butt joints, lap joints and tee joints.
- (b) Gas welding practice

Basic Machining:
- (a) Simple Turning and Taper turning
- (b) Drilling Practice

Sheet Metal Work:
- (a) Forming & Bending:
- (b) Model making – Trays, funnels, etc.
- (c) Different type of joints.

Machine assembly practice:
- (a) Study of centrifugal pump
- (b) Study of air conditioner
Demonstration on:
(a) Smithy operations, upsetting, swaging, setting down and bending. Example –
   Exercise – Production of hexagonal headed bolt.
(b) Foundry operations like mould preparation for gear and step cone pulley.
(c) Fitting – Exercises – Preparation of square fitting and vee – fitting models.

GROUP B (ELECTRICAL & 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 CR.
2. Study of logic gates AND, OR, EOR 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

OUTCOMES:
• ability to fabricate carpentry components and pipe connections including plumbing works.
• ability to use welding equipments to join the structures.
• ability to fabricate electrical and electronics circuits.

REFERENCES:

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

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

MECHANICAL

1. Arc welding transformer with cables and holders 5 Nos.
2. Welding booth with exhaust facility 5 Nos.
3. Welding accessories like welding shield, chipping hammer, wire brush, etc. 5 Sets.
4. Oxygen and acetylene gas cylinders, blow pipe and other welding outfit. 2 Nos.
5. Centre lathe 2 Nos.
6. Hearth furnace, anvil and smithy tools 2 Sets.
7. Moulding table, foundry tools 2 Sets.
8. Power Tool: Angle Grinder 2 Nos
9. Study-purpose items: centrifugal pump, air-conditioner One each.

ELECTRICAL

1. Assorted electrical components for house wiring 15 Sets
2. Electrical measuring instruments 10 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
   (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
OBJECTIVES:
• To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter.

LIST OF EXPERIMENTS
(Any FIVE Experiments)
1. (a) Determination of Wavelength, and particle size using Laser
(b) Determination of acceptance angle in an optical fiber.
2. Determination of velocity of sound and compressibility of liquid – Ultrasonic interferometer.
3. Determination of wavelength of mercury spectrum – spectrometer grating
5. Determination of Young’s modulus by Non uniform bending method
6. Determination of specific resistance of a given coil of wire – Carey Foster’s Bridge

OUTCOMES:
• The hands on exercises undergone by the students will help them to apply physics principles of optics and thermal physics to evaluate engineering properties of materials.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:
1. Diode laser, lycopodium powder, glass plate, optical fiber.
2. Ultrasonic interferometer
3. Spectrometer, mercury lamp, grating
4. Lee’s Disc experimental set up
5. Traveling microscope, meter scale, knife edge, weights
6. Carey foster’s bridge set up
   (vernier Caliper, Screw gauge, reading lens are required for most of the experiments)

CHEMISTRY LABORATORY- I

OBJECTIVES:
• To make the student to acquire practical skills in the determination of water quality parameters through volumetric and instrumental analysis.
• To acquaint the students with the determination of molecular weight of a polymer by vacometry.

LIST OF EXPERIMENTS
(Any FIVE Experiments)
1. Determination of DO content of water sample by Winkler’s method.
Determination of chloride content of water sample by argentometric method.

Determination of strength of given hydrochloric acid using pH meter.

Determination of strength of acids in a mixture using conductivity meter.

Estimation of iron content of the water sample using spectrophotometer.
(1,10-phenanthroline/thiocyanate method).

Determination of molecular weight of polyvinylalcohol using Ostwald viscometer.

Conductometric titration of strong acid vs strong base.

TOTAL: 30 PERIODS

OUTCOMES:
- The students will be outfitted with hands-on knowledge in the quantitative chemical analysis of water quality related parameters.

REFERENCES:

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Iodine flask - 30 Nos
2. pH meter - 5 Nos
3. Conductivity meter - 5 Nos
4. Spectrophotometer - 5 Nos
5. Ostwald Viscometer - 10 Nos

Common Apparatus: Pipette, Burette, conical flask, porcelain tile, dropper (each 30 Nos.)

HS6251 TECHNICAL ENGLISH II L T P C 3 1 0 4

OBJECTIVES:
- To make learners acquire listening and speaking skills in both formal and informal contexts.
- To help them develop their reading skills by familiarizing them with different types of reading strategies.
- To equip them with writing skills needed for academic as well as workplace contexts.
- To make them acquire language skills at their own pace by using e-materials and language lab components.
UNIT I
9+3
Listening - Listening to informal conversations and participating; Speaking - Opening a conversation (greetings, comments on topics like weather) - Turn taking - Closing a conversation (excuses, general wish, positive comment, thanks); Reading - Developing analytical skills, Deductive and inductive reasoning - Extensive reading; Writing - Effective use of SMS for sending short notes and messages - Using ‘emoticons’ as symbols in email messages; Grammar - Regular and irregular verbs - Active and passive voice; Vocabulary - Homonyms (e.g. ‘can’) - Homophones (e.g. ‘some’, ‘sum’); E-materials - Interactive exercise on Grammar and vocabulary – blogging; Language Lab - Listening to different types of conversation and answering questions.

UNIT II
9+3
Listening - Listening to situation based dialogues; Speaking - Conversation practice in real life situations, asking for directions (using polite expressions), giving directions (using imperative sentences), Purchasing goods from a shop. Discussing various aspects of a film (they have already seen) or a book (they have already read); Reading - Reading a short story or an article from newspaper, Critical reading, Comprehension skills; Writing - Writing a review / summary of a story / article, Personal letter (Inviting your friend to a function, congratulating someone for his / her success, thanking one’s friends / relatives); Grammar - modal verbs, Purpose expressions; Vocabulary - Phrasal verbs and their meanings, Using phrasal verbs in sentences; E-materials - Interactive exercises on Grammar and vocabulary, Extensive reading activity (reading stories / novels), Posting reviews in blogs - Language Lab - Dialogues (Fill up exercises), Recording students’ dialogues.

UNIT III
9+3
Listening - Listening to the conversation - Understanding the structure of conversations; Speaking - Conversation skills with a sense of stress, intonation, pronunciation and meaning - Seeking information – expressing feelings (affection, anger, regret, etc.); Reading - Speed reading – reading passages with time limit - Skimming; Writing - Minutes of meeting – format and practice in the preparation of minutes - Writing summary after reading articles from journals - Format for journal articles – elements of technical articles (abstract, introduction, methodology, results, discussion, conclusion, appendices, references) - Writing strategies; Grammar - Conditional clauses - Cause and effect expressions; Vocabulary - Words used as nouns and verbs without any change in the spelling (e.g. ‘rock’, ‘train’, ‘ring’); E-materials - Interactive exercise on Grammar and vocabulary - Speed Reading practice exercises; Language Lab - Intonation practice using EFLU and RIE materials – Attending a meeting and writing minutes.

UNIT IV
9+3
Listening - Listening to a telephone conversation, Viewing model interviews (face-to-face, telephonic and video conferencing); Speaking - Role play practice in telephone skills - listening and responding, - asking questions, - note taking – passing on messages, Role play and mock interview for grasping interview skills; Reading - Reading the job advertisements and the profile of the company concerned – scanning; Writing - Applying for a job – cover letter - résumé preparation – vision, mission and goals of the candidate; Grammar - Numerical expressions - Connectives (discourse markers); Vocabulary - Idioms and their meanings – using idioms in sentences; E-materials - Interactive exercises on
Grammar and Vocabulary - Different forms of résumés- Filling up a résumé / cover letter; Language Lab - Telephonic interview – recording the responses - e-résumé writing.

UNIT V

Listening - Viewing a model group discussion and reviewing the performance of each participant - Identifying the characteristics of a good listener; Speaking - Group discussion skills – initiating the discussion – exchanging suggestions and proposals – expressing dissent/agreement – assertiveness in expressing opinions – mind mapping technique; Reading - Note making skills – making notes from books, or any form of written materials - Intensive reading; Writing – Checklist - Types of reports – Feasibility / Project report – report format – recommendations / suggestions – interpretation of data (using charts for effective presentation); Grammar - Use of clauses; Vocabulary – Collocation; E-materials - Interactive grammar and vocabulary exercises - Sample GD - Pictures for discussion, Interactive grammar and vocabulary exercises; Language Lab - Different models of group discussion.

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
 Learners should be able to
• speak convincingly, express their opinions clearly, initiate a discussion, negotiate, argue using appropriate communicative strategies.
• write effectively and persuasively and produce different types of writing such as narration, description, exposition and argument as well as creative, critical, analytical and evaluative writing.
• read different genres of texts, infer implied meanings and critically analyse 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.

TEXTBOOKS:

REFERENCES:
EXTENSIVE Reading (Not for Examination)

Websites
2. http://owl.english.purdue.edu

TEACHING METHODS:
- Lectures
- Activities conducted individually, in pairs and in groups like individual writing and presentations, group discussions, interviews, reporting, etc
- Long presentations using visual aids
- Listening and viewing activities with follow up activities like discussions, filling up worksheets, writing exercises (using language lab wherever necessary/possible) etc
- Projects like group reports, mock interviews etc using a combination of two or more of the language skills

EVALUATION PATTERN:
Internal assessment: 20%
3 tests of which two are pen and paper tests and the other is a combination of different modes of assessment like
- Project
- Assignment
- Report
- Creative writing, etc.

All the four skills are to be tested with equal weightage given to each.
- Speaking assessment: Individual presentations, Group discussions
- Reading assessment: Reading passages with comprehension questions graded following Bloom’s taxonomy
- Writing assessment: Writing essays, CVs, reports etc. Writing should include grammar and vocabulary.
- Listening/Viewing assessment: Lectures, dialogues, film clippings with questions on verbal as well as audio/visual content graded following Bloom’s taxonomy.

End Semester Examination: 80%

MA6251 MATHEMATICS – II

OBJECTIVES:
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To acquaint the student with the concepts of vector calculus needed for problems in all engineering disciplines.
To develop an understanding of 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 appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I VECTOR CALCULUS
9+3
Gradient, divergence and curl – Directional derivative – Irrotational and solenoidal vector fields – Vector integration – Green’s theorem in a plane, Gauss divergence theorem and Stokes’ theorem (excluding proofs) – Simple applications involving cubes and rectangular paralleloipeds.

UNIT II ORDINARY DIFFERENTIAL EQUATIONS
9+3
Higher order linear differential equations with constant coefficients – Method of variation of parameters – Cauchy’s and Legendre’s linear equations – Simultaneous first order linear equations with constant coefficients.

UNIT III LAPLACE TRANSFORM
9+3

UNIT IV ANALYTIC FUNCTIONS
9+3
Functions of a complex variable – Analytic functions: Necessary conditions – Cauchy-Riemann equations and sufficient conditions (excluding proofs) – Harmonic and orthogonal properties of analytic function – Harmonic conjugate – Construction of analytic functions – Conformal mapping: w = z+k, kz, 1/z, z², e^z and bilinear transformation.

UNIT V COMPLEX INTEGRATION
9+3
Complex integration – Statement and applications of Cauchy’s integral theorem and Cauchy’s integral formula – Taylor’s and Laurent’s series expansions – Singular points – Residues – Cauchy’s residue theorem – Evaluation of real definite integrals as contour integrals around unit circle and semi-circle (excluding poles on the real axis).

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
• The subject helps the students to develop the fundamentals and basic concepts in vector calculus, ODE, Laplace transform and complex functions. Students will be able to solve problems related to engineering applications by using these techniques.

TEXT BOOKS:

REFERENCES:

PH6251	 ENGINEERING PHYSICS – II	 L T P C
3 0 0 3

OBJECTIVES:
- To enrich the understanding of various types of materials and their applications in engineering and technology.

UNIT I CONDUCTING MATERIALS

UNIT II SEMICONDUCTING MATERIALS

UNIT III MAGNETIC AND SUPERCONDUCTING MATERIALS
Superconductivity: properties – Type I and Type II superconductors – BCS theory of superconductivity(Qualitative) - High Tc superconductors – Applications of superconductors – SQUID, cryotron, magnetic levitation.
UNIT IV DIELECTRIC MATERIALS

UNIT V ADVANCED ENGINEERING MATERIALS

TOTAL: 45 PERIODS

OUTCOMES:
• The students will have the knowledge on physics of materials and that knowledge will be used by them in different engineering and technology applications.

TEXT BOOKS:

REFERENCES:

CY6251 ENGINEERING CHEMISTRY - II L T P C
3 0 0 3

OBJECTIVES:
• To make the students conversant with boiler feed water requirements, related problems and water treatment techniques.
• Principles of electrochemical reactions, redox reactions in corrosion of materials and methods for corrosion prevention and protection of materials.
• Principles and generation of energy in batteries, nuclear reactors, solar cells, wind mills and fuel cells.
• Preparation, properties and applications of engineering materials.
• Types of fuels, calorific value calculations, manufacture of solid, liquid and gaseous fuels.

