

# **K.S. Rangasamy College of Technology**

**(Autonomous)**



## **Curriculum & Syllabus of B.Tech. Textile Technology**

**(For the batch admitted in 2018 – 2022)**

### **R 2018**

**Courses Accredited by NBA, Accredited by NAAC with 'B++' Grade,  
Approved by AICTE, Affiliated to Anna University, Chennai.**

**KSR Kalvi Nagar, Tiruchengode – 637 215.  
Namakkal District, Tamil Nadu, India.**

## VISION

To be the centre of excellence in textile education, training, research and service.

## MISSION

- To enlighten the students about the latest technology in textile industries through innovative educational practices and multi-disciplinary approach.
- To engage with the industry as solution providers through consultancy.

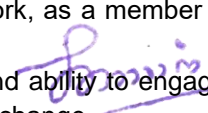
## PROGRAM EDUCATIONAL OBJECTIVES (PEOs)

- PEO1: Production Process and Solutions to Problems:** Graduates are competent in textile production processes and be able to identify problems and suggest suitable solutions.
- PEO2: Modern Tools & Technology and Ethics:** Graduates use latest tools and technology for the production of textile materials and serve society in an ethical manner.
- PEO3: Skills, Entrepreneurship and Life Long Learning:** Graduates will exhibit skills in their career and develop entrepreneurial culture through life-long learning.

## PROGRAMME OUTCOMES (POs)

Engineering Graduates will be able to:

- PO1: Engineering knowledge:** Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.
- PO2: Problem analysis:** Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.
- PO3: Design /development of solutions:** Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.
- PO4: Conduct investigations of complex problems:** Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.
- PO5: Modern tool usage:** Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations
- PO6: The engineer and society:** Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.
- PO7: Environment and sustainability:** Understand the impact of the professional engineering solutions in societal and environmental contexts, and demonstrate the knowledge of, and need for sustainable development.
- PO8: Ethics:** Apply ethical principles and commit to professional ethics and responsibilities and norms of the engineering practice.
- PO9: Individual and team work:** Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.
- PO10: Communication:** Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
- PO11: Project management and finance:** Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.
- PO12: Life-long learning:** Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.

  
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## PROGRAMME SPECIFIC OUTCOMES (PSOs):

Engineering Graduates will be able to:

- PSO1: Application of Basic Concepts:** Apply fundamental concepts in the areas of spinning, weaving, testing, garment making and processing.
- PSO2: Solution for Industrial Problems:** Solve industrial problems in textile industries considering environmental issues to improve quality and productivity.
- PSO3: Moral Values:** Demonstrate social and ethical responsibilities relevant to textile industries.

## MAPPING OF PROGRAMME EDUCATIONAL OBJECTIVES (PEOs) WITH PROGRAMME OUTCOMES (POs)

The B.Tech.Textile Technology Programme Outcomes leading to the achievement of the Program Educational Objectives are summarized in the following table.

Programme Educational Objectives	Programme Outcomes											
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
PEO 1	3	3	3	3	3	2	2	1	3	2	3	2
PEO 2	2	2	3	2	3	2	2	3	2	2	2	2
PEO 3	3	2	2	2	2	2	1	1	3	2	3	3

Contributions: 1- Low, 2- Medium, 3- High

**SEMESTER I**

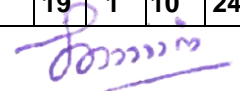
S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
<b>THEORY</b>								
1.	50 EN 001	Communication Skills I	HS	2	1	1	0	2
2.	50 MA 001	Calculus and Differential Equations	BS	4	3	1	0	4
3.	50 PH 005	Applied Physics for Textile	BS	3	3	0	0	3
4.	50 CS 001	Programming for Problem Solving	ES	3	3	0	0	3
5.	50 ME 001	Engineering Drawing	ES	6	2	0	4	4
<b>PRACTICALS</b>								
6.	50 PH 0P1	Engineering Physics laboratory	BS	4	0	0	4	2
7.	50 CS 0P1	Programming for Problem solving Laboratory	ES	4	0	0	4	2
<b>Total</b>				<b>26</b>	<b>12</b>	<b>2</b>	<b>12</b>	<b>20</b>

**SEMESTER II**

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
<b>THEORY</b>								
1.	50 EN 002	Communication Skills II	HS	2	1	1	0	2
2.	50 MA 002	Laplace Transform and Complex Variables	BS	3	3	1	0	4
3.	50 CH 001	Applied Chemistry	BS	3	3	0	0	3
4.	50 EE 001	Basic Electrical Engineering	ES	3	3	0	0	3
5.	50 ME 003	Engineering Mechanics	ES	4	3	1	0	4
6.	50 MY 001	Constitution of India	MC	2	2	0	0	-
<b>PRACTICALS</b>								
7.	50 CH 0P1	Chemistry Laboratory	BS	4	0	0	4	2
8.	50 ME 0P1	Engineering Practices Laboratory	ES	4	0	0	4	2
<b>Total</b>				<b>26</b>	<b>15</b>	<b>3</b>	<b>8</b>	<b>20</b>

**SEMESTER III**

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
<b>THEORY</b>								
1.	50 ME 008	Elements of Mechanical Engineering	ES	4	3	1	0	4
2.	50 CH 002	Chemistry for Textile	BS	3	3	0	0	3
3.	50 TT 301	Fibre Science	PC	3	3	0	0	3
4.	50 TT 302	Structure and Properties of Fibers	PC	4	4	0	0	4
5.	50 TT 303	Yarn Manufacturing Technology I	PC	3	3	0	0	3
6.	50 TT 304	Fabric Manufacturing Technology I	PC	3	3	0	0	3
<b>PRACTICALS</b>								
7.	50 TT 3P1	Fibre Science Laboratory	PC	4	0	0	4	2
8.	50 TT 3P2	Yarn Manufacturing Technology Laboratory I	PC	4	0	0	4	2
9.	50 TP 0P1	Career Competency Development I	EEC	2	0	0	2	0
<b>Total</b>				<b>30</b>	<b>19</b>	<b>1</b>	<b>10</b>	<b>24</b>

  
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**SEMESTER IV**

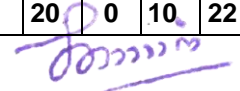
S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
<b>THEORY</b>								
1.	50 MA 012	Statistics for Textile Industry	BS	3	3	1	0	4
2.	50 TT 401	Yarn Manufacturing Technology II	PC	3	3	0	0	3
3.	50 TT 402	Fabric Manufacturing Technology II	PC	3	3	0	0	3
4.	50 TT 403	Textile Chemical Processing I	PC	3	3	0	0	3
5.	50 ** L1*	Open Elective I	OE	3	3	0	0	3
6.	50 MY 002	Environmental Science	MC	2	2	0	0	-
<b>PRACTICALS</b>								
7.	50 TT 4P1	Yarn Manufacturing Technology Laboratory II	PC	4	0	0	4	2
8.	50 TT 4P2	Fabric Manufacturing Technology Laboratory	PC	4	0	0	4	2
9.	50 TP 0P2	Career Competency Development II	EEC	2	0	0	2	0
<b>Total</b>				<b>28</b>	<b>17</b>	<b>1</b>	<b>10</b>	<b>20</b>

**SEMESTER V**

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
<b>THEORY</b>								
1.	50 MA 015	Operations Research	BS	4	3	1	0	4
2.	50 TT 501	Knitting Technology	PC	3	3	0	0	3
3.	50 TT 502	Textile Chemical Processing II	PC	3	3	0	0	3
4.	50 TT 503	Woven Fabric Structure	PC	3	3	0	0	3
5.	50 ** L2*	Open Elective II	OE	3	3	0	0	3
6.	50 TT E1*	Elective I	PE	3	3	0	0	3
7.	50 MY 003	Ethics for Engineers	MC	2	2	0	0	-
<b>PRACTICALS</b>								
8.	50 TT 5P1	Textile Chemical Processing Laboratory	PC	4	0	0	4	2
9.	50 TT 5P2	Fabric Structure Laboratory	PC	4	0	0	4	2
10.	50 TP 0P3	Career Competency Development III	EEC	2	0	0	2	0
<b>Total</b>				<b>31</b>	<b>20</b>	<b>1</b>	<b>10</b>	<b>23</b>