UNIT I WATER TECHNOLOGY
Introduction to boiler feed water-requirements-formation of deposits in steam boilers and heat exchangers- disadvantages (wastage of fuels, decrease in efficiency, boiler explosion) prevention of scale formation -softening of hard water -external treatment zeolite and demineralization -
internal treatment- boiler compounds (phosphate, calgon, carbonate, colloidal) - caustic embrittlement -boiler corrosion-priming and foaming- desalination of brackish water –reverse osmosis.

UNIT II ELECTROCHEMISTRY AND CORROSION

UNIT III ENERGY SOURCES
Introduction- nuclear energy- nuclear fission- controlled nuclear fission- nuclear fusion- differences between nuclear fission and fusion- nuclear chain reactions- nuclear reactor power generator-classification of nuclear reactor- light water reactor- breeder reactor- solar energy conversion- solar cells- wind energy. Batteries and fuel cells:Types of batteries- alkaline battery- lead storage battery- nickel-cadmium battery- lithium battery- fuel cell H₂ -O₂ fuel cell- applications.

UNIT IV ENGINEERING MATERIALS
Abrasives: definition, classification or types, grinding wheel, abrasive paper and cloth. Refractories: definition, characteristics, classification, properties – refractoriness and RUL, dimensional stability, thermal spalling, thermal expansion, porosity; Manufacture of alumina, magnesite and silicon carbide, Portland cement- manufacture and properties - setting and hardening of cement, special cement- waterproof and white cement–properties and uses. Glass - manufacture, types, properties and uses.

UNIT V FUELS AND COMBUSTION

TOTAL: 45 PERIODS

OUTCOMES:
• The knowledge gained on engineering materials, fuels, energy sources and water treatment techniques will facilitate better understanding of engineering processes and applications for further learning.
**TEXT BOOKS:**
2. DaraS.S,UmareS.S.”Engineering Chemistry”, S. Chand & Company Ltd., New Delhi , 2010

**REFERENCES:**

---

**GE6252 BASIC ELECTRICAL AND ELECTRONICS ENGINEERING**

<table>
<thead>
<tr>
<th>L</th>
<th>T</th>
<th>P</th>
<th>C</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>0</td>
<td>0</td>
<td>4</td>
</tr>
</tbody>
</table>

**OBJECTIVES:**
- To explain the basic theorems used in Electrical circuits and the different components and function of electrical machines.
- To explain the fundamentals of semiconductor and applications.
- To explain the principles of digital electronics
- To impart knowledge of communication.

**UNIT I ELECTRICAL CIRCUITS & MEASURMENTS**

- Operating Principles of Moving Coil and Moving Iron Instruments (Ammeters and Voltmeters), Dynamometer type Watt meters and Energy meters.

**UNIT II ELECTRICAL MECHANICS**


**UNIT III SEMICONDUCTOR DEVICES AND APPLICATIONS**


**UNIT IV DIGITAL ELECTRONICS**

UNIT V FUNDAMENTALS OF COMMUNICATION ENGINEERING 12

TOTAL: 60 PERIODS

OUTCOMES:
• ability to identify the electrical components explain the characteristics of electrical machines.
• ability to identify electronics components and use of them to design circuits.

TEXT BOOKS:

REFERENCES:

GE6253 ENGINEERING MECHANICS L T P C 3 1 0 4

OBJECTIVES:
• To develop capacity to predict the effect of force and motion in the course of carrying out the design functions of engineering.

UNIT I BASICS AND STATICS OF PARTICLES 12

UNIT II EQUILIBRIUM OF RIGID BODIES 12
Free body diagram – Types of supports –Action and reaction forces –stable equilibrium – Moments and Couples – Moment of a force about a point and about an axis – Vectorial representation of moments and couples – Scalar components of a moment – Varignon’s theorem – Single equivalent force -Equilibrium of Rigid bodies in two dimensions – Equilibrium of Rigid bodies in three dimensions
UNIT III PROPERTIES OF SURFACES AND SOLIDS


UNIT IV DYNAMICS OF PARTICLES


UNIT V FRICTION AND ELEMENTS OF RIGID BODY DYNAMICS

Friction force – Laws of sliding friction – equilibrium analysis of simple systems with sliding friction – wedge friction-. Rolling resistance -Translation and Rotation of Rigid Bodies – Velocity and acceleration – General Plane motion of simple rigid bodies such as cylinder, disc/wheel and sphere.

OUTCOMES:

- ability to explain the differential principles applies to solve engineering problems dealing with force, displacement, velocity and acceleration.
- ability to analyse the forces in any structures.
- ability to solve rigid body subjected to dynamic forces.

TEXT BOOKS:


REFERENCES:

OBJECTIVES:
• To develop skill to use software to create 2D and 3D models.

List of Exercises using software capable of Drafting and Modeling

1. Study of capabilities of software for Drafting and Modeling – Coordinate systems (absolute, relative, polar, etc.) – Creation of simple figures like polygon and general multi-line figures.
2. Drawing of a Title Block with necessary text and projection symbol.
3. Drawing of curves like parabola, spiral, involute using Bspline or cubic spline.
4. Drawing of front view and top view of simple solids like prism, pyramid, cylinder, cone, etc, and dimensioning.
5. Drawing front view, top view and side view of objects from the given pictorial views (eg. V-block, Base of a mixie, Simple stool, Objects with hole and curves).
6. Drawing of a plan of residential building ( Two bed rooms, kitchen, hall, etc.)
7. Drawing of a simple steel truss.
8. Drawing sectional views of prism, pyramid, cylinder, cone, etc,
10. Creation of 3-D models of simple objects and obtaining 2-D multi-view drawings from 3-D model.

Note: Plotting of drawings must be made for each exercise and attached to the records written by students.

TOTAL: 45 PERIODS

OUTCOMES:
• ability to use the software packers for drafting and modeling
• ability to create 2D and 3D models of Engineering Components

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

<table>
<thead>
<tr>
<th>Sl.No</th>
<th>Description of Equipment</th>
<th>Quantity</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Pentium IV computer or better hardware, with suitable graphics facility</td>
<td>30 No.</td>
</tr>
<tr>
<td>2.</td>
<td>Licensed software for Drafting and Modeling.</td>
<td>30 Licenses</td>
</tr>
<tr>
<td>3.</td>
<td>Laser Printer or Plotter to print / plot drawings</td>
<td>2 No.</td>
</tr>
</tbody>
</table>
OBJECTIVES:
• To introduce different experiments to test basic understanding of physics concepts applied in optics, thermal physics and properties of matter.

LIST OF EXPERIMENTS
(Any FIVE Experiments)
1. Determination of Young’s modulus by uniform bending method
2. Determination of band gap of a semiconductor
3. Determination of Coefficient of viscosity of a liquid – Poiseuille’s method
4. Determination of Dispersive power of a prism - Spectrometer
5. Determination of thickness of a thin wire – Air wedge method
6. Determination of Rigidity modulus – Torsion pendulum

OUTCOMES:
• The students will have the ability to test materials by using their knowledge of applied physics principles in optics and properties of matter.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:
1. Traveling microscope, meter scale, Knife edge, weights
2. Band gap experimental set up
3. Burette, Capillary tube, rubber tube, stop clock, beaker and weighing balance
4. spectrometer, prism, sodium vapour lamp.
5. Air-wedge experimental set up.
6. Torsion pendulum set up.
   (vernier Caliper, Screw gauge, reading lens are required for most of the experiments)

CHEMISTRY LABORATORY - II

OBJECTIVES:
• To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of hardness, alkalinity, metal ion content, corrosion in metals and cement analysis.

LIST OF EXPERIMENTS
(Any FIVE Experiments)
1. Determination of alkalinity in water sample
2. Determination of total, temporary & permanent hardness of water by EDTA method
3. Estimation of copper content of the given solution by EDTA method
4. Estimation of iron content of the given solution using potentiometer
5. Estimation of sodium present in water using flame photometer
6. Corrosion experiment – weight loss method
7. Conductometric precipitation titration using BaCl$_2$ and Na$_2$SO$_4$
OUTCOMES:
- The students will be conversant with hands-on knowledge in the quantitative chemical analysis of water quality related parameters, corrosion measurement and cement analysis.

REFERENCES:
- Laboratory classes on alternate weeks for Physics and Chemistry.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS:

1. Potentiometer - 5 Nos
2. Flame photo meter - 5 Nos
3. Weighing Balance - 5 Nos
4. Conductivity meter - 5 Nos

Common Apparatus: Pipette, Burette, conical flask, percelain tile, dropper (30 Nos each)

GE6263 COMPUTER PROGRAMMING LABORATORY

OBJECTIVES:
The Students should be made to
- Be exposed to Unix shell commands
- Be familiar with an editor on Unix
- Learn to program in Shell script
- Learn to write C programme for Unix platform

LIST OF EXPERIMENTS

1. UNIX COMMANDS

Study of Unix OS - Basic Shell Commands - Unix Editor

2. SHELL PROGRAMMING
Simple Shell program - Conditional Statements - Testing and Loops

3. C PROGRAMMING ON UNIX 15
Dynamic Storage Allocation-Pointers-Functions-File Handling

TOTAL: 45 PERIODS

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

- Use Shell commands
- Design of Implement Unix shell scripts
- Write and execute C programs on Unix

HARDWARE / SOFTWARE REQUIREMENTS FOR A BATCH OF 30 STUDENTS

Hardware
- 1 UNIX Clone Server
- 3 3 Nodes (thin client or PCs)
- Printer – 3 Nos.

Software
- OS – UNIX Clone (33 user license or License free Linux)
- Compiler - C

MA6468 PROBABILITY AND STATISTICS L T P C
3 1 0 4

OBJECTIVES:
- This course aims at providing the required skill to apply the statistical tools in engineering problems.

UNIT I RANDOM VARIABLES 9 + 3
Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma and Normal distributions.

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 9 + 3
Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).
UNIT III    TESTING OF HYPOTHESIS  9 + 3
Sampling distributions - Estimation of parameters - Statistical hypothesis - Large sample test based on Normal distribution for single mean and difference of means - Tests based on t, Chi-square and F distributions for mean, variance and proportion - Contingency table (test for independent) - Goodness of fit.

UNIT IV    DESIGN OF EXPERIMENTS  9 + 3
One way and Two way classifications - Completely randomized design – Randomized block design – Latin square design - $2^2$ factorial design.

UNIT V    STATISTICAL QUALITY CONTROL  9 + 3
Control charts for measurements (X and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

TOTAL (L:45+T:15): 60 PERIODS

OUTCOMES:
• The students will have a fundamental knowledge of the concepts of probability. Have knowledge of standard distributions which can describe real life phenomenon. Have the notion of sampling distributions and statistical techniques used in engineering and management problems.

TEXT BOOKS:

REFERENCES:
OBJECTIVES:
To enable the students to learn about the
- Theory of preparation of yarn for fabric formation and various preparatory process, and
- Selection and control of process variables during weaving preparatory.

UNIT I  BASICS OF WINDING  9
Objects of winding; principles of cheese and cone winding machines; uniform build of yarn package;
types of drums – half accelerated and fully accelerated drums; control of balloons; Classification of
yarn faults and its removal; concepts in yarn clearing – mechanical, optical and electronic clearers;
knotters and splicers

UNIT II  PROCESS CONTROL IN WINDING  9
Faults in wound packages, their causes and remedies; winding synthetic and blended yarns; weft
winding; winding for colouration; quality of knots and splices; study of modern automatic winders.
winding performance; productivity; maintenance; quality control; material handling.

UNIT III  WARping  5
Objectives of warping, material flow in beam warping and creels used in warping machines; sectional
warping machines.

UNIT IV  SIZING  9
Objectives of sizing; sizing materials and recipii used for different types of fibers; size preparation
equipment; sizing machines; sizing filament yarns; concept of single end sizing, combined dyeing and
sizing. Control concepts in modern sizing; energy conservation in sizing; Sizing defects and
production calculations.

UNIT V  PROCESS CONTROL IN WARPING AND SIZING  9
Process control in warping (production calculation, machine and labor productivity, control of end
breaks, quality and hard waste in warping); Control systems used in sizing machine.

UNIT VI  DRAWING-IN  4
Need for drawing-in operation; manual and automatic drawing-in, leasing, knotting and pinning
machines; selection and care of reeds, healds and drop pins, control of cross ends and extra ends
and calculations.

TOTAL : 45 PERIODS

OUTCOME:
Upon completion of this course, the student shall be able to know the various preparatory processes,
and controlling of process variables at preparatory to achieve the fabric with required qualities.

TEXTBOOKS:
OBJECTIVE:
To enable the students to learn the theory of various operations carried out at different stages of pre spinning process, which would be helpful to them in understanding the influence of various parameters on quality of the yarn and productivity.

UNIT I INTRODUCTION
Sequence of spinning machinery for producing carded, combed and blended yarns in short staple and long staple spinning system; yarn numbering systems- direct, indirect and conversions; influence of characteristics of raw material – fibre fineness, length, strength, elongation, stiffness, fibre friction, cleanliness on spinning performance; spinnability

UNIT II GINNING AND BLOWROOM MACHINERY
Description and working of different types of gins; selection of right type of gins; ginning performance on yarn quality; objects, principle and description of opening, cleaning and blending machines used in blowroom; chute feed; cleaning efficiency, production calculations.

UNIT III CARDING MACHINE
Objects and principle of carding; detailed study of flat card; autolevelling; card clothing and its maintenance; drives and production calculation.

UNIT IV COMBER
Objectives of comber preparatory; detailed study of sliver lap, ribbon lap and super lap formers; objects and principles of combing; sequence of combing operation; combing efficiency and production calculation.

UNIT V DRAWING MACHINE AND ROVING MACHINE
Tasks of drawing machine; drafting systems used in modern drawing machines; autolevelling; draft and production calculation; objectives of roving machine; working of roving machine; bobbin builder mechanism – mechanical and electro-mechanical; draft, twist and production calculations.

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to
- Understand the processes involved in the conversion of fibre to yarn
• Select suitable machine and process variables at different pre processes of yarn spinning to produce better quality yarn with maximum productivity and
• Design processes for producing yarn of required parameters.

**TEXTBOOKS:**

**REFERENCES:**
1. Lord P.R., “Yarn Production: Science, Technology and Economics “, The Textile Institute, Manchester, 1999

**HT6301 TEXTILE PHYSICS**

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

**OBJECTIVES:**
To enable the students to
• Enhance their knowledge related to the structure and morphology of textile fibres
• Understand the mechanical, physical characteristics of each fiber in detail.

**UNIT I STRUCTURE OF FIBRES**
Classification of fibres; study of morphological structures of fibers; physical properties of fibres; order and disorder of fibres; molecular conformations – planar zig-zag, helical, lamellar, and spherulite

**UNIT II STRUCTURE INVESTIGATION TECHNIQUES**
Transmission and Scanning Electron Microscopes - principle, construction and working; X-ray diffraction techniques – estimation of crystallinity; Infrared radiation and dichroism techniques; chemical element and group identification by transmittance and optical density methods, molecular orientation estimation.

**UNIT III MOISTURE ABSORPTION CHARACTERISTICS**
Moisture absorption behavior of natural and man-made fibres; influence of fibre structure, humidity and temperature on the moisture absorption; conditioning of fibres –mechanism of conditioning and factors influencing conditioning; moisture diffusion in fibres, heat of sorption – integral and differential, their relation; factors influencing heat of sorption, measurement of heat of sorption.
UNIT IV TENSILE AND ELONGATION CHARACTERISTICS OF FIBRES

Tensile characteristics – study of strength, elongation, work of rupture, initial modulus, work factor and yield point; determination of yield point; stress-strain relations of natural and manmade fibre, influence of humidity and temperature on tensile characteristics; Time effects, study of creep phenomena; elastic recovery and its relation to stress and strain of fibres; mechanical conditioning of fibres and its influence on elastic recovery; load cycling and extension cycling-their effect on elastic recovery; introduction about torsional and flexural rigidity of fibres.

UNIT V OPTICAL, FRICTIONAL AND THERMAL CHARACTERISTICS

Reflexion and Lustre-objective and subjective methods of measurement, refractive index and its measurement, birefringence, factors influencing birefringence, Absorption and dichroism Friction – static, limiting and kinetic friction, its measurement, comparison of fibres, directional friction in wool, thermal transitions of fibres - thermal conductivity, thermal expansion and contraction, glass transition temperature (Tg) and melting.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be

• able to correlate the physical properties of fibre to its microstructure and its influence to other characteristics.
• able to choose appropriate fibre for the required property

TEXT BOOKS:

REFERENCES:
OBJECTIVES:

- To enable the students to understand the concepts of woven fabric and construction weaves.

UNIT I
Classification of textile fabrics; classification of woven fabrics - simple, compound and complex; fundamental aspects of woven fabrics - count of graph paper, factors influencing the selection of appropriate count of graph paper, graphical representation of structure of a woven fabric - warp way and weft way; study of plain weave, ornamentation of plain fabrics; study of derivative structures of plain - regular and irregular warp rib, regular and irregular weft rib and regular and irregular hopsack weaves, catch-cord technique for weaving warp rib and hop-sack; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.

UNIT II
Study of twill weaves up to 12 threads, classification of twills - warp faced twill, weft faced twill and equal faced twill; angle of inclination of twill diagonals, influence of the twist direction of yarn over prominence of twill diagonals; study of derivatives of twill weaves - wavy twill, herringbone, transposed twill, broken twill and curved twill, elongated twill, combined twill, shaded twill and figured twill; diamond twill, twill dice check, diaper; regular and irregular satin up to 12 threads, regular and irregular sateen up to 12 threads, satin dice check; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.

UNIT III
Study of honey comb weaves - Ordinary honey comb and Brighton honey comb - cell formation, suitability for toweling purpose; study of Huck-a-Back weaves, Study of mock leno weaves, study of corkscrew weaves study of crepe weaves – construction upon sateen base, by combination of floating weaves with plain thread, by reversing and by insertion of one weave over another; light and pigment theory of colours, classification of colour and weave effect- simple colour and weave effect, continuous line effects, hound’s tooth patterns, bird’s eye and spot effects, hairline stripes, step patterns, and all over effects; combination of weaves – twill and plain, mock leno and plain, honey comb and plain, stripe and check effect by these combinations; care about beaming, distorted thread effects – salient feature, warp and weft distortion; design, draft, and peg plan, tie-up and thread interlacing diagram of above weaves.

UNIT IV
Bedford cord weaves – salient features, plain faced bedford cord (regular and alternate pick principle), twill faced bed ford cord, wadded bed ford cord, and crepon Bedford cords; welt structures – salient features and manufacturing techniques, ordinary welts, wadded welts (loose back and fast back); design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.
UNIT V

Backed cloths- warp & weft backed cloths using twill, sateen and satin.; weft wadded warp backed cloth, reversible and non-reversible using twill, satin and sateen, weft backed cloth - reversible and non-reversible weft backed cloth using twill, satin and sateen, warp wadded weft backed cloth – reversible and non-reversible using twill, satin and sateen - Imitation backed cloth, imitation warp backing and imitation weft backing; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course the student will be able to
• Understand different classification of woven fabrics.
• Construct basic weaves, draft and peg plan.
• Design fabric structures for different and uses.

TEXT BOOKS:

REFERENCES:

HT6303 HANDLOOM WEAVING TECHNOLOGY

OBJECTIVES:
• To enable the students to understand the principles of handlooms weaving technology like primary, secondary, system of ties, calculation of casting out dobbies and jacquard and traditional method of designing.

UNIT I
Different forms of yarn packages like hanks, cones, cheeses, and spools - purpose and use; essential characteristic of warp and weft, yarn preparatory process; warping and its requirements- peg warping, vertical warping and sectional warping; objective and importance of sizing of cotton yarn, ingredients used in size mixture and their functions, various forms of sizing- hank sizing and street warp sizing; illustrative size recipe for cotton, viscose and polyester - cotton blends; ideal sizing, common defects during sizing- causes and remedies.
UNIT II
Evolution of handlooms- various parts of a handloom and their functions, types of handlooms-
throw shuttle handloom, fly shuttle handloom, pit loom & frame loom; passage of warp in a fly
shuttle handloom; motions of a handloom; definitions of primary, secondary & auxiliary,
motions; different types of shed formations – centre closed shed, bottom closed shed, top
closed shed, open shed and semi open shed; shedding mechanism of a handloom using
 treadles and heald reversing motions – roller system, pulley reversing system and jack and
lam rod system

UNIT III
Picking mechanism of a handloom, types of shuttles – throw shuttle, fly shuttle and roller
shuttle, design and suitability; beating up- closed shed beating and crossed shed beating,
different types of reed – bamboo reed, pith bound steel reed and all metal steel reed, suitability
for various fabrics; let off motion in handlooms – ratchet and pawl, rope and weight, rope-lever
and weight; take up motion in handloom – poker rod and ratchet & pawl; auxiliary motions of a
handloom – temple motion and terry motion; handloom dobbies – lattice dobbey, barrel dobbey
and bottom closed shed dobbey – mechanism, working principles and suitability; design and
essential features of a pit loom – structural loom, lay-out and relationship between the loom
design and the product manufactured; design and essential features of a frame loom, structural
loom, layout and relationship between the loom design and the product manufactured, layout
and design of an industrial handloom weaving unit.

UNIT IV
Introduction to numbering of yarns; indirect system of numbering of yarns – new English cotton,
new French, decimal, metric, worsted, woolen Yorkshire, linen, spun silk and spun rayon, direct
system of numbering of yarns – denier and flax/ jute/ hemp -Evolution of universal system of
numbering – tex and its derivatives - millitex, kilotex; determination of conversion factors,
conversion of count of yarn -indirect to indirect, conversion of count of yarn -direct to direct,
conversion of count of yarn - indirect to direct, conversion of count of yarn - direct to indirect.

UNIT V
Expression of count of folded yarns, contraction during twisting, expression of contraction as a
percentage to original length, determination of Equivalent/Resultant count of folded yarns,
amount of component threads in folded yarn and costing, average count of warp, combination
of different counts, material and system of counting; Read Count, dents per linear space and
groups of dents per linear space models, dents per linear space – Stockport-relation between
reed count, number of ends per dent, cloth width, reed width and ends per inch- heald count
calculations.

OUTCOMES:
• Upon completion of the syllabus, the student will be able to perform the primary,
secondary mechanism, system of ties, and calculation of casting-out, dobbies and
jacquard and traditional method of designing.
TEXT BOOKS:

REFERENCES:
4. David Ezakia, “Preparatory Process for weaving with calculation: including Development of the modern Power Loom”.

HT6311 TEXTILE DESIGN AND COLOUR LABORATORY L T P C
0 0 3 2

OBJECTIVES:
- The student shall practice different aspects of design & colour and principals of textiles designing.

LIST OF EXPERIMENTS
1. Practice of drawing of lines, horizontal lines, curved lines, lines of growth and grace, thick and thin lines, double lines, broken lines, oblique lines or lines of movement, accented lines.
2. Free hand drawing practice of creation of foliage drawing, small plants and flowers, creepers, birds, animals, clouds and still water.
3. Practice and understanding of light and colour, colour vision, complementary colours, the chromatic circle, attributes of colour, properties of colour – hue, value and intensity, simultaneous contrast – contrast of hue, contrast of tone and colour harmony.
4. Practice of modification of colours – hue, tone, tint, shade, coloured greys and triadic colour.
5. Drawing of special illusions, colour contrast – mono chromatic contrast and polychromatic contrast.
6. Free hand drawing practice of elements of textile design – motif, unit figure and design repeat
7. Practice of creation of setting using textile design bases of ability to use following principles - rectangular, diamond, ogee, diagonal bases; distribution of unit figures - principles of simple drop and drop reverse; sateen distribution, all over effects etc.
8. Practice of creation of layout of a ready to wear textile products – saree, dhoti, lungi, shawl etc.
9. Practice of create layout for home furnishing – bedspread, bed sheet, table cover, pillow cover, window curtain and door curtain, ladies top, baby wears etc.
10. Documentation of traditional Indian textiles pictures/samples, documentation of Indian brocade fabrics pictures/samples.
11. Documentation of Indian sarees pictures/samples.

TOTAL: 45 PERIODS

OUT COMES:
- Upon completion of the syllabus, the students will be able to draw designs for different varieties of fabric with colour combination and shall have documentation of Indian textiles.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS
1. Drawing Table and Chair
2. Poster Colours
3. Colour mixing plat
4. Brushes

HT6312 HANDLOOM WEAVING LABORATORY L T P C
0 0 2 1

OBJECTIVES:
- The student shall practice different aspects of handloom weaving.

LIST OF EXPERIMENT:
1. Drawing and of sketches of different parts of handloom
2. Sketching and practice of various knots and piecing
3. Practice of bobbin and pirn winding
4. Practice of warping
5. Study of preparation of design draft and tie–up plan and practice
6. Practice of drawing–in and denting
7. Practice of gaiting–up
8. Practice of tie- up and loom setting
9. Practice of weaving
10. Development of samples using twill weaves
11. Development of samples using Plain and its derivatives
12. Development of samples using Mock-Leno weave
13. Development of samples using Honey Comb weave
OUTCOMES:
Student shall get through knowledge about different aspects of handloom weaving.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS
1. Charka -10 Nos.
2. Warping machine-1
3. Handlooms-10 Nos.
4. Pirns-20 Nos.
5. Double flanged bobbins-120 Nos.
6. Shuttles

MA6459 NUMERICAL METHODS

OBJECTIVES:
- This course aims at providing the necessary basic concepts of a few numerical methods and give procedures for solving numerically different kinds of problems occurring in engineering and technology

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 10+3

UNIT II INTERPOLATION AND APPROXIMATION 8+3
Interpolation with unequal intervals - Lagrange’s interpolation – Newton’s divided difference interpolation – Cubic Splines - Interpolation with equal intervals - Newton’s forward and backward difference formulae.

UNIT III NUMERICAL DIFFERENTIATION AND INTEGRATION 9+3
Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal, Simpson’s 1/3 rule – Romberg’s method - Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson’s 1/3 rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 9+3
UNIT V  BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS  

Finite difference methods for solving two-point linear boundary value problems - Finite difference techniques for the solution of two dimensional Laplace’s and Poisson’s equations on rectangular domain – One dimensional heat flow equation by explicit and implicit (Crank Nicholson) methods – One dimensional wave equation by explicit method.