**SEMESTER VI**

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
<b>THEORY</b>								
1.	50 TT 601	Textile and Apparel Quality Evaluation	PC	3	3	0	0	3
2.	50 TT 602	Garment Manufacturing Technology I	PC	3	3	0	0	3
3.	50 TT 603	Nonwoven Technology	PC	3	3	0	0	3
4.	50 TT 604	Technical Textiles	PC	3	3	0	0	3
5.	50 ** L3*	Open Elective III	OE	3	3	0	0	3
6.	50 TT E2*	Elective II	PE	3	3	0	0	3
7.	50 MY 014	Start-ups and Entrepreneurship	MC	2	2	0	0	-
<b>PRACTICALS</b>								
8.	50 TT 6P1	Garment Construction Laboratory I	PC	4	0	0	4	2
9.	50 TT 6P2	Textile and Apparel Quality Evaluation Laboratory	PC	4	0	0	4	2
10.	50 TP 0P4	Career Competency Development IV	EEC	2	0	0	2	0
<b>Total</b>				<b>30</b>	<b>20</b>	<b>0</b>	<b>10</b>	<b>22</b>

  
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**SEMESTER VII**

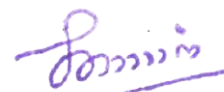
S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
<b>THEORY</b>								
1.	50 TT 701	Garment Manufacturing Technology II	PC	3	3	0	0	3
2.	50 TT 702	Apparel Production Planning and Control	PC	3	3	0	0	3
3.	50 TT 703	Textile Industry and Mill Management	PC	3	3	0	0	3
4.	50 ** L4*	Open Elective IV	OE	3	3	0	0	3
5.	50 TT E3*	Elective III	PE	3	3	0	0	3
6.	50 TT E4*	Elective IV	PE	3	3	0	0	3
<b>PRACTICALS</b>								
7.	50 TT 7P1	Textile CAD Laboratory	PC	4	0	0	4	2
8.	50 TT 7P2	Garment Construction Laboratory II	PC	4	0	0	4	2
9.	50 TT 7P3	Project Work – I	EEC	4	0	0	4	2
10.	50 TT 7P4	Industrial Internship	EEC	0	0	0	0	2
11.	50 TP 0P5	Career Competency Development V	EEC	2	0	0	2	0
<b>Total</b>				<b>32</b>	<b>18</b>	<b>0</b>	<b>14</b>	<b>26</b>

**SEMESTER VIII**

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
<b>THEORY</b>								
1.	50 TT E5*	Elective V	PE	3	3	0	0	3
<b>PRACTICALS</b>								
2.	50 TT 8P1	Project Work – II	EEC	16	0	0	16	8
<b>Total</b>				<b>19</b>	<b>3</b>	<b>0</b>	<b>16</b>	<b>11</b>

**TOTAL NUMBER OF CREDITS TO BE EARNED FOR AWARD OF THE DEGREE = 166**

**Note:** HS- Humanities and Social Sciences including Management Courses, BS- Basic Science Courses, ES-Engineering Science Courses, PE-Professional Core Courses, PE-Professional Elective Courses, OE- Open Elective Courses, EEC-Employability Enhancement Courses & MC- Mandatory Courses



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### HUMANITIES AND SOCIAL SCIENCES (HS)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 EN 001	Communication Skills I	HS	2	1	1	0	2
2.	50 EN 002	Communication Skills II	HS	2	1	1	0	2

### BASIC SCIENCE (BS)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 MA 001	Calculus and Differential Equations	BS	4	3	1	0	4
2.	50 PH 005	Applied Physics for Textile	BS	3	3	0	0	3
3.	50 PH 0P1	Engineering Physics Laboratory	BS	4	0	0	4	2
4.	50 MA 002	Laplace Transform and Complex Variables	BS	3	3	1	0	4
5.	50 CH 001	Applied Chemistry	BS	3	3	0	0	3
6.	50 CH 0P1	Chemistry Laboratory	BS	4	0	0	4	2
7.	50 CH 002	Chemistry for Textile	BS	3	3	0	0	3
8.	50 MA 012	Statistics for Textile Industry	BS	4	3	1	0	4
9.	50 MA 015	Operations Research	BS	4	3	1	0	4

### ENGINEERING SCIENCES (ES)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 CS 001	Programming For Problem Solving	ES	3	3	0	0	3
2.	50 ME 001	Engineering Drawing	ES	6	2	0	4	4
3.	50 CS 0P1	Programming for Problem Solving Laboratory	ES	4	0	0	4	2
4.	50 EE 001	Basic Electrical Engineering	ES	3	3	0	0	3
5.	50 ME 003	Engineering Mechanics	ES	4	3	1	0	4
6.	50 ME 0P1	Engineering Practices Laboratory	ES	4	0	0	4	2
7.	50 ME 008	Elements of Mechanical Engineering	ES	4	3	1	0	4

### PROFESSIONAL CORE (PC)

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 TT 301	Fibre Science	PC	3	3	0	0	3
2.	50 TT 302	Structure and Properties of Fibers	PC	4	4	0	0	4
3.	50 TT 303	Yarn Manufacturing Technology I	PC	3	3	0	0	3
4.	50 TT 304	Fabric Manufacturing Technology I	PC	3	0	0	0	3
5.	50 TT 3P1	Fibre Science Laboratory	PC	4	0	0	4	2
6.	50 TT 3P2	Yarn Manufacturing Technology Laboratory I	PC	4	0	0	4	2
7.	50 TT 401	Yarn Manufacturing Technology II	PC	3	3	0	0	3
8.	50 TT 402	Fabric Manufacturing Technology II	PC	3	3	0	0	3
9.	50 TT 403	Textile Chemical Processing I	PC	3	3	0	0	3
10.	50 TT 4P1	Yarn Manufacturing Technology Laboratory II	PC	4	0	0	4	2
11.	50 TT 4P2	Fabric Manufacturing Technology Laboratory	PC	4	0	0	4	2
12.	50 TT 501	Knitting Technology	PC	3	0	0	0	3

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13.	50 TT 502	Textile Chemical Processing II	PC	3	3	0	0	3
14.	50 TT 503	Woven Fabric Structure	PC	3	3	0	0	3
15.	50 TT 5P1	Textile Chemical Processing Laboratory	PC	4	0	0	4	2
16.	50 TT 5P2	Fabric Structure Laboratory	PC	4	0	0	4	2
17.	50 TT 601	Textile and Apparel Quality Evaluation	PC	3	3	0	0	3
18.	50 TT 602	Garment Manufacturing Technology I	PC	3	3	0	0	3
19.	50 TT 603	Nonwoven Technology	PC	3	3	0	0	3
20.	50 TT 604	Technical Textiles	PC	3	3	0	0	3
21.	50 TT 6P1	Garment Construction Laboratory I	PC	4	0	0	4	2
22.	50 TT 6P2	Textile and Apparel Quality Evaluation Laboratory	PC	4	0	0	4	2
23.	50 TT 701	Garment Manufacturing Technology II	PC	3	0	0	0	3
24.	50 TT 702	Apparel Production Planning and Control	PC	3	3	0	0	3
25.	50 TT 703	Textile Industry and Mill Management	PC	3	3	0	0	3
26.	50 TT 7P1	Textile CAD Laboratory	PC	4	0	0	4	2
27.	50 TT 7P2	Garment Construction Laboratory II	PC	4	0	0	4	2

### PROFESSIONAL ELECTIVES (PE)

#### SEMESTER V, ELECTIVE I


S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 TT E 11	High Performance Fibres	PE	3	3	0	0	3
2.	50 TT E 12	Man Made Fibre Technology	PE	3	3	0	0	3
3.	50 TT E 13	Textured Yarn Technology	PE	3	3	0	0	3
4.	50 TT E 14	Process Control In Spinning	PE	3	3	0	0	3
5.	50 TT E 15	Home Textiles	PE	3	3	0	0	3

#### SEMESTER VI, ELECTIVE II

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 TT E 21	Theory of Textile Structures	PE	3	3	0	0	3
2.	50 TT E 22	Process Control In Weaving and Chemical Processing	PE	3	3	0	0	3
3.	50 TT E 23	Protective Textiles	PE	3	3	0	0	3
4.	50 TT E 24	Medical Textiles	PE	3	3	0	0	3
5.	50 TT E 25	Apparel Marketing and Merchandising	PE	3	3	0	0	3

#### SEMESTER VII, ELECTIVE III

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 TT E 31	Textile Mechanics	PE	3	3	0	0	3
2.	50 TT E 32	Smart Textiles	PE	3	3	0	0	3
3.	50 TT E 33	Sustainable Textiles	PE	3	3	0	0	3
4.	50 TT E 34	Apparel Processing and Clothing Care	PE	3	3	0	0	3
5.	50 TT E 35	Apparel Production Machinery and Equipment	PE	3	3	0	0	3



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**SEMESTER VII, ELECTIVE IV**

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 TT E 41	Clothing Science	PE	3	3	0	0	3
2.	50 TT E 42	Computer Application in Textiles	PE	3	3	0	0	3
3.	50 TT E 43	Industrial Engineering in Textile and Clothing Industry	PE	3	3	0	0	3
4.	50 TT E 44	Production and Operations Management	PE	3	3	0	0	3
5.	50 TT E 45	Export Policies and Documentation	PE	3	3	0	0	3