OUTCOMES:
- The students will have a clear perception of the power of numerical techniques, ideas and would be able to demonstrate the applications of these techniques to problems drawn from industry, management and other engineering fields.

TEXT BOOKS:

REFERENCES:

GE6351  ENVIRONMENTAL SCIENCE AND ENGINEERING  

OBJECTIVES:
To the study of nature and the facts about environment.
- To finding and implementing scientific, technological, economic and political solutions to environmental problems.
- To study the interrelationship between living organism and environment.
- To appreciate the importance of environment by assessing its impact on the human world; envision the surrounding environment, its functions and its value.
- To study the dynamic processes and understand the features of the earth’s interior and surface.
- To study the integrated themes and biodiversity, natural resources, pollution control and waste management.

UNIT I  ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY  

Definition, scope and importance of Risk and hazards; Chemical hazards, Physical hazards, Biological hazards in the environment – concept of an ecosystem – structure and function of an
ecosystem – producers, consumers and decomposers-Oxygen cycle and Nitrogen cycle – energy flow in the ecosystem – ecological succession processes – 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. Field study of common plants, insects, birds
Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION
Definition – causes, effects and control measures of: (a) Air pollution (Atmospheric chemistry- Chemical composition of the atmosphere; Chemical and photochemical reactions in the atmosphere - formation of smog, PAN, acid rain, oxygen and ozone chemistry; Mitigation procedures- Control of particulate and gaseous emission, Control of SO$_2$, NO$_x$, CO and HC) (b) Water pollution : Physical and chemical properties of terrestrial and marine water and their environmental significance; Water quality parameters – physical, chemical and biological; absorption of heavy metals - Water treatment processes. (c) Soil pollution - soil waste management: causes, effects and control measures of municipal solid wastes – (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards–role of an individual in prevention of pollution – pollution case studies – Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES
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 overutilization of surface and ground 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. Energy Conversion processes – Biogas – production and uses, anaerobic digestion; 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. Introduction to Environmental Biochemistry: Proteins –Biochemical degradation of pollutants, Bioconversion of pollutants.
Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT
From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization-

Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

TOTAL : 45 PERIODS

OUTCOMES:
Environmental Pollution or problems cannot be solved by mere laws. Public participation is an important aspect which serves the environmental Protection. One will obtain knowledge on the following after completing the course.

- Public awareness of environmental is at infant stage.
- Ignorance and incomplete knowledge has lead to misconceptions
- Development and improvement in std. of living has lead to serious environmental disasters

TEXT BOOKS:

REFERENCES:
UNIT I  STRESS, STRAIN AND DEFORMATION OF SOLIDS  9

UNIT II  TRANSVERSE LOADING ON BEAMS  9

UNIT III  DEFLECTIONS OF BEAMS  9
Double integration method – Macaulay’s method – Area – moment theorems for computation of slopes and deflections in beams.

UNIT IV  STRESSES IN BEAMS  9

UNIT V  TORSION AND COLUMNS  9
Torsion of circular shafts – derivation of torsion equation \(T/J = fs/R = C\theta/L\) – stress and deformation in circular and hollow shafts – stresses and deformation in circular and hollow shafts – stepped shafts – shafts fixed at both ends – stresses in helical springs – deflection of springs – spring constant. Axially loaded short columns – columns of unsymmetrical sections – Euler’s theory of long columns – critical loads for prismatic columns with different end conditions – effect of eccentricity.

TOTAL : 45 PERIODS

OUTCOME:
Upon completion of the program the student will be able to design the support columns, beams in a textile industrial point of view. And also they can overcome defects in the existing construction.

TEXT BOOKS:

REFERENCE:
OBJECTIVES:
To enable the students to learn the
- Theory of yarn formation by different spinning systems
- Effect of process parameters used in the spinning system on yarn quality.

UNIT I  RING SPINNING  13
Principle of yarn formation in ring spinning machines; working of ring spinning machine; cop building; design features of important elements used in ring spinning machine; draft, twist and production calculations in ring spinning machine; end breakage rate – causes and remedies

UNIT II  CONDENSED YARN SPINNING  5
Condensed yarn spinning – principle, different methods, properties; comparison with ring spun yarn

UNIT III  YARN PLYING  9
Merits of plying of yarns; methods followed for plying – TFO, ring twisting; selection of twist level for plying; calculation of resultant count of plied yarns; types of fancy yarns, method of production

UNIT IV  ROTOR SPINNING  9
Principle of open end spinning; principle of yarn production by rotor spinning system; design features of important elements used in rotor spinning; properties of rotor yarn

UNIT V  OTHER SPINNING SYSTEMS  9
Friction and air-jet spinning methods – principle of yarn production, raw material used, structure, properties and applications; principle of yarn production by self-twist, core, wrap, integrated compound spinning systems.

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to
- Understand the theory of formation of yarn by ring, rotor, friction, airjet and other spinning systems
- Select suitable machine and process variables at different processes of yarn spinning to produce required quality yarn
- Understand the spinning system to be used for different raw materials and to produce yarn for specific end use.

TEXTBOOKS:
REFERENCES:
1. Lord P.R., “Yarn Production: Science, Technology and Economics”, The Textile Institute, Manchester, 1999
2. Shaw J., “Short-staple Ring Spinning, Textile Progress”, The Textile Institute, Manchester, 1982

HT6401 FABRIC STRUCTURE - II
OBJECTIVES: 3 0 0 3

- To enable the students to understand the construction of double layer and pile fabrics and its production techniques.

UNIT I
Double cloth – classification on the basis of techniques of achieving unison; self-stitched double cloth, reversible and non-reversible varieties using twill, satin, and sateen, centre stitched double cloth, two methods of stitching, reversible and non-reversible varieties using twill, satin, and sateen; double width plain cloth – interlacement diagram and its graphical representation; plain Tubular cloth – interlacement diagram and its graphical representation; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.

UNIT II
Thread interchanging double cloth - warp thread interchanging double cloth and weft thread interchanging double cloth, reversible and non-reversible varieties using twill, satin, and sateen; cloth interchanging double cloth using plain and twill, creation of column stripes, row stripes and check effects using warp and weft patterning; wadded double cloth - warp wadding and weft wadding; treble width plain cloth – interlacement diagram and its graphical representation; treble cloth using twill, satin, and sateen; backed cloths - salient features, warp backed cloth, reversible and non-reversible warp backed cloth using twill, satin and sateen; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.

UNIT III
Pile fabrics – salient features, classification of pile fabrics; loop pile and cut pile; warp pile and weft pile; warp file fabrics produced with the aid of wires; loop piles and cut piles production techniques – simultaneous insertion of pick and wire and the twin shed formation technique; techniques of anchoring of piles using two beams for ground ends and by using ‘W’ binding; warp pile fabrics produced on face-to-face principle; single shuttle and double shuttle weaving; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.

UNIT IV
Weft piles – salient features, manufacturing technique and processes involved; Allover velveteen and corduroys; Chenille Ax minster pile fabrics manufactured using handlooms, technique of fabric manufacture and designing; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.
UNIT V
Terry piles - salient features, technique of pile formation; classification of terry pile structures – 3 pick, 4 pick, 5 pick and 6 pick, thread interlacement diagram and graphical representation; terry pile on one side of fabric and on both sides, stripe and check effects – terry pile on one side and both sides; design, draft, denting, peg plan, tie-up and thread interlacing diagram of above weaves.

OUTCOMES:
Upon completion of the course the student will be able to

- Understand about the layers of fabrics, piles and its construction.
- Construct weaves, draft peg plan and other weaving techniques for the production of double layer and pile fabrics.

TEXT BOOKS:

REFERENCES:

HT6402 FABRIC MANUFACTURE I

OBJECTIVES:
- To enable the student to understand the principle of preparatory machines power loom weaving technology, stop motions in power looms, different colored weft introduction techniques and calculation of yarn diameter and cloth cover.

UNIT I
Modem high speed beam warping machine – mechanism and working principle, mill warping calculations – efficiency, production, creel capacity, number of back beams, amount of yarn, wastage and production planning; sectional warping calculation – creel capacity, no of sections, no of patterns per sections, width of warp and total no of ends; sizing calculations – size pick up, efficiency, production and production planning; yarn winding calculations – cone, cheese and pirn– efficiency, production and production planning.
UNIT II
Introduction to power loom – primary, secondary and auxiliary motions of a power loom; tappet shedding and reversing motions – plain, twill and satin; early shedding, late shedding; designing of tappets – plain, twill and satin up to 5 shafts; picking mechanism – scope of over-pick and under-pick mechanism, cone over-pick mechanism – mechanism and working principle; parallel motion under-pick mechanism – mechanism and working principle, early picking and late picking; beating-up mechanism – eccentricity of sley, timing and synchronization of primary motions; seven wheel take up motions; negative let-off motion; driving of loom – single motor and counter shaft arrangements; gear calculations, spur gear (simple and compound arrangements), driver and driven wheels, direction of rotation worm and worm wheel, pulleys and belts, flat belt and v belt, slippage and efficiency simple and compound arrangements.

UNIT III
Warp protection motions – loose reed and fast reed motions, mechanism and working principle; weft detection motions – side weft fork and center weft fork motions, mechanism and working principle; power-loom dobies – climax doby, mechanism and working principle, lattices and pegging.

UNIT IV
Multiple box motion; drop box – mechanism and working principle; automatic power looms – introduction; mechanical warp stop motion; weft replenishment mechanism; shuttle changing & cop changing; brief description about loom width, speed and suitability of power looms for manufacturing various varieties of cloth; preparation of lay-out for a loom shed.

UNIT V
Diameter of yarns – Ashenhurst’s formula for estimation of diameter of yarns; Pierce’s formula for estimation of diameter of yarns; relative diameter of yarns; calculation of cover cloth – warp cover, weft cover and cloth cover, diversion and calculations, fractional cover, percentage cover and cover factor; calculation for light, medium and heavy fabrics.

TOTAL(L:45+T:15) :60 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to
- Understand the functioning of weaving machine and its important motions
- Select and control the process variables at loom
- Understand the principle of forming special fabrics

TEXT BOOKS:
REFERENCES:


HT6411 YARN PROCESS LABORATORY L T P C
0 0 3 2

OBJECTIVES:
To enable the students to handle machine and operate them practically
- To enables the students to learn technology of yarn manufacturing from fibre to yarn

LIST OF EXPERIMENTS:
1. Construction details of blow room machineries the material passage and production calculations
2. Construction details of carding machine and the material passage and production calculations
3. Wire point specifications and settings in card
4. Construction details of drawing machine, material passage, draft and production calculations
5. Production calculations in comber preparatory machines, and construction details of comber and material passage
6. Combing cycle, draft and production calculations
7. Construction details of roving machine, material passage, and production calculations
8. Draft, twist in roving machine and builder mechanism of roving machine
9. Determination of degree of openness of fibre at blow room
10. Determination of neps present in the card and comber web
11. Construction details of ring spinning machine and material passage
12. Draft, twist and production calculations in ring spinning machine
13. Study of builder mechanism of ring spinning machine and selection of ring travelers
14. Construction details of rotor spinning machine and material passage
15. Draft, twist and production calculations in rotor spinning machine
16. Production of carded web using miniature card, sliver using miniature drawing machine
17. Production of yarn using ring spinning machine and rotor spinning machine
18. Analysis of MIS reports from spinning mills

TOTAL :45 PERIODS

56
OUTCOMES:
• Upon completion of this practical course, the student will be able to understand production of yarn manufacturing technology.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS
Lab model Ginning machine – 1 No.
Miniature Blow room line – 1 No.
Carding machine – 1 No.
Draw frame – 1 No.
Comber Preparatory machines – 1 No.
Comber – 1 No.
Speed frame – 1 No.
Ring frame – 1 No.
Rotor spinning machine – 1 No. (Commercial or Miniature models of above machines)

HT6412  CLOTH ANALYSIS LABORATORY  L  T  P  C
0  0  3  2

OBJECTIVES:
• To enable the student to understand the principles of cloth analysis for weave construction, production techniques.

LIST OF EXPERIMENT:
General principles of cloth analysis and fabric construction
1. Analysis of weave, constructional details and weaving techniques of fabrics with plain weave and its derivatives for its reproduction
2. Analysis of weave, construction and weaving techniques of fabrics with different types of twill weaves for its reproduction
3. Analysis of weave, construction and weaving techniques of fabrics with satin and sateen weaves for its cloth reproduction
4. Analysis of weave, construction and weaving techniques of fabrics for toweling such as honey comb, huck a back and terry weaves for its cloth reproduction
5. Analysis of weave, construction and weaving techniques of double cloths for its reproduction
6. Yarn and cloth calculations for its fabric reproduction
7. Costing of fabrics for its reproduction

TOTAL : 45 PERIODS

OUTCOMES:

Upon completion of the course the student will be able to
• Analysis the weave, draft and peg plan of the fabric
• Extract the quality particular of fabric for its reproduction
• Calculate the quantity of yarn requirement for warp and weft
• Calculate the cost of fabric

**LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS**

1. GSM cutter
2. Electronic balance
3. Beesley’s balance
4. Counting glass
5. Cloth analysis needle
6. Crimp tester
7. Scale and scissor
OBJECTIVES:

- To enable the students to learn advanced fabric structure, multi-layer fabrics, tapestry, etc.