**SEMESTER VIII, ELECTIVE V**

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 TT E 51	Financial Management and Costing for Textile and Apparel Industry	PE	3	3	0	0	3
2.	50 TT E 52	Textile and Apparel Entrepreneurship	PE	3	3	0	0	3
3.	50 TT E 53	Lean and Six Sigma Concepts for Textile and Apparel Industry	PE	3	3	0	0	3
4.	50 TT E 54	Supply Chain Management for Textile and Apparel Industry	PE	3	3	0	0	3
5.	50 TT E 55	International Social Compliance	PE	3	3	0	0	3

**OPEN ELECTIVES I / II / III / IV (OE)**

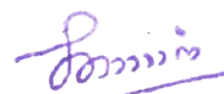
S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 TT L01	Fibre Science and Technology	OE	3	3	0	0	3
2.	50 TT L02	Basics of Textile Technology	OE	3	3	0	0	3
3.	50 TT L03	Introduction to Fashion Design	OE	3	3	0	0	3
4.	50 TT L04	Industrial Textiles	OE	3	3	0	0	3

**EMPLOYABILITY ENHANCEMENT COURSES (EEC)**

S.No.	Course Code	Course Title	Category	Contact Periods	L	T	P	C
1.	50 TP 0P1	Career Competency Development I	EEC	2	2	0	0	-
2.	50 TP 0P2	Career Competency Development II	EEC	2	2	0	0	-
3.	50 TP 0P3	Career Competency Development III	EEC	2	2	0	0	-
4.	50 TP 0P4	Career Competency Development IV	EEC	2	2	0	0	-
5.	50 TP 0P5	Career Competency Development V	EEC	2	2	0	0	-
6.	50 TT 7P3	Project Work – I	EEC	4	0	0	4	2
7.	50 TT 7P4	Industrial Internship	EEC	0	0	0	0	2
8.	50 TT 8P1	Project Work – II	EEC	16	0	0	16	8

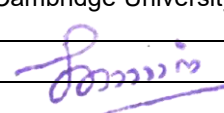
**SUMMARY**

S.No.	Category	Credits Per Semester								Total Credits	Percentage (%)
		I	II	III	IV	V	VI	VII	VIII		
1.	HS	2	2	-	-	-	-	-	-	04	02.41
2.	BS	9	9	3	4	4	-	-	-	29	17.47
3.	ES	9	9	4	-	-	-	-	-	22	13.25
4.	PC	-	-	17	13	13	16	13	-	72	43.37
5.	PE	-	-	-	-	3	3	6	3	15	09.04
6.	OE	-	-	-	3	3	3	3	-	12	07.23
7.	EEC	-	-	-	-	-	-	4	8	12	07.23
8.	MC	-	MC I	-	MC II	MC III	MC IV	-	-	-	-
<b>Total</b>		<b>20</b>	<b>20</b>	<b>24</b>	<b>20</b>	<b>23</b>	<b>22</b>	<b>26</b>	<b>11</b>	<b>166</b>	<b>100</b>



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50 EN 001 – Communication Skills I									
Common to all Branches									
Semester	Hours/Week			Total hrs	Credit	Maximum Marks			
	L	T	P			C	CA	ES	Total
I	1	1	0	30	2	50	50	100	
Objective(s)	<ul style="list-style-type: none"> <li>To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts.</li> <li>To help learners develop strategies that could be adopted while reading texts.</li> <li>To help learners acquire the ability to speak effectively in English in real life and career related situations.</li> <li>To equip students with effective speaking and listening skills in English.</li> <li>To facilitate learners to enhance their writing skills with coherence and appropriate format effectively.</li> </ul>								
Course Outcomes	<p><b>At the end of the course, students will be able to</b></p> <ol style="list-style-type: none"> <li>Utilize digital literacy tools to develop listening skills &amp; make use of contextual clues to infer meanings of unfamiliar words</li> <li>Able to select, compile &amp; synthesize information using communication strategies for an effective oral presentation</li> <li>Skim &amp; Scan the textual content &amp; infer meanings of unfamiliar words to develop reading &amp; vocabulary skills</li> <li>Generate ideas from sources to develop coherent content and support with relevant details in writing</li> <li>Recognize the basic phonetic patterns of language &amp; execute it for competent loud reading</li> </ol>								
<p><b>Note:</b> Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.</p>									
<p><b>Listening</b></p> <p>Listening to Short Audios – Watching Short Videos - answering MCQs and Vocabulary Check- Listening to Short Comprehension Passages – Guided Listening – Listening to songs and cognizing the lyrics [4]</p>									
<p><b>Speaking</b></p> <p>Brainstorming – Group Discussion (unstructured) – Self Introduction - Just a Minute (JaM) - Short Narratives – Cue Cards – Picture Cards – Conversational Practices (Preliminary) [4]</p>									
<p><b>Reading</b></p> <p>Silent Reading – Scanning and Skimming - Reading short and Medium Passages – Cognition of Theme and Inferential Meaning - Academic and Functional Vocabulary List (350 words) – Word Power Check - Loud Reading – Modulation and Pronunciation Check [4]</p>									
<p><b>Writing</b></p> <p>Functional Vocabulary and Word Power – Data Interpretation - Paragraph Writing – Letter Writing –Email Writing – Conversational Fill Ups [3]</p>									
<b>Lecture Hour: 15; Tutorial Hour: 15; Total Hours: 30</b>									
<b>Text Book(s):</b>									
1.	M.Ashraf Rizvi, 'Effective Technical Communication', 2 <sup>nd</sup> Edition, McGraw Hill Education (India) Private Limited, Chennai, 2018								
2.	Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020								
<b>Reference(s):</b>									
1.	Paul Emmerson and Nick Hamilton , 'Five Minute Activities for Business English', Cambridge University Press, N.York, 2005								
2.	Arthur Brookes and Peter Grundy , 'Beginning to Write: Writing Activities for Elementary and Intermediate Learners', Cambridge University Press, N.York, 2003								
3.	Michael McCarthy and Felicity O Dell , 'English Vocabulary in Use: Upper Intermediate', Cambridge University Press, N.York, 2012								
4.	<a href="https://learningenglish.britishcouncil.org/en/listening">https://learningenglish.britishcouncil.org/en/listening</a>								

  
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 Professor and Head  
 Department of Textile Technology  
 K S Rangasamy College of Technology  
 TIRUCHENGODE-637 215

## 50 MA 001 - Calculus and Differential Equations

## Common to All Branches

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
I	3	1	0	60	4	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>The goal of this course is to achieve conceptual understanding and to retain the best traditions of traditional calculus.</li> <li>The syllabus is designed to provide the basic tools of calculus mainly for the purpose of modeling the engineering problems mathematically and obtaining solutions.</li> <li>Matrix Algebra is one of the powerful tools to handle practical problems arising in the field of engineering.</li> <li>This course deals with topics such as single variable and multivariable calculus and plays an important role in the understanding of science, engineering, economics and computer science, among other disciplines.</li> <li>Development of mathematical skills to solve the differential equations.</li> </ul>
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Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Apply Cayley - Hamilton theorem to find inverse matrix and transformation techniques to reduce quadratic form into canonical form.</li> <li>Determine the circle of curvature, evolute and envelope of the curves.</li> <li>Analyze the Jacobian methods and the constrained maxima and minima function.</li> <li>Solve the linear and simultaneous differential equations.</li> <li>Evaluate definite and indefinite integrals using different techniques.</li> </ol>
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**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Matrices**

Characteristic equation – Eigen values and Eigen vectors of a real matrix – Properties of Eigen values and Eigen vectors – Cayley-Hamilton theorem (without proof) – Orthogonal transformation of a symmetric matrix to diagonal form – Reduction of quadratic form to canonical form by orthogonal transformation - Nature of quadratic form.

[8]

**Differential Calculus**

Curvature – radius of curvature (Cartesian and polar co-ordinates) – Centre of curvature – Circle of curvature – Involute and evolute – envelope.

[9]

**Functions of Several Variables**

Partial differentiation – Homogeneous functions and Euler's theorem – Jacobians – Taylor's series for functions of two variables – Maxima and minima of functions of two variables – Constrained maxima and minima : Lagrange's Method of Undetermined Multipliers.

[9]

**Differential Equations**

Linear differential equations of second and higher order with constant co-efficient - R.H.S is  $e^{\alpha x}$ ,  $\sin \alpha x$ ,  $\cos \alpha x$ ,  $x^n$   $n > 0$ ,  $e^{\alpha x} \sin \beta x$ ,  $e^{\alpha x} \cos \beta x$ ,  $e^{\alpha x} x^n$ ,  $x^n \sin \alpha x$  and  $x^n \cos \alpha x$  – Differential equations with variable co-efficients : Cauchy's and Legendre's form of linear equation – Method of variation of parameters – Simultaneous first-order linear equations with constant co-efficients.

[9]

**Integral Calculus**

Definite and Indefinite integrals - Substitution rule - Techniques of Integration - Integration by parts, Trigonometric integrals, Trigonometric substitutions, Integration of rational functions by partial fraction, Integration of irrational functions - Improper integrals.

[10]

**Lecture Hours:45, Tutorial Hours:15, Total Hours: 60****Text book(s):**

1.	Grewal B.S, "Higher Engineering Mathematics", 43rd Edition, Khanna Publishers, Delhi, 2014. Web site: <a href="https://pvpsitrealm.blogspot.com/2016/09/higher-engineering-mathematics-by-bs.html">https://pvpsitrealm.blogspot.com/2016/09/higher-engineering-mathematics-by-bs.html</a>
2.	Veerarajan.T., "Engineering Mathematics", for Semesters I and II , Tata McGraw Hill Publishing Co., New Delhi., 2010.

**Reference(s):**

1.	Kreyszig Erwin, "Advanced Engineering Mathematics", 10 <sup>th</sup> Edition, John Wiley and Sons (Asia) Limited, New Delhi, 2016.
2.	Dr. P.N. Agrawal and Dr. D.N Pandey,"Integral equations, calculus of variations and its applications", NPTEL online video courses.
3.	Dr. S.K. Gupta and Dr.Sanjeev Kumar, "Matrix Analysis with Applications" and Prof. Somnath Roy "Matrix Solvers", NPTEL online video courses.
4.	Dr. P. Kandasamy, Dr.K. Thilagavathy and Dr. K. Gunavathy, "Engineering Mathematics - II", S.Chand & Company Ltd, New Delhi.

**50 PH 005 - Applied Physics for Textile**

**B.Tech Textile Technology**

Semester	Hours/week				Credit	Maximum marks		
	L	T	P	Total hrs		C	CA	ES
I	3	0	0	45	3	50	50	100

- Objective(s)**
- To Explain the principles of laser, types of laser and demonstrate the applications of laser
  - To state the principle of optical fiber and to understand the design and applications of optical fibers
  - To study the basics of ultrasonic's, production of ultrasonic waves and non destructive techniques
  - To understand the theory of the surface tension of liquids and correlate the property of surface tension with different natural phenomena.
  - To enrich the understanding of advanced materials and nanotechnology for their applications in engineering and technology

- Course Outcomes**
- At the end of the course, Students will be able to**
1. Know the basic idea about classification of lasers with applications.
  2. Explain the propagation of lights in fibre optics and communication link and its applications.
  3. Gives explanation for production, detection of ultrasonic waves and its applications.
  4. Have the knowledge and apply the properties of surface tension, viscosity and friction.
  5. Gain a broad view of smart materials and nano materials.

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Lasers**

Einstein's theory of matter radiation interaction and A and B coefficients; amplification of light by population inversion-different types of lasers: gas lasers (CO<sub>2</sub>), solid-state lasers (Nd: YAG), dye lasers, Semiconductor laser (Homojunction and Hetero junction)-Properties of laser beams-applications of lasers in science and engineering. [8]

**Fiber Optics and Sensors**

Principles – cone of acceptance, numerical aperture (derivation)- Modes of propagation –Fabrication of optical fibre: Crucible-crucible technique - Classification: based on materials, modes and refractive index profile– Splicing : types of splicing- Losses in optical fiber – Detectors – Fiber optical communication links (Block diagram) – Advantage of fiber optical cable over copper cables- Fiber optic sensors: liquid level sensors, Temperature and Displacement sensors. [9]

**Ultrasonics and Applications**

Introduction-Properties-Production: Magnetostriction effect, Magnetostriction generator- piezoelectric effect, piezoelectric generator – Ultrasonic detection- acoustical grating-Applications: Cavitation, cleaning, SONAR– Non destructive testing: Pulse echo system, through transmission, resonance system- Medical applications: cardiology, neurology, ultrasonic imaging (A, B and TM- Scan). [9]

**Surface Tension, Viscosity and Friction**

Molecular forces-Rise of liquids in a capillary tube-Determination of surface tension by capillary rise method-Viscosity-Co-efficient of viscosity-streamline and turbulent flow-Reynold's number-Poiseuille's equation for the flow of liquid through a tube-Volume of liquid flowing out-Stoke's law-Terminal velocity-Experimental determination of co-efficient of viscosity for a liquid by Poiseuille's method-Comparision of viscosities-Ostwald viscometer-friction-factors influencing friction-rolling and sliding friction-hydrodynamic friction-stick slip phenomenon. [10]

**Advanced Materials and Nanotechnology**

**New Engineering Materials:** Metallic glasses – preparation, properties and applications – Shape memory alloys (SMA) – characteristics, properties of NiTi alloy applications – advantages and disadvantages of SMA

**Nano Materials:** Nanomaterials: Properties- Top-down process: Ball Milling method – Bottom-up process: Vapour Phase Deposition method- Carbon Nano Tube (CNT): Properties, preparation by electric arc method, Applications. [9]

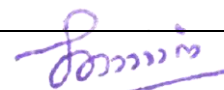
**Total Hours: 45**

**Text Book(s):**

1. Rajendran V, "Engineering Physics", McGraw Education (India), PVT LTD, New Delhi,2014
2. M.N.Avathanalu & P.G.Kshirsagar, (2005) "A text book of engineering physics" S.Chand & co.ltd.

**Reference(s) :**

1. Dr.M.Arumugam, "Engineering Physics", Anuradha Agencies publishers, Chennai, 2005
2. P.K.Palanisamy "Engineering Physics", Scitech Publications (India), PVT LTD,Chennai,2006
3. Mathur D.S. , "Elements of properties of matter" shyamlal charitable trust, N.Delhi, 1987
4. Halliday and Resnick, Fundamentals of Physics, John Wiley and Sons, Inc, 11 th edition,2018



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## 50 CS 001 - Programming For Problem Solving

## Common to all Branches

Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
I	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To learn the evolution of computers and examines the most fundamental element of the C language</li> <li>To examine the execution of branching, looping statements, arrays and strings.</li> <li>To understand the concept of functions , pointers and the techniques of putting them to use</li> <li>To apply the knowledge of structures and unions to solve basic problems in C language</li> <li>To enhance the knowledge in file handling functions for storage and retrieval of data</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Infer the evolution, generation, representation of problem and recognize the concepts of data types and expressions</li> <li>Annotate the concept of console Input and output features and examine the execution of branching, looping statements, arrays and strings</li> <li>Recognize the concepts of functions, recursion, storage class specifiers and pointers with its features</li> <li>Comprehend basic concepts of structures ,unions ,user defined data types and pre processor</li> <li>Interpret the file concepts using proper standard library functions</li> </ol>							

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

### Introduction to Computer and Programming

Introduction to Computers - Evolution of computers - Generations of computers and Programming Languages– Introduction to components of a computer system -Idea of Algorithm: steps to solve logical and numerical problems. Representation of Algorithm: Flowchart–Pseudocode with examples. From algorithms to programs–variables (with data types)– Type Qualifiers - Constants – Operators –expressions and precedence [9]

### I/O ,Branching, Loops and Arrays

Console I/O– Unformatted and Formatted Console I/O – Conditional Branching and Loops -Writing and evaluation of conditionals and consequent branching -Iteration and loops - Arrays (1-D, 2-D), Character arrays and Strings [9]

### Functions and Pointers

Functions: Scope of a Function – Library Functions and User defined functions - Function Prototypes – Function Categorization - Function Arguments - Arguments to main function - The return Statement - Recursion - Passing Arrays to Functions– Storage class Specifiers. Introduction to Pointer Variables - The Pointer Operators - Pointer Expressions - Pointers and Arrays - Generating a Pointer to an Array - Indexing Pointers– Dynamic memory allocation [9]

### Structures, Unions, Enumerations, Typedef and Preprocessors

Structures - Arrays of Structures- Arrays and Structures within Structures - Passing Structures to Functions - Structure Pointers - Unions – Bit Fields - Enumerations - typedef – The preprocessor and comments. [9]

### File

File: Streams –Reading and Writing Characters - Reading and Writing Strings -,File System functions - Random Access Files [9]

**Total Hours: 45**

### Text book(s):

- Herbert Schildt, "The Complete Reference C", Fourth Edition, Tata McGraw Hill Edition, 2010.
- Byron Gottfried, "Programming with C", Third Edition, McGraw Hill Education, 2014.

### Reference(s):

- E.Balagurusamy, "Programming in ANSI C", Seventh Edition, Tata McGraw Hill Edition, New Delhi, 2016.
- Brian W. Kernighan and Dennis M. Ritchie, "C Programming Language", Prentice-Hall.
- Reema Thareja, "Computer Fundamentals and Programming in C", Second Edition, Oxford Higher Education, 2016.
- K N King, "C Programming: A Modern Approach", Second Edition, W.W.Norton, New York, 2008.