UNIT I

UNIT II
Figured double cloth structure – use of similar colours in warp and weft – Use of different colours in warp and weft - Figured terry piles – Figured warp backed cloth – Figured weft backed cloth.

UNIT III
Figuring with extra threads - extra warp and extra weft - comparison - Extra Warp figuring technique - Continuous, intermittent and spot styles - Anchoring of spot effects - Extra Weft figuring technique - Continuous, intermittent and spot styles - Anchoring of spot effects – Chintzing.

UNIT IV

UNIT V

TOTAL: 45 PERIODS
OUTCOMES:
Upon completion of the course the student will be able to Understand
- Leno structures.
- Fabric structure with multiple warp and weft.
- Traditional handloom fabrics of India.

TEXT BOOKS:

REFERENCES:

TT6502 QUALITY EVALUATION OF FIBRES AND YARNS L T P C
3 0 0 3

OBJECTIVE:
- To make the students understand the principle and method of working of equipments used for testing of fibres and yarns.

UNIT I INTRODUCTION
Definition of quality- importance of quality assessment- selection of samples for quality assessment – random and biased samples – squaring technique and zoning technique for fibre selection; yarn sampling – use of random numbers – sampling for various types of yarn tests.

UNIT II FIBRE LENGTH AND STRENGTH ANALYSIS
Fibre testing, the fibre quality index and spinnability; Fibre length and length uniformity measuring techniques. Strength Tensile Testing modes – CRT, CRE, CRL and ARL; Fibre strength, importance, relation to yarn strength; Measurement techniques.

UNIT III FIBRE FINENESS, MATURITY AND TRASH ANALYSIS
Fibre fineness – definition-comparison of various fibres – its importance in yarn manufacture; measurement techniques. Cotton fibre maturity, estimation by microscopic method – maturity ratio and index, estimation by other methods – optical, air flow differential dyeing; its importance in
spinning. Fibre trash – influence on quality; measurement – principle and estimation microdust estimation for rotor spinning. High volume instrument for total fiber quality measurement.

UNIT IV YARN COUNT, TWIST AND STRENGTH
Yarn numbering systems-Indirect and direct systems-count conversions; Count measuring systems. Twist in single and ply yarns –twist direction – twist factor – twist and yarn strength; twist measurement and breaking twist angle measurement. Single yarn strength; Lea count strength product (CSP) and Corrected Count Strength Product (CCSP).

UNIT V YARN MASS EVENNESS AND SURFACE QUALITY

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to

- Understand the principle of operation of equipments used for testing fibres and yarns
- Apply knowledge gained through this course, while operating the equipments
- Analyze and interpret the results obtained from quality evaluating systems of fibre and yarns

TEXTBOOKS:

REFERENCES:

TT6503 KNITTING TECHNOLOGY

OBJECTIVES:
To make the students to understand
- Fundamentals of knitting
- Types of knitting processes in detail
• Functioning of components of knitting machine

UNIT I        INTRODUCTION

UNIT II       FUNDAMENTALS OF KNITTING
General definitions and principles of knitting; Types of knitting needles – Bearded, Latch & Compound Needle. Elements of knitted loop structure.

UNIT III      WEFT KNITTING
Basic weft knitted structures and their production - plain, rib, interlock and purl; Fundamentals of formation of knit, tuck and float stitches; factors affecting the formation of loop; effect of loop length and shape on fabric properties; Analysis of various types of weft knitted structure. Weft knitted fabric geometry.

UNIT IV       WEFT KNITTING MACHINES
Construction, Characteristics and working of circular knitting machines used for the production of basic structures; production of derivatives of weft knitted structures; needle control in circular knitting machines; quality control in knitted fabric production; production calculation. Basic principles and elements of flat knitting machines; different types of flat knitting machines - manual, mechanical and computer controlled; production of various weft knitted structures using flat knitting machines.

UNIT V        WARP KNITTING
Basic principles; elements of warp knitted loop – open loop, closed loop; warp knitting elements- chain link, chain links for simple patterns, guide bar movement mechanism,. Tricot and Rachel warp knitting machines. Principles of double needle bar patterning, Terry pile fabric production. Let off system; run in value based on the lapping diagram; take up system; theoretical concepts of warp knitted loop configuration.; Uses of warp knitted fabrics in technical applications.

OUTCOMES:
Upon completion of this course, the student shall be able to understand the
• Principle of knitting by different types of knitting machines
• Structure and properties of fabric produced by different knitting machines

TEXTBOOKS:

REFERENCES:
OBJECTIVE:

- To enable the students to learn about chemical structure of fibres and pre treatments involved in the wet processing of textiles.

UNIT I

Chemical structure of fibres – Cotton, wool, PET polyester, Nylon 6 and 6,6, poly acrylonitrile poly propylene and poly urethane; Action of chemicals on fibres – Effect of alkalis, acids, oxidizing agents and reducing agents on cotton and viscose, wool, silk and the above synthetic fibres; Natural and other impurities in textiles and their basic properties; Singeing – Methods of singeing and their comparison, detailed study on gas singing, evaluation of singing efficiency and bio polishing; Desizing – methods of desizing and their comparison, desizing of natural and synthetic fibres and their blends, evaluation of desizing efficiency; Heat setting – principle and heat setting of PET and nylon fabrics.

UNIT II

Scouring – Chemistry involved in scouring of cotton, wool, silk and synthetic fibres, process details on scouring of these fibres, assessment of scouring efficiency and bio scouring; Bleaching – Fundamentals on bleaching agents, bleaching of cotton with sodium hypochlorite and hydrogen peroxide, bleaching of wool, assessment of efficiency of bleaching; Mercerization – role of alkali concentration, stretch and temperature, effect of mercerization on structural, 63uster, tensile and dyeing properties, steps involved in mercerization process, assessment of efficiency of mercerization; carbonization of wool; degumming of silk – methods and their comparison, process details on the methods and assessment of efficiency of degumming.
UNIT III
Principle, construction and working of chemical processing machines – Loose stock machine; Hank and package processing machines; Yarn singeing machine; Woven and knitted fabric singeing machines; Stretching devices; Shearing and raising machines; Kiers; Mangles; Jiggers; Winch; Jet and soft flow machines; Yarn mercerizer, Chain and chainless mercerizers; Continuous scouring and bleaching machines; Washing ranges, Hydro extractors; Detwisters; Dryers; Stenters.

UNIT IV
Calendering – Various objectives, construction and working of Calendering machines; Crease proofing – Mechanism of creasing, crease proofing with formaldehyde based agents namely ureaformaldehyde precondensate and dimethylol dihydroxy ethylene urea, drawbacks of these agents, advantages of low formaldehyde and free formaldehyde crease proofing agents, crease proofing with butane tetra carboxylic acid, assessment of crease proofing efficiency; Shrink proofing – Assessment of shrinkage, Principle of belt shrinking and compacting, construction and working of shrink proofing machines, assessment of shrink proofing process; Softening – Role played by softeners, methods of softening, chemical softeners and their classification, chemistry and application of cationic and silicone softeners, assessment of efficiency of softeners, end-uses; Wool finishing – Wet and dry setting of wool and their assessment; principle of Milling and milling machines, assessment of milling operation.

UNIT V
Water and oil repellant finishes – Mechanisms of repellency, durable and non-durable finishing agents, basics of silicone and fluorocarbon finishes, assessment of repellent finishes; Fire retardant finish – Mechanisms of flame retardancy, durable and non durable retardants for cotton and polyester, assessment of flame retardancy; Antimicrobial finish – Mechanisms, controlled release and bound antimicrobials, assessment of the finish; introduction to use of nanotechnology in finishing.

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall have the knowledge on
- Chemical structure of the fibres
- Necessity and requirements of Pre treatments in wet processing of textiles
- Knowledge on various finishing treatments done on fabric
- Needs of various finishes to the fabric

TEXTBOOKS:

REFERENCES:

TT6505 TECHNOLOGY OF MANUFACTURED FIBRE PRODUCTION L T P C
3 0 0 3

OBJECTIVES:
- To enable the students to learn about the polymer rheology and the laws, and various spinning techniques of polymers
- To expose the students to advances in the spinning process

UNIT I POLYMER RHEOLOGY
Transport Phenomena in Fibre Manufacturing- Heat and mass; Polymer rheology-Newtonian and non-Newtonian fluids, factors affecting shear viscosity; Necessary conditions of fibre forming polymer; Melt instabilities.

UNIT II MELT SPINNING
Melt Spinning- Polymer Selection and Preparation, equipments, properties and applications of polyester, polyamide and polypropylene fibers.

UNIT III SOLUTION SPINNING
Solution spinning- Polymer Selection and Preparation, equipments, properties and applications of acrylic, polyurethane and regenerated cellulose fibres.

UNIT IV POST SPINNING OPERATIONS
Neck drawing, drawing systems, influence of drawing on structure and properties of fibres; Types of heat setting, influencing parameters on heat setting, influence of heat setting on fibre behavior; Spin finish composition and application; texturising.

UNIT V ADVANCES IN FIBER SPINNING
Liquid crystal spinning; Gel spinning; Profile fibres, hollow & porous fibres; Speciality fibres polyglycolic acid, polylactic acid, chitosan fibres preparation properties and applications.

TOTAL : 45 PERIODS
OUTCOMES:
Upon completion of this course, the student shall be able to understand
- Polymer Rheology and the laws
- Various spinning techniques of polymers parameter involved in spinning synthetic yarn
- Need of various post spinning operations
- Advances in the spinning process

TEXTBOOKS:

REFERENCES:

GE6562 EMPLOYABILITY SKILLS

OBJECTIVES:
- To enhance the employability skills of learners with a special focus on presentation skills, group discussion and interview skills.
- To enable them to improve their soft skills necessary for workplace contexts.
- To equip them with effective communicative competence for a global reach.

UNIT I SPEAKING SKILLS
Conversational skills (formal and informal contexts) - telephonic communication, attending job interviews (responding to FAQs) - taking part in GDs - making presentations.

UNIT II WRITING SKILLS

UNIT III READING SKILLS
Vocabulary building – speed reading (skimming – scanning) – reading different genres of texts from newspapers to philosophical treatises – critical reading – effective reading strategies such as reading ‘beyond the lines’, summarizing, graphic organizers and distinguishing facts from opinions.
UNIT IV LISTENING/VIEWING SKILLS
Speeches of different nationalities with focus on American and British accent (TED talks, podcasts) – listening to lyrics – lectures – instructions – dialogues – news casting – talk shows – interviews (Hardtalk, Devil’s Advocate)

UNIT V SOFT SKILLS

TOTAL : 30 PERIODS

TEACHING METHODS:
1. To be totally learner-centric with minimum teacher intervention as the course revolves around practice.
2. Suitable audio/video samples from Podcast/YouTube to be used for illustrative purposes.
3. Portfolio approach for writing to be followed. Learners are to be encouraged to blog, tweet, text and email employing appropriate language.
4. GD/Interview/Role Play/Debate could be conducted off the laboratory (in a regular classroom) but learners are to be exposed to telephonic interview and video conferencing.
5. Learners are to be assigned to read/write/listen/view materials outside the classroom as well for graining proficiency and better participation in the class.

Required Lab Infrastructure:

<table>
<thead>
<tr>
<th>Sl. No</th>
<th>Description of Equipment (Minimum Configuration)</th>
<th>Qty Required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td><strong>Server</strong></td>
<td>1 No.</td>
</tr>
<tr>
<td></td>
<td>PIV System</td>
<td></td>
</tr>
<tr>
<td></td>
<td>1 GB RAM / 40 GB HDD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OS: Win 2000 server</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Audio card with headphones</td>
<td></td>
</tr>
<tr>
<td></td>
<td>JRE 1.3</td>
<td></td>
</tr>
<tr>
<td>2</td>
<td><strong>Client Systems</strong></td>
<td>30 Nos.</td>
</tr>
<tr>
<td></td>
<td>PIII System</td>
<td></td>
</tr>
<tr>
<td></td>
<td>256 or 512 MB RAM / 40 GB HDD</td>
<td></td>
</tr>
<tr>
<td></td>
<td>OS: Win 2000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Audio card with headphones</td>
<td></td>
</tr>
<tr>
<td></td>
<td>JRE 1.3</td>
<td></td>
</tr>
<tr>
<td>3</td>
<td>Handicam</td>
<td>1 No.</td>
</tr>
<tr>
<td>4</td>
<td>Television 46&quot;</td>
<td>1 No.</td>
</tr>
<tr>
<td>5</td>
<td>Collar mike</td>
<td>1 No.</td>
</tr>
<tr>
<td>6</td>
<td>Cordless mike</td>
<td>1 No.</td>
</tr>
<tr>
<td>7</td>
<td>Audio Mixer</td>
<td>1 No.</td>
</tr>
<tr>
<td>8</td>
<td>DVD recorder/player</td>
<td>1 No.</td>
</tr>
<tr>
<td>9</td>
<td>LCD Projector with MP3/CD/DVD provision for Audio/video facility</td>
<td>1 No.</td>
</tr>
</tbody>
</table>
Evaluation:

Internal: 20 marks

Record maintenance: Students should write a report on a regular basis on the activities conducted, focusing on the details such as the description of the activity, ideas emerged, learning outcomes and so on. At the end of the semester records can be evaluated out of 20 marks.