## 50 ME 001 - Engineering Drawing

## Common to Civil , Mech, MCT &amp; Tex

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
I	2	0	4	90	4	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>To acquire various concepts like dimensioning, conventions and standards.</li> <li>To impart the graphic skills for converting pictorial views of solids in to orthographic views.</li> <li>To learn the concept of projection of solids.</li> <li>To understand the section of solids and development of surfaces.</li> <li>To learn the concept of isometric projection.</li> </ul>
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Course Outcomes	<p><b>At the end of the course, the student will be able to</b></p> <ol style="list-style-type: none"> <li>Use the drafting instruments and construct the conic sections</li> <li>Convert the pictorial views of solids in to orthographic views</li> <li>Draw the projections of regular solids and floor plans</li> <li>Draw the true shape of sections and develop the lateral surfaces of right solids</li> <li>Sketch the three dimensional view of solids for given orthographic views.</li> </ol>
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**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Introduction to Engineering Drawing and Plane Curves**

Use of drawing instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning – Drawing sheet layouts - Title block – Line types – Scales: plain, diagonal and vernier scales. Construction of ellipse, parabola and hyperbola (Eccentricity method) - Construction of rectangular hyperbola - Construction of cycloids, epicycloids and hypocycloids. [7+12]

**Orthographic Projection**

Introduction to orthographic projections – Planes of projection – Projection of points and lines inclined to both planes – Projection of planes (Inclined to one plane and parallel to other – Inclined to both planes) - Conversions of pictorial views to orthographic views. [6+12]

**Projection of Solids and Floor plan**

Projections of simple solids: prism, pyramid, cylinder and cone (Axis of solid inclined to both HP and VP) - Floor plans: windows, doors and fixtures such as water closet (WC), bath sink, shower etc. [5+12]

**Sections of solids and Development of surfaces**

Sections of solids :Prism, Cylinder, Pyramid, Cone – Auxiliary Views - Draw the sectional orthographic views of geometrical solids, objects from industry - Development of surfaces of Right solids – Prism, Pyramid, Cylinder and Cone. [6+12]

**Isometric Projection**

Principles of isometric projection – Isometric scale – Isometric projections of simple solids: Prism, pyramid, cylinder and cone - Isometric projections of frustum and truncated solids - Combination of two solid objects in simple vertical positions. [6+12]

**Total Hours: 90****Text Book(s):**

- Bhatt N.D., "Engineering Drawing", Charotar Publishing House Pvt. Ltd., 53rd Edition, Gujarat, 2014.
- Basant Agarwal and C.M.Agarwal., "Engineering Drawing", McGraw Hill Education, 2013.

**Reference(s)**

- Shah M.B., Rana B.C., and V.K.Jadon., "Engineering Drawing", Pearson Education, 2011.
- Natarajan K.V., "A Text Book of Engineering Graphics", Dhanalakshmi Publishers, Chennai, 2014.
- Venugopal K., "Engineering Graphics", New Age International (P) Limited, 2014.
- Dhawan, R.K., "A Text Book of Engineering Drawing" 3<sup>rd</sup> Revised Edition, S. Chand Publishing, New Delhi, 2012.

K.S.Rangasamy College of Technology – Autonomous							R2018	
50 PH 0P1 - Engineering Physics Laboratory								
Common to - MECH, MCT, Textile, FT, BT, NST, CIVIL								
Semester	Hours/week			Total hrs	Credit	Maximum marks		
	L	T	P			C	CA	ES
I	0	0	4	60	2	60	40	100
Objective(s)	<ul style="list-style-type: none"> <li>To gain practical knowledge by applying the experimental methods to correlate with the Physics theory.</li> <li>Demonstrate an ability to make physical measurements and understand the limits of precision in measurements</li> <li>To introduce different experiments to test basic understanding of physics concepts applied in optics and electronics.</li> <li>To enable the students to correlate the theoretical principles with application oriented studies.</li> <li>Analyze the behavior and characteristics of various materials for its optimum utilization</li> </ul>							
Course Outcomes	<p><b>At the end of the course, Students will able to</b></p> <ol style="list-style-type: none"> <li>Know the concept stress, strain and elastic limit of a given sample. (1-3)</li> <li>Grasp the knowledge of dependency of viscosity of a liquid. (4-5)</li> <li>Absorb the property of surface tension and capillarity action. (6)</li> <li>Understand the knowledge about optical fiber cable parameter. (7)</li> <li>Have a knowledge of diffraction property of light through a spectrometer grating .(8)</li> <li>Gain the dielectric constant of a given material. (9)</li> <li>Acquire the knowledge of semiconductor photovoltaic solar cells. (10)</li> </ol>							
<b>LIST OF EXPERIMENTS</b>								
<ol style="list-style-type: none"> <li>Determination of Young's modulus of a steel bar by uniform bending method.</li> <li>Determination of Young's modulus of a cantilever (Pin &amp; Microscope method).</li> <li>Determination of rigidity modulus of a wire by torsional pendulum.</li> <li>Comparison of co-efficient of viscosity of two different liquids by Poiseuille's method.</li> <li>Co-efficient of viscosity of highly viscous liquids.</li> <li>Comparison of surface tension of two different liquids by capillary rise method.</li> <li>Determination of NA, acceptance angle, and wave length of a given laser by using optical fiber.</li> <li>Determination of wavelength of mercury spectral lines – spectrometer grating.</li> <li>Determination of dielectric constant.</li> <li>V-I characteristics of solar cell.</li> </ol>								
<b>Total Hours: 60</b>								
<b>Lab Manual:</b>								
"Physics Lab Manual", Department of Physics , KSRCT								

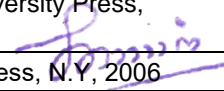
## 50 CS 0P1 - Programming for Problem Solving Laboratory

Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
I	0	0	4	60	2	60	40	100
Objective(s)	<ul style="list-style-type: none"> <li>To enable the students to apply the concepts of C to solve simple problems</li> <li>To use selection and iterative statements in C programs</li> <li>To apply the knowledge of library functions in C programming</li> <li>To implement the concepts of arrays, functions, structures and pointers in C</li> <li>To implement the file handling operations through C</li> </ul>							
Course Outcomes	<p><b>At the end of the course the students will be able to</b></p> <ol style="list-style-type: none"> <li>Apply how to read, display basic information and use selection and iterative statements</li> <li>Demonstrate C program to manage collection of related data</li> <li>Design and Implement different ways of passing arguments to functions, Recursion and implement pointers concepts</li> <li>Develop a C program to manage collection of different data using structures, Union, user-defined data types and pre processor directives</li> <li>Demonstrate C program to store and retrieve data using file concepts</li> </ol>							
<b>LIST OF EXPERIMENTS</b>								
<ol style="list-style-type: none"> <li>Implementation of Simple computational problems using various formulas.</li> <li>Implementation of Problems involving Selection statements.</li> <li>Implementation of Iterative problems e.g., sum of series.</li> <li>Implementation of 1D Array manipulation.</li> <li>Implementation of 2D Array manipulation.</li> <li>Implementation of String operations.</li> <li>Implementation of Simple functions and different ways of passing arguments to functions and Recursive Functions.</li> <li>Implementation of Pointers</li> <li>Implementation of structures and Union.</li> <li>Implementation of Bit Fields, Type def and Enumeration.</li> <li>Implementation of Pre processor directives.</li> <li>Implementation of File operations.</li> </ol>								
<b>Total Hours: 60</b>								



## II Semester

K.S.Rangasamy College of Technology – Autonomous							R2018	
50 EN 002 – Communication Skills II								
Common to all Branches								
Semester	Hours/Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	1	1	0	30	2	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To help learners improve their vocabulary and to enable them to use words appropriately in different academic and professional contexts.</li> <li>To help learners develop strategies that could be adopted while reading texts.</li> <li>To help learners acquire the ability to speak and write effectively in English in real life and career related situations.</li> <li>Improve listening, observational skills, and problem solving capabilities</li> <li>Develop message generating and delivery skills</li> </ul>							
Course Outcomes	<p><b>At the end of the course, students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Identify speaker's purpose &amp; tone, comprehend relationship between ideas and respond to the listening content</li> <li>2. Use communicate strategies, vocabulary &amp; appropriate grammatical structures for effective oral interactions</li> <li>3. Make inferences &amp; predictions develop reading speed, build academic vocabulary by utilizing digital literacy tools on textual comprehension</li> <li>4. Use a variety of accurate sentence structures with functional vocabulary, apply the conventions of academic writing and use peer and teacher feedback for effective writing.</li> <li>5. Demonstrate proficiency in communication skills in academic and professional contexts</li> </ol>							
<p><b>Note:</b> Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.</p>								
<p><b>Advanced English Listening Module</b>            Extended Listening to Podcasts – Listen and Watch Video Clips - answering Inferential Multiple Choice Questions and Vocabulary Check- Listening to Lengthy Discourses – Structured Listening – Listening to Songs and Cognizing the Lyrics-Listening to popular speeches, news briefs and stories. <span style="float: right;">[4]</span></p>								
<p><b>Oral Communication</b>            Debates – Group Discussion (Structured) and rotate roles – Elevator Speech – Prepared Talk – Extempore – Brief Technical presentations- Spin-a-Yarn – Short Film reviews – talk on silent videos – Dialogues and Role plays (Intermediate &amp; Higher Level) – Interviews <span style="float: right;">[4]</span></p>								
<p><b>Critical Reading Process</b>            Silent Reading – Scanning and Skimming - Reading comprehension with logical reasoning questions – Cognition of Theme and Inferential Meaning – advanced Academic and Functional Vocabulary List (1000 words) – word webs and semantic threads - Loud Reading – Modulation and Pronunciation Check – Mind maps – Note making – Deep Reading Skills <span style="float: right;">[4]</span></p>								
<p><b>Academic Writing Practices</b>            Sentence Equivalence and Text completion tasks – Data Interpretation - Essay Writing – Letter Writing – Business Emails – Conversational Fill Ups-Rewordify (select a text and simplify/enhance the language)- Reports on events. <span style="float: right;">[3]</span></p>								
<b>Lecture Hour: 15; Tutorial Hour: 15; Total Hours: 30</b>								
<b>Text Book(s):</b>								
1.	M.Ashraf Rizvi, 'Effective Technical Communication', 2 <sup>nd</sup> Edition, McGraw Hill Education (India) Private Limited, Chennai, 2018							
2.	Norman Lewis, 'Word Power Made Easy - The Complete Handbook for Building a Superior Vocabulary Book', Penguin Random House India, 2020							
<b>Reference(s):</b>								
1.	Paul Emmerson and Nick Hamilton , 'Five Minute Activities for Business English', Cambridge University Press, N.York, 2005							
2.	Ruth Wainry b, 'Stories: Narrative Activities for The Language Classroom', Cambridge University Press, N.York, 2005							
3.	Stuart Redman, 'English Vocabulary in Use: Upper Intermediate', Cambridge University Press, N.Y, 2006							
4.	<a href="https://www.khanacademy.org/test-prep/sat/sat-reading-writing-practice">https://www.khanacademy.org/test-prep/sat/sat-reading-writing-practice</a>							

  
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Semester	Hours / Week			Total hrs	Credit C	Maximum Marks		
	L	T	P			CA	ES	Total
II	3	1	0	60	4	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>Multiple integration is used to solve problems involving volume and surface area.</li> <li>Vector calculus can be widely used for modeling the various of physics.</li> <li>Introduce the fundamental ideas of the functions of complex variables and developing a clear understanding of the fundamental concepts of complex analysis such as analytic function and complex integral.</li> <li>Identify and construct complex - differentiable function.</li> <li>Laplace Transforms can be used for efficiently solving the problems that occur in various branches of engineering disciplines.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>(i) Evaluate double and triple integrals. (ii) Understand the concept of Beta and Gamma functions.</li> <li>Apply the concept of vector calculus to verify Green's, Stoke's and Gauss divergence theorems.</li> <li>Construct analytic function and bilinear transformation.</li> <li>Expand the functions as Taylor's and Laurent's series and evaluate the complex integrals.</li> <li>Apply Laplace transform techniques for solving differential equations.</li> </ol>							

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

### Multiple Integrals

Double integration – Cartesian and polar coordinates – Change of order of integration – Area between two curves – Area as double integral – Triple integration in Cartesian coordinates.

Beta and Gamma functions: Relationship between Beta and Gamma functions – Properties – Problems. [9]

### Vector Calculus

Introduction - gradient of a scalar point function - directional derivative - angle of intersection of two surfaces – divergence and curl(excluding vector identities) - solenoidal and irrotational vectors - Green's theorem in the plane - Gauss divergence theorem -Stokes' theorem(without proof)- verification of the above theorems and evaluation of integrals using them. [9]

### Analytic Functions

Analytic functions – Necessary conditions (Cauchy–Riemann equations)- Polar form of Cauchy–Riemann equations – Sufficient conditions (without proof) – Properties of analytic functions – Harmonic function –Harmonic conjugate – Construction of analytic functions– Conformal mapping:  $w = z + a$ ,  $az$ ,  $1/z$  -Bilinear transformation. [9]

### Complex Integration

Cauchy's Integral theorem (without proof) – Cauchy's integral formula – Taylor's and Laurent's series (without proof) – Classification of singularities – Cauchy's residue theorem – Contour integration – Circular and semi-circular contours (excluding poles on real axis). [8]

### Laplace Transforms

Conditions for existence – Transform of elementary functions – Basic properties – Shifting theorems- Derivatives and integrals of transforms — Transform of unit step function – Dirac's delta function- Initial and final value theorem– Transform of periodic functions. Inverse Laplace transform – Convolution theorem (excluding proof) – Solution of second order ordinary differential equation with constant co-efficients – simultaneous equations of first order with constant co-efficients. [10]

**Lecture Hours:45, Tutorial Hours:15, Total Hours: 60**

### Text Book(s):

- Grewal B.S, "Higher Engineering Mathematics", 43<sup>rd</sup> Edition, Khanna Publishers, Delhi, 2014.  
Website: <https://pvpsitrealm.blogspot.com/2016/09/higher-engineering-mathematics-by-bs.html>
- Kreyszig Erwin, "Advanced Engineering Mathematics", 10<sup>th</sup> Edition, John Wiley and Sons (Asia) Limited, New Delhi, 2016.

### Reference(s):

- Bali.N.P and Dr.Manish Goyal,"A text book of Engineering Mathematics",8<sup>th</sup> edition, Laxmi Publications (P) Ltd., 2011.
- Veerarajan.T. "Engineering Mathematics", for Semesters I and II , Tata McGraw Hill Publishing Co., New Delhi, 2010.
- Dr P. Kandasamy,Dr K. Thilagavathy and Dr K. Gunavathy , "Engineering Mathematics -II", S.Chand & Company Ltd, New Delhi.
- SWAYAM online video courses.(www.swayamprabha.gov.in)

## 50 CH 001 - Applied Chemistry

Semester	Periods / Week			Total hours	Credit	Maximum marks		
	L	T	P			C	CA	ES
II	3	0	0	45	3	50	50	100

## Objective(s)

- To rationalize the periodic properties such as ionization potential, electronegativity, oxidation state, electro negativity, atomic and molecular orbitals
- To analyze the thermodynamic functions, concept of cells and corrosion of metals and its control methods
- To help the learners to analyze the hardness of water and its removal
- To endow with an overview of spectroscopy principles and its applications
- To recall the basics of stereochemistry and reaction mechanism

## Course Outcomes

**At the end of the course, the student will be able to:**

1. Rationalize the periodic properties, variation of orbitals, interactions and orbitals with energy level diagrams
2. Analyze the thermodynamic functions, cell potentials and corrosion with its control measures
3. Recognize the sources ,hardness of water and its removal
4. Interpret the ranges of the electromagnetic spectrum used for exciting different molecular energy levels in various spectroscopic techniques
5. Review of stereochemistry and types of chemical reactions with their mechanism

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Periodic Properties**

Effective nuclear charge - atomic and ionic sizes - ionization energies - electron affinity - electronegativity - polarizability - oxidation states - penetration of orbitals- variations of s, p, d and f orbital energies of atoms - electronic configurations, ionic, dipolar and Vander- waals interactions. Hard soft acids and bases (HSAB). Molecular orbitals of diatomic molecules - plots of the multicentre orbitals. Equations for atomic and molecular orbitals. Energy level diagrams of diatomics. Pi-molecular orbital of butadiene and benzene. [9]

**Chemical Equilibria and Corrosion**

Thermodynamic functions - energy - entropy - enthalpy- free energy - Gibbs-Helmholtz equation - Van 't Hoff isotherm. Cell potentials - Nernst equation - applications - EMF series - applications - Potentiometric and Conductometric titrations.