External: 80 marks

- Online Test - 35 marks
- Interview - 15 marks
- Presentation - 15 marks
- Group Discussion - 15 marks

NOTE FOR THE INTERNAL ASSESSMENT:

1. Interview – mock interview can be conducted on one-on-one basis.
2. Speaking – example for role play:
   a. Marketing engineer convincing a customer to buy his product.
   b. Telephonic conversation- fixing an official appointment/placing an order/enquiring and so on.
3. Presentation – should be extempore on simple topics
4. Discussion – topics of different kinds; general topics, case studies and abstract concept

OUTCOMES:

At the end of the course learners should be able to
- Participate in conversations both formal and informal, attend phone calls and interviews successfully.
- Read different types of texts.
- Listen to, and understand foreign accents.

REFERENCES:

OBJECTIVE:
To train the students on different mechanism of Plain Loom, Jacquard Loom and figured fabric weaving.

1. Sketching and familiarizing of different part of Semi-Automatic loom & Power loom – the students shall draw the respective diagrams and acquire the basic knowledge about their functions.
2. Preparation of lattice for left & right hand dobbies and the way in which adjust the depth of shed.
4. Determination of depth of shed and heald shaft movement in tappet shedding mechanism and erection and setting of tappet shedding mechanism
5. Study of jacquard shedding mechanism
6. Erection and setting of over and under picking mechanisms
7. Control of sley eccentricity and beat up force in weaving
8. Study of let-off mechanisms
9. Determination of picks space through 5 and 7 wheel take-up mechanisms
10. Study of weft fork and weft replenishment mechanism in shuttle looms
11. Methods of achieving the required color patterns in 4x1 drop box motion
12. Study of warp protector mechanism

OUTCOMES:
Upon completion of this course, the student will have knowledge on

- Functioning of cone winding / cheese winding machine
- Different elements of plain loom and important motions of loom
- Picking mechanisms in shuttleless looms
### LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Description of Equipment</th>
<th>Quantity required</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Cone / Cheese winding machine</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Pirn winding machine</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Sizing chemicals (Consumables)</td>
<td>Quantity as per the requirements</td>
</tr>
<tr>
<td>4.</td>
<td>Tappet shedding mechanism – positive/negative</td>
<td>1 each</td>
</tr>
<tr>
<td>5.</td>
<td>Dobby shedding mechanism</td>
<td>1</td>
</tr>
<tr>
<td>6.</td>
<td>Jacquard shedding mechanism</td>
<td>1</td>
</tr>
<tr>
<td>7.</td>
<td>Shuttle picking mechanism – Over pick or under pick</td>
<td>1 each</td>
</tr>
<tr>
<td>8.</td>
<td>Beat up mechanism</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Take up mechanism (Five wheel or seven wheel)</td>
<td>1 each</td>
</tr>
<tr>
<td>10.</td>
<td>Negative let-off mechanism</td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td>Positive let-off mechanism</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>Warp protector mechanism – loose reed and fast reed</td>
<td>1 each</td>
</tr>
<tr>
<td>13.</td>
<td>Weft fork mechanism</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>Automatic pirn changing mechanism</td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>Automatic warp stop motion</td>
<td>1</td>
</tr>
<tr>
<td>16.</td>
<td>Drop box mechanism</td>
<td>1</td>
</tr>
<tr>
<td>17.</td>
<td>Terry fabric weaving (Desirable)</td>
<td>1</td>
</tr>
<tr>
<td>18.</td>
<td>Shuttleless loom</td>
<td>Any one type</td>
</tr>
<tr>
<td>19.</td>
<td>Yarn fault classifier (Desirable)</td>
<td>1</td>
</tr>
</tbody>
</table>
OBJECTIVE:

- To enable the student to gain knowledge about quantitative analysis, pre-treatment and dyeing process in textile materials.

1. Demonstration on Identification of fibers by using burning and microscopic test, and its conformation with solubility test.
2. Demonstration on analysis of given blended samples for its blended percentage (P/V,P/C)
3. Determination of whiteness and yellowness index of bleached fabric
4. Desizing and scouring of cotton fabrics
5. Mercerizing of Cotton – Cold / Hot / Stretch / Slack methods
6. Peroxide bleaching of cotton yarn / Fabric
8. Dyeing of cotton using cold brand reactive dye
9. Dyeing of cotton using Hot brand reactive dye
10. Dyeing of cotton using Vat dye
11. Degumming of silk
12. Dyeing of silk with acid dye.
13. Dyeing of polyester using Disperse dye
14. Dyeing of polyester and cotton blend
15. Determination of wash, light, rubbing fastness of dyed fabrics

OUTCOME:

- Upon completing this practical course, the student would be able to desize, bleach, dye, print and finish the fabric with different types of chemicals and colourants

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

1. Stainless vats (500 ml) - 30
2. Water bath, Thermometers - 10
3. Stirrer - 1
4. Steam ager - 1
5. Pilot padding mangle - 1
6. HTHP Beaker dyeing machine - 1
7. Pilot curing chamber - 1
8. Crock meter - 1
9. Landro meter - 1
10. Light fastness tester - 1
11. Shade card - 1
12. Grey scale set - 1
13. Microscope - 1
14. Spectro photo meter - 1

71
OBJECTIVE:
- To practice the students in testing of fibres and yarns for important properties.

LIST OF EXPERIMENTS
Determination of
1. Fibre fineness
2. Fibre length
3. Fibre maturity
4. Fibre trash content
5. Bundle fibre strength
6. Fiber migration parameters
7. Roving, sliver and yarn linear density
8. Single yarn strength
9. Yarn lea strength
10. Yarn single and ply yarn twist
11. Yarn impact strength
12. Yarn to yarn abrasion
13. Evenness of yarn
14. Assessment of yarn appearance

TOTAL: 45 PERIODS

OUTCOMES:
After the completion this practical course, the students will be able to
- Evaluate fiber and yarn characteristics using different equipments
- Analyse the results generated from these equipments
- Apply statistical techniques for better explanation

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

<table>
<thead>
<tr>
<th>S.No.</th>
<th>Description of Equipment</th>
<th>Required (R)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.</td>
<td>Baer Sorter</td>
<td>1</td>
</tr>
<tr>
<td>2.</td>
<td>Fibre Bundle strength tester</td>
<td>1</td>
</tr>
<tr>
<td>3.</td>
<td>Fibre Fineness tester</td>
<td>1</td>
</tr>
<tr>
<td>4.</td>
<td>Trash Analyser</td>
<td>1</td>
</tr>
<tr>
<td>5.</td>
<td>Projection Microscope</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>---</td>
<td>---</td>
<td>---</td>
</tr>
<tr>
<td>6.</td>
<td>Nep Count Template</td>
<td>5</td>
</tr>
<tr>
<td>7.</td>
<td>Wrap Reel</td>
<td>1</td>
</tr>
<tr>
<td>8.</td>
<td>Wrap Block</td>
<td>1</td>
</tr>
<tr>
<td>9.</td>
<td>Yarn Twist Tester</td>
<td>1</td>
</tr>
<tr>
<td>10.</td>
<td>Single Yarn Strength Tester</td>
<td>1</td>
</tr>
<tr>
<td>11.</td>
<td>Lea strength tester</td>
<td>1</td>
</tr>
<tr>
<td>12.</td>
<td>Ballistic Tester</td>
<td>1</td>
</tr>
<tr>
<td>13.</td>
<td>Yarn Unevenness tester</td>
<td>1</td>
</tr>
<tr>
<td>14.</td>
<td>Yarn abrasion tester</td>
<td>1</td>
</tr>
<tr>
<td>15.</td>
<td>Weighing balance</td>
<td>1</td>
</tr>
<tr>
<td>16.</td>
<td>Yarn appearance Board Winder</td>
<td>1</td>
</tr>
<tr>
<td>17.</td>
<td>Yarn appearance Board (Standards)</td>
<td>1 set</td>
</tr>
</tbody>
</table>

HT 6601  FABRIC MANUFACTURE – II  L T P C  3 0 0 3

UNIT I  JACQUARDS

UNIT II  SHUTTLELESS WEAVING MACHINES
UNIT III  JET LOOMS  9
Air Jet loom - Weft Insertion - Basic requirements - Merit and demerit - Water Jet loom - weft Insertion 
- Basic requirements - Merit and demerit - Multiphase looms - Various methods - Circular weaving.

UNIT IV  FABRIC CALCULATIONS  9
Determination of Ends per inch and Picks per inch while changing count, weave and both to maintain 
the same level compactness. Determination of count of Warp & Weft and Ends per inch and Picks per 
inch while increasing or decreasing the weight of fabric to maintain same level of compactness. Cloth 
calculation - Amount of Warp and Weft weight per linear meter, weight per square meter using Direct, 
Indirect and Universal systems

TOTAL 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to
- Understand the functioning of weaving machine and its important motions
- Select and control the process variables at loom
- Understand the principle of forming special fabrics

TEXTBOOKS:

REFERENCES:

TT 6601  FABRIC QUALITY EVALUATION  L T P C
3  0  0  3

OBJECTIVES:
- To enable the students to learn about the construction of fabrics and evaluation of fabric 
  properties and their importance

UNIT I  CONSTRUCTION CHARACTERISTICS  9
Basic fabric particulars – Measurement of ends and picks per inch, count of warp and weft, 
determination of the type of weave, measurement of length, width, thickness and Area density 
(GSM);warp and weft crimp measurements for spun and filament yarn fabrics, the cover factor 
calculations; Fabric sampling techniques.
UNIT II  STRENGTH CHARACTERISTICS  9

UNIT III  COMFORT AND SURFACE CHARACTERISTICS  9
Fabric stiffness – principle of measurement of flexural rigidity; Drapeability – measurement of drap coefficient; Crease recovery measurement techniques. Wrinkle recovery assessment using standard grades; Principle and functioning of air permeability testers, water repellency, contact angle and fabric shrinkage testing; Fabric abrasion resistance – measuring technique; Fabric pilling resistance – methods of determination.

UNIT IV  SPECIAL CHARACTERISTICS  5
Fabric bending hysteresis testing; Shear hysteresis measurements; Fabric compression and decompression behaviour; Fabric surface roughness and friction measurements; Fabric tensile hysteresis measurements; Fabric flame resistance testing methods; Moisture and thermal characteristics.

UNIT V  FABRIC INSPECTION AND GARMENT QUALITY  13

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, students would be able to
- Evaluate the constructional parameters of fabrics
- Understand the principle of measurement of fabric characteristics
- Analyze the various reports generated during quality evaluation of fabric
- Understand the evaluation of garment quality

TEXTBOOKS:

REFERENCES:
OBJECTIVES:

- To enable the students understand basics of financial management that is required for the textile industry
- To enable the students to learn about sources of capital, cost of capital and capital budgeting

UNIT I

18
Costing – concepts; classification of costs; preparation of cost sheet; costing of yarn, fabric and garment; cost profit volume analysis, breakeven analysis

UNIT II

9
Depreciation – method of computing depreciation; techniques of investment analysis – payback period method, accounting rate of return, Discounted Cash Flow methods – IRR, NPV, PI

UNIT III

5
Capital structure; Sources and cost of capital; working capital management

UNIT IV

13
Tools for financial analysis and control- profit and loss account, balance sheet; financial ratio analysis – illustrations from textile unit

TOTAL: 45 PERIODS

OUTCOMES:

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

- Determine the cost of yarn, fabrics and garments
- Construct cost sheet
- Understand the economical feasibility of capital investment, sources of capital and cost of capital
- Interpret the financial statements

TEXTBOOKS:

1. Bhave P.V. and Srinivasan V., “Costing Accounting to Textile Mills”, ATIRA, Ahmadabad, 1976

REFERENCES:


TT6604  MECHANICS OF TEXTILE MACHINERY  L T P C

OBJECTIVES:
To enable the students to learn about
- Basic elements used in the textile machinery
- Design of cams, cone drums and other important elements used in the textile machinery

UNIT I
Equations of forces, motion and energy; energy stored in rotating masses.