Corrosion- types of corrosion - chemical and electrochemical corrosion - mechanism - Factors influencing corrosion - Corrosion control methods (impressed current and sacrificial anode methods) - Corrosion inhibitors. [9]

**Water Chemistry**

Sources - Water quality parameters - impurities in water and their effects. Hardness - Estimation of hardness - effect of hard water in various industries-Softening of water- zeolite process- ion-exchange process - reverse osmosis - electrodialysis. Boiler troubles - methods of prevention. [9]

**Analytical Techniques and Applications**

Absorption laws - Ultra violet spectroscopy (UV) - Principle - Instrumentation (Block diagram) - applications. Infra red spectroscopy (IR)- Instrumentation (Block diagram) - selection rule - types of fundamental vibrations - applications. Nuclear magnetic resonance spectroscopy (NMR) - Principle - selection rule - Instrumentation (Block diagram) - chemical shift - factors influencing the chemical shift -applications. Atomic absorption spectroscopy (AAS) - Principle - Instrumentation (Block diagram) -applications. [9]

**Concepts in Organic Chemistry**

Structural isomerism- types - Stereoisomerism - geometrical (Maleic and Fumaric acids) - optical isomerism (Lactic and Tartaric acids) - symmetry - chirality- enantiomers - diastereomers - optical activity - absolute configurations.

Introduction to reactions - substitution - addition - oxidation - reduction - cyclization and ring openings - mechanism. [9]

**Total Hours: 45****Text Book(s):**

1. Jain. P.C. and Monica Jain, "Engineering Chemistry", Dhanpatrai publishing co. New Delhi, 14<sup>th</sup> edition, 2015.
2. Dr.S.Vairam and Dr.Suba Ramesh, "Engineering Chemistry", Wiley India Limited, 2<sup>nd</sup> Edition, 2013.

**Reference(s):**

1. Puri B. R., Sharma L.R., and Pathania M.S., "Principles of Physical Chemistry", Vishal Publishing Company, New Delhi, 2017.
2. Dara. S.S, "A Text Book of Engineering Chemistry", S Chand & co. Ltd., 2014.
3. Bahl B.S. and Arun Bahl, "Advanced Organic Chemistry", S.Chand & co. Ltd., New Delhi, 2014
4. Sharma BK. Instrumental methods of chemical analysis, Goel Publishing House Meerut, 23<sup>rd</sup> Edition; 2014.

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## 50 EE 001 - Basic Electrical Engineering

## Common to all Branches

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
II	3	0	0	45	3	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>To understand and determine the electrical quantity in DC and AC circuits.</li> <li>To understand the working principle of electrical machines by applying Faraday's laws of electromagnetic induction.</li> <li>To know the sources of electric power generation and explain the working principles of different types of power plant.</li> <li>To understand the various components of low voltage electrical installation and basic house wiring.</li> <li>To implement the principles of energy conservation and understand the need of earthing and safety measures.</li> </ul>
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Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Analyze the fundamentals of electric circuits excited by DC and AC supply.</li> <li>Explain the construction and working of DC and AC electrical machines and identify their applications.</li> <li>Describe the operation of various types of power plant with their layouts.</li> <li>Recognize the significance of various components of low voltage electrical installations.</li> <li>Demonstrate the various types of wiring used in domestic and to know safety measures.</li> </ol>
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**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**DC and AC Circuits**

Electrical circuit elements (R, L and C), Voltage and current sources – Kirchhoff's current and voltage laws – Serial and parallel circuits – Analysis of simple circuits with DC excitation.

Representation of sinusoidal waveforms, Peak and RMS values, Phasor representation, Real power, Reactive power, Apparent power, Power factor. Analysis of single-phase AC circuits consisting of R, L, C, RL, RC, RLC combinations. [12]

**DC Machines**

Construction, Types and Operation, Simple Problems – Applications. [6]

**AC Machines**

Faraday's laws of electromagnetic induction – Transformers: Construction, Working principle, Types, Losses in transformers, Regulation, Efficiency and applications.

Generation of rotating magnetic fields – Three-phase induction motor: Construction, working principle, Characteristics, Starting-Single-phase induction motor: Construction, working principle and applications – Synchronous generators: Construction, Working principle and applications. [8]

**Electrical Power Generation Systems**

Sources of electrical energy: Renewable and nonrenewable – Principles and schematic diagram of Hydroelectric power plant, Thermal power plant, Nuclear power plant, Solar PV system and Wind energy conversion systems. [5]

**Electrical Installations and House Wiring**

Components of LT Switchgear: Switch Fuse Unit (SFU), MCB, ELCB, MCCB – Types of Batteries, Important Characteristics for Batteries – UPS.

Single phase and three phase systems: Three phase balanced circuits, Phase sequence, voltage and current relations in star and delta connections- Basic house wiring tools and components – Domestic wiring: Service mains, meter board, distribution board, energy meter. Different types of wiring: staircase, fluorescent lamp and ceiling fan. [8]

**Electrical Energy Conservation & Safety**

Elementary calculations for energy consumption –BEE Standards –Electrical energy conservation – Methods.

Electric shock, Precautions against shock, Objectives of earthing, Types of earthing – Basic electrical safety measures at home and industry. [6]

**Total Hours: 45****Text Book(s):**

- D. P. Kothari and I. J. Nagrath, "Basic Electrical Engineering", Tata McGraw Hill, 2017.
- D. C. Kulshreshtha, "Basic Electrical Engineering", McGraw Hill, 2017.

**Reference(s):**

- L. S. Bobrow, "Fundamentals of Electrical Engineering", Oxford University Press, 2011.
- E. Hughes, "Electrical and Electronics Technology", Pearson, 2016.
- V. D. Toro, "Electrical Engineering Fundamentals", Prentice Hall India, 2015.
- Vincent Del Toro, "Electrical Engineering Fundamentals", Prentice Hall, 2006.

## 50 ME 003 – Engineering Mechanics

## Common to all Branches

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
II	3	1	0	60	4	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>To learn a process for analysis of static objects, concepts of force, moment, and mechanical equilibrium in two and three dimensions.</li> <li>To learn the equilibrium of rigid bodies such as frames, trusses, beams.</li> <li>To identify the properties of surfaces and solids by using different theorem.</li> <li>To impart basic concept of dynamics of particles</li> <li>To understand the concept of friction and elements of rigid body dynamics.</li> </ul>
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Course Outcomes	<p><b>At the end of the course, the student will be able to</b></p> <ol style="list-style-type: none"> <li>Use scalar and vector analytical techniques for analysing forces in statically determinate structures.</li> <li>Apply basic knowledge of scientific concepts to solve real-world problems.</li> <li>Calculate the properties of surfaces and solids using various theorems.</li> <li>Analyse and solve problems on kinematics and kinetics.</li> <li>Draw a shear force and bending moment diagrams, analysis of rigid body dynamics and calculation of frictional forces on contact surfaces.</li> </ol>
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**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Basics and Statics of Particles**

Introduction –Units and Dimensions-Laws of Mechanics–Principle of transmissibility-Lame's theorem, Parallelogram and triangular Law of forces–Vectors–Vectorial representation of forces and moments.

**Vector operations**

Addition, subtraction, dot product, cross product-Coplanar Forces–Resolution and Composition of forces–Equilibrium of a particle– Forces in space-Equilibrium of a particle in space-Equivalent systems of forces-Single equivalent force.

[9]

**Equilibrium of Rigid Bodies**

Free body diagram–Types of supports and their reactions–requirements of stable equilibrium–Static determinacy, Moments and Couples–Moment of a force about a point and about an axis–Vectorial representation of moments and couples–Varignon's theorem-Equilibrium of Rigid bodies in two dimensions.

**Trusses:** Introduction, axial members, calculation of forces on truss members using method of joints-Method of sections.

[9]

**Properties of Surfaces and Solids**

Determination of Areas and Volumes-Centroid, Moment of Inertia of plane area (Rectangle, circle, triangle using Integration Method; T section, I section, Angle section, Hollow section using standard formula) – Parallel axis theorem and perpendicular axis theorem- Polar moment of inertia –Mass moment of inertia of thin rectangular section –Relation between area moment of inertia and mass moment of inertia.

[9]

**Dynamics of Particles**

Displacement, Velocity, acceleration and their relationship–Relative motion –Projectile motion in horizontal plane–Newton's law–Work Energy Equation – Impulse and Momentum.

[9]

**Elements of Rigid Body Dynamics, friction and Beams**

Translation and Rotation of Rigid Bodies: Velocity and acceleration–General Plane motion: Crank and Connecting rod mechanism.

**Friction**

Frictional force–Laws of Coloumb friction–Simple contact friction–Ladder friction-Rolling resistance–Ratio of tension in belt.

**Transverse bending on beams**

Types of beams: Supports and loads – Shear force and bending moment in beams – Cantilever, simply supported and overhanging beams.

[9]

Lecture Hours:45, Tutorial Hours:15, Total Hours: 60

**Text Book(s):**

1.	Rajasekaran, S, Sankarasubramanian, G., "Fundamentals of Engineering Mechanics", Vikas Publishing House Pvt. Ltd., 3 <sup>rd</sup> Edition, 2017.
2.	Beer, F.P and Johnson Jr. E.R, "Vector Mechanics for Engineers, Statics and Dynamics", McGraw-Hill International, 11 <sup>th</sup> Edition, 2016.