UNIT II
Clutches and brakes – types, application in textile machines; gears, gear trains; power transmission – different modes, advantages and limitations, applications

UNIT III
Differential and variable speed drives – principles, application in textile machines; design of cone drums – piano feed regulation, roving machine builder mechanism;

UNIT IV
Friction – calculations; bearings, design of drive transmitting shafts, balancing of rotating masses

UNIT V
Design of winder drums; kinematics of shedding; design of tappets; beat up force, sley eccentricity; power for picking

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course students will
- Have knowledge of types of gears, gear trains and their applications
- Be able to design cams, tappets and cone drums used in the spinning machinery
- Be able to understand the design aspects of machine elements for specific requirements
TEXTBOOKS:

REFERENCE:

TT6605 CHEMICAL PROCESSING OF TEXTILE MATERIALS – II

OBJECTIVE:
- To enable the students to have knowledge about theory of coloration, and knit and garment Processing

UNIT I COLOUR SCIENCE
Beer–Lambert’s law, definitions of various terms associated with it and the mathematical representation, determination of concentration of dye in solution; Assessment of colour in textile substrates – colour order system, colour atlas, Munsell system, CIE colour system, tristimulus values, L,a,b values, psychometric colour parameters, whiteness and yellowness indices, colour difference, metamerism, K-M equation and its application in colour matching.

UNIT II THEORY OF DYEING
Stages in dyeing and their governing factors, equilibrium dye uptake, sorption isotherm and Nernst, Langmuir and Freundlich isotherms, definition of dye affinity and its mathematical derivation; rate of dyeing and half dyeing time.

UNIT III DYEING
Basic properties of dyes and pigments; classification of dyes and principle of application of various dyes; basic chemistry, properties, types and technology of application of direct, reactive, disperse, acid and basic dyes, after-treatments for these methods; processing of denims; determination of washing, light, rubbing and perspiration fastness properties.

UNIT IV PRINTING
Methods and styles of printing; manual screen printing, flat bed and rotary screen printing machines; constituents of printing paste and their roles; printing with direct, reactive, acid and disperse dyes; printing with pigments, environmental issues with pigment printing and alternatives.

UNIT V KNIT AND GARMENT PROCESSING
Tube slitting machine, tube reversing machine, need for dimensional stabilization of knits, various stages in dimensional stabilization of tubular and open width knits; advantages and limitations of
garment dyeing, selection of garment accessories, garment dyeing machines, garment washing, various methods of garment printing.

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course the student will have knowledge on

- Colour, perception of colour
- Different class of dyes and ways of coloration
- Knit and garment processing
- Need of various finishes to the fabric.

TEXTBOOKS:

REFERENCES:

TT6606 GARMENT MANUFACTURING TECHNOLOGY L T P C 3 1 0 4

OBJECTIVES:
- To enable the students to understand the basics of garment manufacturing, pattern making & sewing and garment wet processing
- To expose the students to various problems & remedies during garment manufacturing & Processing
UNIT I
Anthropometry, mass-production, mass-customization; pattern making, grading, marker planning, spreading & cutting

UNIT II
Different types of seams and stitches; single needle lock stitch machine – mechanism and accessories; needle – functions, special needles, needle size, numbering, needlepoint; sewing thread construction, material, thread size, packages.

UNIT III
Labels, linings, interlinings, wadding, lace, braid, elastic, hook and loop fastening, shoulder pads, eyelets and laces, zip fasteners, buttons

UNIT IV
Raw material, in process and final inspection; needle cutting; sewability of fabrics; strength properties of apparel; dimensional changes in apparel due to laundering, dry-cleaning, steaming and pressing; care labeling of apparel

UNIT V
Garment dyeing, printing and finishing; pressing categories and equipment, packing

TOTAL (45 + 15) 60 PERIODS

OUTCOMES:
Upon completion of the course, the students will
- Know about pattern making, market planning, cutting and sewing of apparels
- Know about dyeing and finishing of garments

TEXTBOOKS:

REFERENCES:
OBJECTIVE:
- To enable the students to gain knowledge about quantitative analysis, dyeing, printing and finishing process in textile materials.
1. Dyeing of wool / acrylic with basic dyes
2. Dyeing of wool with 1:1 metal complex dyes
3. Dyeing of wool with 1:2 metal complex dyes
4. Dyeing of silk with reactive (cold brand) dyes
5. Printing of cotton fabric by direct technique
6. Printing of cotton by resist technique
7. Printing of cotton by discharge technique
8. Batik printing of cotton fabric
9. Tie and dye of cotton (yarn and fabric)
10. Block printing on cotton fabric
11. Screen printing on cotton fabric
12. Determination of K/S value for dyed fabric using spectrophotometer
13. Crease recovery finishing on cotton fabric
15. Antimicrobial finishing on cotton fabric

OUTCOME:
- Upon completing this practical course, the student would be able to desize, bleach, dye, print and finish the fabric with different types of chemicals and colourants

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS
1. Stainless vats (500 ml) - 30
2. Water bath, Thermometers -
3. Stirrer - 1
4. Steam ager - 1
5. Pilot padding mangle - 1
6. HTHP Beaker dyeing machine - 1
7. Pilot curing chamber - 1
8. Crock meter - 1
9. Landro meter - 1
10. Zewn Tester - 1
11. Shade card - 1
12. Grey scale set - 1
13. Microscope - 1
14. Spectro photo meter - 1
15. Printing table
16. Laminar air flow meter, refrigerator, petric dish (desirable)
OBJECTIVE:
- To make the students practically learn various fabric evaluation procedures to determine characteristics of fabric

LIST OF EXPERIMENTS
Determination of
1. Fabric tensile strength
2. Fabric bursting strength
3. Fabric tear strength
4. Fabric flexural rigidity and bending modulus
5. Drapability of fabrics
6. Fabric crease recovery
7. Fabric wrinkle recovery
8. Fabric abrasion resistance
9. Fabric pilling resistance
10. Fabric air permeability
11. Fabric compression and decompression characteristics
12. Fabric surface roughness and friction coefficient
13. Seam strength and seam slippage

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion the students will be able to
- Measure important characteristics of fabric and garment
- Interpret the results obtained during evaluation of fabrics

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

<table>
<thead>
<tr>
<th>Equipments</th>
<th>No.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fabric tensile strength tester</td>
<td>1</td>
</tr>
<tr>
<td>Fabric Bursting Strength Tester</td>
<td>1</td>
</tr>
<tr>
<td>Fabric tearing strength tester</td>
<td>1</td>
</tr>
<tr>
<td>Fabric Stiffness Tester</td>
<td>1</td>
</tr>
<tr>
<td>Fabric Drape meter</td>
<td>1</td>
</tr>
<tr>
<td>Fabric Crease Recovery Tester</td>
<td>1</td>
</tr>
<tr>
<td>Wrinkle recovery tester</td>
<td>1</td>
</tr>
<tr>
<td>Fabric Abrasion Resistance Tester</td>
<td>1</td>
</tr>
<tr>
<td>Fabric Crock meter</td>
<td>1</td>
</tr>
<tr>
<td>Fabric Pilling resistance tester</td>
<td>1</td>
</tr>
<tr>
<td>Fabric air permeability tester</td>
<td>1</td>
</tr>
<tr>
<td>Fabric Thickness Tester</td>
<td>1</td>
</tr>
<tr>
<td>Weighing balance</td>
<td>1</td>
</tr>
<tr>
<td>Kawabata Tester (Desirable)</td>
<td>1</td>
</tr>
<tr>
<td>Sewing Machine</td>
<td>1</td>
</tr>
</tbody>
</table>
OBJECTIVE:
- To enable the students to understand the fundamentals of the yarn and fabric structure, measures of structural parameters and factors influencing them.

UNIT I GEOMETRY OF TWISTED YARNS
Idealized helical yarn structure - twist contraction - Limits of twist & retraction. Packing of Fibers in Yarn- Idealized packing - measurement of packing density and radial packing density of yarn - Packing in actual yarns - Specific volume of yarns - relation between twist, diameter and twist angle.

UNIT II FIBRE MIGRATION
Ideal migration, tracer fiber technique, characterization of migration behavior, migration in spun yarns, mechanisms of migration, effect of various parameters on migration behavior

UNIT III MECHANICS OF STAPLE FIBRE YARNS
Theoretical analysis of tensile behavior - deduction based on fiber obliquity and slippage - influence of fiber length, fineness and friction on tensile behavior - strength prediction model for blended yarns

UNIT IV GEOMETRY OF CLOTH STRUCTURE
Geometry of Plain and Non-Plain weaves - Peirce and Olofsson models - crimp ratio and thread Spacing - Jamming of threads - Crimp interchange - Balance of crimp, cover fraction and cover factor.

UNIT V FABRIC DEFORMATION
Fabric deformation under tensile stress - prediction of modulus - tensile properties in bias direction - other fabric deformation – compression, shear, bending and buckling - fabric handle - Spirality and skewness formation and its control.

TOTAL: = 45 PERIODS

OUTCOMES:
Upon completion of the course the student will be able to explain
- Ideal helical model of yarn and different structural parameters
- Method of measuring structural parameters
- Effect of different parameters affecting the structure of yarn
- Models proposed for geometry of woven fabrics
- Characteristics of fabric on deformation and the student can design the fabric to get the desired property

TEXTBOOKS:
REFERENCES:

TT6701 TOTAL QUALITY MANAGEMENT FOR TEXTILE INDUSTRY L T P C
3 0 0 3

OBJECTIVES:
- To enable the students to understand about total quality management, different TQM tools and techniques and Quality standards
- To train the students to apply TQM tools in textile industry

UNIT I INTRODUCTION
9

UNIT II TQM PRINCIPLES
9

UNIT III TQM TOOLS & TECHNIQUES - I
9
The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to spinning, weaving, chemical processing and garment industries – Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types

UNIT IV TQM TOOLS & TECHNIQUES - II
9

UNIT V QUALITY SYSTEMS
9

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will be able to
- Understand the principle of TQM, different TQM tools and techniques
- Develop innovative tools to implement TQM in the textile industry
TEXTBOOKS:

REFERENCES:

TT6702 OPERATIONS RESEARCH FOR TEXTILE INDUSTRY

OBJECTIVES:
To enable the students to learn about
- Various operations research (OR) methods that can be applied in the textile industry
- Designing OR problem related to textile industry
- Method of solving OR problems

UNIT I
Scope of operation research, applications, limitations; linear programming problems – construction, solutions by graphical method, simplex method, Big M method; sensitivity analysis; application of LP technique for mixing optimization in spinning mill

UNIT II
Transportation problem – construction, initial basic feasible solution – North West Corner rule, lowest cost entry method, Vogel’s Approximation Method; optimality test - MODI method, stepping stone method; replacement analysis

UNIT III
Assignment problem – construction, solution by Hungarian method, application in textile industry; sequencing problems; integer programming – construction, solving by cutting plane method

UNIT IV
Game theory- two person zero sum games, solving by matrix method, graphical method; Decisions theory - decisions under assumed certainty, decision under risk, decision under uncertainty, illustrations from textile industry; inventory control - EOQ models-deterministic models –probabilistic models
UNIT V
Project planning and control models: CPM, PERT – network representation, determining critical path, project duration; crashing of project duration; resource leveling

OUTCOMES:
Upon completion of the course, the students will be able to
- Design operations research problems that can be applied to textile industry.
- Solve the OR problems

TEXTBOOKS:

REFERENCES:

TT6703 CLOTHING COMFORT

OBJECTIVES:
To enable the students to learn about the
- Important characteristics of the fabric responsible for its comfort properties and
- Different phenomena which take place in the fabric related to the comfort properties of the fabric.

UNIT I
Comfort – types and definition; human clothing system; Psychology and comfort - perception of comfort, psychological research techniques, comfort sensory descriptors, psychophysics, scales of measurement, scales to measure direct responses, wear trial technique, comfort perception and preferences.
UNIT II
Thermo physiological comfort - clothing and thermal comfort; Thermal comfort – thermoregulatory mechanisms of the human body, two-node model of thermal regulation, dynamic thermal interaction between the body and clothing, role of clothing on thermal regulations.

UNIT III
Heat and moisture transfer – wearer’s temperature regulations, effect of physical properties of fibres, behavior of different types of fabrics, dynamic heat and moisture transfer in fabric, moisture exchange between fiber and air, boundary conditions, method of solution, moisture sorption of wool fabrics, behavior of fabrics made from different fibers.

UNIT IV
Psychological comfort - Transient temperature and moisture sensations, coolness to the touch, warmth, dampness, clamminess and moisture buffering during exercise, environmental buffering; Neuro physiological comfort - basis of sensory perceptions; Measurement techniques – mechanical stimuli and thermal stimuli.

UNIT V
Fabric tactile and mechanical properties - fabric prickliness, itchiness, stiffness, softness, smoothness, roughness, and scratchiness; Garment fit and pressure comfort; predictability of clothing comfort performance - prediction of fabric hand, prediction of clothing thermophysiological comfort, predictability of sensory comfort, predictability of subjective preferences; application of clothing comfort research.

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to
- Understand different phenomena such as perception of comfort, fabric mechanical properties and, heat and moisture interaction and
- Correlate the property of the fabric with comfort to the wearer.

TEXTBOOKS:

REFERENCE:

HT6711 GARMENT CONSTRUCTION LABORATORY

OBJECTIVE:
- To train the students in construction of garments

LIST OF EXPERIMENTS
1. Stitch classification and stitch properties.
2. Formation of different classes of stitches.
3. Sewing practice of – superimposed seam, lapped seam
5. Button holing and button stitching machine.
6. Practice on Feed-of-the-arm machine.
7. Assembling of various garment components using appropriate seams.
8. Sewing and finishing of formal men’s top wear.
9. Sewing and finishing of formal men’s bottom wear.
10. Sewing and finishing of basic women’s top wear.
11. Sewing and finishing of basic women’s bottom wear.
12. Sewing and finishing of kid’s wear.

TOTAL: 45 PERIODS

OUTCOME:

- Upon completion of this practical course, the students can carry out different types of stitching, button holing and button stitching and would have hands on experience on different machines used for garment manufacture.

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS

- High speed industrial sewing machines
  - Single needle lock stitch machine - 15 No.
  - Double needle lock stitch machine - 02 No.
  - Over-lock machine - 02 No.
  - Feed-of-the-arm machine - 01 No.
  - Button stitch machine - 01 No.
  - Button hole machine - 01 No.
  - Flat lock machine - 01 No.
  - Zigzag machine - 01 No.
- Straight knife cutting machine - 01 No.
- Steam pressing table (Desirable) - 01 No.
- Iron box (electric) - 04 N0.
- Folding clips ¼", ½", 3". - 2 each
- Rib cutting machines - 1
- Cylinder bed Sewing machines - 1(Preferable)
- Collar & Cuff recessing machine - 1(Preferable)

GE6075 PROFESSIONAL ETHICS IN ENGINEERING

OBJECTIVE:

- To enable the students to create an awareness on Engineering Ethics and Human Values, to instill Moral and Social Values and Loyalty and to appreciate the rights of others.
UNIT I  HUMAN VALUES  10

UNIT II  ENGINEERING ETHICS  9

UNIT III  ENGINEERING AS SOCIAL EXPERIMENTATION  9
Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics – A Balanced Outlook on Law.

UNIT IV  SAFETY, RESPONSIBILITIES AND RIGHTS  9

UNIT V  GLOBAL ISSUES  8

TOTAL : 45 PERIODS

OUTCOME:
- Upon completion of the course, the student should be able to apply ethics in society, discuss the ethical issues related to engineering and realize the responsibilities and rights in the society

TEXTBOOKS:

REFERENCES:


**Web sources:**
1. www.onlineethics.org
2. www.nspe.org
3. www.globalethics.org
4. www.ethics.org

**TC6010 HOME TEXTILES**

**OBJECTIVES:**
To enable the students to learn about the
- Recent developments in furnishing, floor covering and other home textile products
- Various kinds of materials used in home textile.

**UNIT I HOME FURNISHING**

**UNIT II FLOOR COVERINGS**

**UNIT III CURTAINS AND DRAPERIES**

**UNIT IV BED LINERS**
UNIT V  TOWELS

OUTCOMES:
Upon completion of this course, the student shall be able to
- Know about different types of home textiles
- Understand the production method of different types of home textile products

TEXT BOOKS:

REFERENCE:

TC6001  ECO - FRIENDLY DYES, CHEMICALS AND PROCESSING  L T P C
3 0 0 3

OBJECTIVES:
- To impart knowledge about the environmental and ecological aspects of various chemicals, dyes and auxiliaries used in processing.
- To make the students aware of the alternative chemicals and dyes that can replace the harmful chemicals.
- To update the students on the various rules, regulation that governs the textile processing industry.

UNIT I  INTRODUCTION

UNIT II  ECO-FRIENDLY PREPARATION, DYEING, PRINTING AND FINISHING

UNIT III  ECO-AUDIT
UNIT IV   ECO-NORMS AND ECO-LABELING  9

UNIT V   TESTING OF ECO-PARAMETERS  9

TOTAL : 45 PERIODS

OUTCOMES:
- The study of this course would help the students to understand and comprehend the human and environmental hazards involved in day to day production activities in a textile wet processing mill.
- With the knowledge acquired from the other processing subjects along with his/her knowledge of the rules and regulations governing the processing industry he/she is better equipped to implement processes and new technologies which have lower environmental impact and so provide sustainable alternatives to the industry.
- This also helps and supports the students in making socially responsible and economically viable solutions

TEXT BOOKS:

REFERENCES:
2. Eco Textiles '98, Bolton Institute, 1998
3. Eco Textiles, Book of Papers, BTRA, 1996

FT6605   INDUSTRIAL ENGINEERING IN APPAREL INDUSTRY  L T P C  3 0 0 3

OBJECTIVES:
To enable the students to learn about
- Basics of industrial engineering
- Different tools of industrial engineering and its application in apparel industry

UNIT I
Industrial Engineering - evolution, functions, role of industrial engineer
UNIT II
Methods study – introduction, techniques of recording; method analysis techniques; principles of motion economy; method study in garment manufacture; ergonomics- importance, workplace design, fatigue

UNIT III
Work measurement – introduction; time study – equipment and procedure; standard data; predetermined time standards; work sampling techniques; incentive wage system; work measurement applied to garment industry

UNIT IV
Site selection for textile industry; plant layout - types of layouts suitable for textile industry, methods to construct layout; line balancing

UNIT V
Statistical Process Control – data collection; concept of AQL, control charts in quality control; process capability

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course the student will be able to apply the following methodologies in apparel industry.

- Method study, work measurement
- Layout study and line balancing
- Statistical process control

TEXTBOOKS:

REFERENCES:
OBJECTIVE:

- To acquaint students of the basic production machinery and equipments used in apparel construction

UNIT I  FABRIC INSPECTION AND SPREADING MACHINES


UNIT II  CUTTING MACHINES

Mechanism of straight knife cutting machines, rotary cutting machines, band knife cutting machines, die cutting, laser cutting, plasma cutting, water jet cutting and ultra sonic cutting; Notches, drills and thread markers; Computer interfaced cutting machines.

UNIT III  SEWING MACHINES

Sewing machines – primary and secondary components; Working principle, stitch formation and timing diagram - lock stitch and chain stitch; single needle and double needle lock stitch mechanism; needle bar, hook – rotary and feed mechanism; Needles – geometry, types and selection

UNIT IV  SPECIAL SEWING MACHINES

Over lock, Flatlock, Feed off arm, button fixing and button holing; Embroidery machines – mechanism and stitch formation; Sewing machines feed mechanisms; sewing machine attachments

UNIT V  FINISHING MACHINES

Molding machineries; Shrinking machineries – London shrinking, hot-water shrinking, steam sharking and compaction shrinkage; Pressing machineries – buck pressing, iron pressing, block or die pressing, form pressing, steamers and advanced pressing machineries; Pleating – principles and mechanics machineries

TOTAL : 45 PERIODS

OUTCOME:

- Upon completion of the course the student will be able to understand the fundamental principles and working of garment production machinery and the interrelationship of assembly methods

TEXTBOOKS:

1. Harold Carr& Barbara latham, “The Technology of Clothing Manufacture”, Black well Sciences,
1996.

REFERENCE:


FT6606 APPAREL MARKETING AND MERCHANDISING

OBJECTIVES:
- To acquaint the students of the concepts of business, merchandising, sourcing and export documentation

UNIT I INTRODUCTION TO APPAREL BUSINESS
International apparel business pattern, basic business concepts in Indian apparel export house, business operations in China and other south Asian countries. Business patterns for Indian apparel retail and home textiles. Understanding from concept board to finished product and its sequence.

UNIT II MARKETING FOR APPAREL AND TEXTILE PRODUCTS
Defining marketing, marketing mix the objectives of marketing department, market research, different types of markets, marketing strategies with respect to a product/brand, Indian apparel houses international marketing strategies and domestic marketing strategies, marketing models, B to B marketing, B to C marketing, direct marketing, digital marketing.

UNIT III MERCHANDISING
Concepts of merchandising, concepts and apparel product lines, dimensions of product change, determination and development of product line and product range. Creative and technical design in garments and accessories, new product development and seasons of sale, costing, coordination and communication with the production house and export house

UNIT IV SOURCING
Understanding the basics of sourcing, sourcing strategy and best sourcing practice in apparel and textile businesses, supply chain and demand chain understanding, sourcing negotiations, global coordination in sourcing, materials management and quality in sourcing, quick response and supplier partnership in sourcing, JIT technology.

UNIT V EXPORT DOCUMENTATION AND POLICIES

TOTAL : 45 PERIODS
OUTCOMES:
Upon completion of this course, the student shall be able to apply
- Concept of marketing and merchandizing in the apparel industry in India
- Procedure involved in the export of apparel

TEXT BOOKS:

REFERENCE:

TT6006 SUPPLY CHAIN MANAGEMENT FOR TEXTILE INDUSTRY L T P C
3 0 0 3

OBJECTIVES:
- To provide an insight on the fundamentals of supply chain networks, tools and techniques.
- To train the students to new and recent developments in supply chains, e-business and information technology

UNIT I
Basic principles of supply chain management and logistics, supply chain models, supply chain for volatile market; supply chain drivers and metrics in apparel industries; roll of supply chain in the textile and apparel industries’ financial stability.

UNIT II
Planning supply and demand in apparel production house, managing economies of scale, supply cycle and inventory levels; managing uncertainty in supply chain, safety pricing and inventory; make Vs buy decision, make Vs hire decision; geographical identification of suppliers, supplier evaluation, supplier selection, contract negotiations and finalization.

UNIT III
Distribution network and design for global textile and apparel products, models of distribution – facility location and allocation of capacity, uncertainty on design and network optimization; the role of transportation in supply chain, modes of transportation, characteristics of transportation, transport design options for global textile and apparel network, trade-off in transport design, risk management in transportation, transport decision in practice for textile and apparel industries.
UNIT IV
Coordination in supply chain- the bullwhip effect, forecasting, obstacles to coordination in supply chain; supply chain management for apparel retail stores, high fashion fad; supply chain in e-business and b2b practices

UNIT V
Import - Export management, documentation, insurance, packing and foreign exchange; methods of payments – domestic, international, commercial terms; dispute handling modes and channels; supply chain and Information system; Customer relationship management

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall have the
- Knowledge of the framework and scope of supply chain networks and functions.
- Capacity to develop clear, concise and organized approach to operations management

TEXTBOOKS:

REFERENCES:

TT6603 TECHNOLOGY OF BONDED FABRICS

OBJECTIVES:
To enable the students to learn about the
- Fundamentals of bonded fabrics
- Different method of web formation and bonding

UNIT I FUNDAMENTALS OF BONDED FABRICS
Definitions and classification of bonded fabrics; fibres, fibre preparations and their characteristics for the production of bonded fabrics, uses; methods of bonded fabric production

UNIT II WEB FORMATION WITH STAPLE FIBRES
Production of staple-fibre web by dry and wet methods; influence of web laying methods on fabric properties; quality control of web
UNIT III  MECHANICAL, CHEMICAL AND THERMAL BONDING  13
Bonded fabric production by mechanical bonding - needling, stitching, water jet consolidation; Thermal Bonding technologies; Chemical bonding – Binder polymers and bonding technologies

UNIT IV  POLYMER – LAID WEB AND FABRIC FORMATION  9
Manufacture of Spun bonded fabrics, fibre orientation in spun bonded fabrics and characterization of filament arrangement; Manufacture of Melt blown fabrics – fibre formation and its attenuation; Effect of processing parameters on fabric characteristics

UNIT V  FINISHING AND APPLICATION OF BONDED FABRICS  9
Dry and Wet finishing; Characterisation, structure - property relationship in bonded fabrics; End uses of bonded fabrics

TOTAL : 45 PERIODS

OUTCOMES:
Upon completion of the course the student will be able to

- Explain different types of nonwovens and their method of production
- Explain different type of finishes applied on the fabric and their end uses
- Choose appropriate bonded technique for getting desired properties in fabric.

TEXTBOOKS:

REFERENCES:

TC6004  TECHNICAL TEXTILES  L T P C  3 0 0 3

OBJECTIVE:
- To enable the students to learn about production, properties & application of various technical textile products viz., tyre cords, fabrics, belts, filter fabrics and medical textiles.

UNIT I  HIGH PERFORMANCE FIBRE  9
UNIT II Tyre Cords and Fabrics

Requirements of tyre cord - suitability of various fibres-Polyester and Nylon tyre cords – manufacture of tyre cords - physical and mechanical property requirements of tyre cord fabrics - fabric design - Specifications - Rubberised textiles.

UNIT III BELTS

Conveyor belts - physical and mechanical properties-construction, manufacture of conveyor belts & power transmission belts. HOSE: Construction, applications and properties (physical and mechanical).

UNIT IV FILTER FABRICS

General consideration of filtration of solids from liquids, solid from gases, solids from solids, liquids from liquids, liquids from gases and gases from gases. PROTECTIVE CLOTHING: Fire protection-thermal protection – electro-magnetic protection – water proof fabrics - protection against microorganisms, chemicals and pesticides - protection against aerosols.

UNIT V MEDICAL TEXTILES


TOTAL : 45 PERIODS

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

- Understand different high performance fibres and their properties
- Explain various method of production of technical textiles, their properties and applications

TEXT BOOKS:

REFERENCES:
5. Kennady, Anand Miraftab, Rajandran, Medical Textile & Biomaterials for Health care, Woodhead publishing Ltd., UK, 2005