**Reference(s):**

1.	Jayakumar, V. and Kumar, M, "Engineering Mechanics", PHI Learning Private Ltd, New Delhi, 2012
2.	Hibbeler, R.C., "Engineering Mechanics", Vol. 1 Statics, Vol. 2 Dynamics, Pearson Education Asia Pvt. Ltd., 2016.
3.	Bansal R.K, "Engineering Mechanics" Laxmi Publications (P) Ltd, 2011.
4.	Irving H. Shames, "Engineering Mechanics – Statics and Dynamics", Pearson Education Asia Pvt. Ltd, 4 <sup>th</sup> Edition, 2003.

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## 50 MY 001 - Constitution of India

## Common to all Branches

Semester	Hours / Week			Total hrs	Credit C	Maximum Marks		
	L	T	P			CA	ES	Total
II	2	0	0	30	-	100	-	100
Objective(s)	<ul style="list-style-type: none"> <li>To know the premises informing the twin themes of liberty and freedom from a civil rights perspective.</li> <li>To address the growth of Indian opinion regarding modern Indian intellectuals' constitutional role and entitlement to civil and economic rights as well as the emergence of nationhood in the early years of Indian nationalism.</li> <li>To address the role of socialism in India after the commencement of the Bolshevik Revolution in 1917 and its impact on the initial drafting of the Indian Constitution.</li> <li>To gain knowledge on bill passing</li> <li>To acquire knowledge on function of election commission</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the student will be able to</b></p> <ol style="list-style-type: none"> <li>Discuss the growth of the demand for civil rights in India for the bulk of fns before the arrival of Gandhi in Indian politics.</li> <li>Discuss the intellectual origins of the framework of argument that informed the conceptualization of social reforms leading to revolution in India.</li> <li>Discuss the circumstances surrounding the foundation of the Congress Socialist Party [CSP] under the leadership of Jawaharlal Nehru and the eventual failure of the proposal of direct elections through adult suffrage in the Indian Constitution.</li> <li>Discuss the passage of the Hindu Code Bill of 1956.</li> <li>Explain the functions of Election Commission</li> </ol>							

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**History of Making of the Indian Constitution:**

History - Drafting Committee, ( Composition& Working)

[2]

**Philosophy of the Indian Constitution:**

Preamble - Salient Features

[2]

**Contours of Constitutional Rights & Duties:**

Fundamental Rights - Right to Equality - Right to Freedom - Right against Exploitation -Right to Freedom of Religion - Cultural and Educational Rights - Right to Constitutional Remedies - Directive Principles of State Policy - Fundamental Duties.

[6]

**Organs of Governance:**

Parliament - Composition - Qualifications and Disqualifications - Powers and Functions Executive - President - Governor - Council of Ministers - Judiciary, Appointment and Transfer of Judges, Qualifications - Powers and Functions.

[6]

**Local Administration:**

District's Administration head: Role and Importance, - Municipalities: Introduction, Mayor and role of Elected Representative, CEO of Municipal Corporation - Pachayati raj: Introduction, PRI: ZilaPachayat - Elected officials and their roles, CEO ZilaPachayat: Position and role- Block level: Organizational Hierarchy (Different departments) -Village level: Role of Elected and Appointed officials - Importance of grass root democracy.

[9]

**Election Commission:**

Election Commission: Role and Functioning- Chief Election Commissioner and Election Commissioners- State Election Commission: Role and Functioning- Institute and Bodies for the welfare of SC/ST/OBC and women.

[5]

**Total Hours: 30****Text Book(s):**

1.	The Constitution of India, 1950 (Bare Act), Government Publication
2.	Dr. S. N. Busi, Dr. B. R. Ambedkar framing of Indian Constitution, 1st Edition, 2015.

**Reference(s):**

1.	Basu, D D., "Introduction to the Constitution of India", Lexis Nexis, 2015.
2.	M.P Jain, "Indian Constitution Law", 7 <sup>th</sup> Edition, Lexis Nexis, 2014.
3.	S R Bhansali, "Textbook on The Constitution of India", Universal Publishers, 2015
4.	M P Jain, "Outlines of Indian Legal and Constitutional History", Lexisnexis, 2014

K.S.Rangasamy College of Technology - Autonomous							R2018		
50 CH 0P1 - Chemistry Laboratory									
Semester	Periods / Week			Total hrs	Credit	Maximum Marks			
	L	T	P			C	CA	ES	Total
II	0	0	4	60	2	60	40	100	
Objective(s)	<ul style="list-style-type: none"> <li>To test the knowledge of theoretical concepts.</li> <li>To develop the experimental skills of the learners.</li> <li>To facilitate data interpretation.</li> <li>To enable the learners to get hands-on experience on the principles discussed in theory sessions.</li> <li>To expose the learners to various industrial and environmental applications.</li> </ul>								
Course Outcomes	<p><b>At the end of the course, the student will be able to</b></p> <ol style="list-style-type: none"> <li>Estimate the amount of hardness, alkalinity, chloride ion and dissolved oxygen in water sample</li> <li>Estimate the amount of barium chloride and mixture of acids by conductometry</li> <li>Estimate the amount of ferrous ion by potentiometry</li> <li>Estimate the amount of acid by pH metry and apply the knowledge of pH determination for health drinks, beverages, soil, effluent and other biological samples</li> <li>Estimate the amount of ferrous ion by spectrophotometry</li> <li>Determine the percentage of corrosion by weight loss method</li> </ol>								
LIST OF EXPERIMENTS									
<ol style="list-style-type: none"> <li>Estimation of hardness of water by EDTA method.</li> <li>Estimation of alkalinity of water sample.</li> <li>Estimation of chloride content in water sample (Argentometric method).</li> <li>Determination of dissolved oxygen in boiler feed water (Winkler's method).</li> <li>Estimation of barium chloride by conductometric precipitation titration.</li> <li>Estimation of mixture of acids by conductometric titration.</li> <li>Estimation of ferrous ion by potentiometric titration.</li> <li>Estimation of HCl, beverages and other biological samples by pH meter.</li> <li>Estimation of iron content by spectrophotometry method.</li> <li>Determination of corrosion rate and inhibitor efficiency by weight loss method.</li> </ol>									
<b>Total Hours: 60</b>									
Text book(s):									
1.	Dr. S.Vairam and Dr. Suba Ramesh, "Engineering Chemistry", Wiley India Private Limited, Delhi, 2 <sup>nd</sup> edition, January 2013.								
2.	S.S. Dara, "A Text Book on Experiments and Calculations Engineering", S.Chand & Co., Ltd., 2 <sup>nd</sup> edition, 2003								
Reference(s):									
1.	Mendham. J, Denney. R.C, Barnes. J.D, and Thomas. N.J.K, Vogel's, "Text Book of Quantitative Chemical Analysis", Pearson Education, 6 <sup>th</sup> edition, 2009.								
2.	O P Vermani, and A K Narula, "Applied Chemistry : Theory And Practice", New Age International (P) Ltd., Publishers, 2 <sup>nd</sup> edition, January 2020.								
3.	Gary D. Christian, "Analytical Chemistry", John Wiley & Sons, 6th edition, 2007.								
4.	Chatwal Anand, "Instrumental Methods of Chemical Analysis", Himalaya Publications, 5th Edition, 2019.								

## 50 ME 0P1 – Engineering Practices Laboratory

## Common to all branches

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			CA	ES	Total
II	0	0	4	60	2	60	40	100
Objective(s)	<ul style="list-style-type: none"> <li>To acquire skills in basic engineering practices.</li> <li>To identify the hand tools and instruments.</li> <li>To provide hands on experience in Fitting, Carpentry, Sheet metal, Welding and lathe shop.</li> <li>To provide practical training on house hold wiring and electronic circuits.</li> <li>To offer real time activity on plumbing connections in domestic applications.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the student will be able to:</b></p> <ol style="list-style-type: none"> <li>Perform facing, plain turning, drilling.</li> <li>Make a model of fitting and carpentry: Square, Dovetail and Cross lap joints.</li> <li>Fabricate the models of sheet metal and welding joints.</li> <li>Construct and demonstrate electrical and electronic wiring circuit.</li> <li>Construct the water pipe line in plumbing shop.</li> </ol>							

**Machine shop**

Safety aspects in machine shop, Study of Lathe and Radial drilling machine, Turning, Facing and Drilling.

**Fitting and Carpentry**

Safety aspects in Fitting and Carpentry, Study of tools and equipments, Preparation of models- Square, Dove tail joint, Cross Lap.

**Sheet Metal and Welding**

Safety aspects in Sheet metal and Welding, Study of tools and equipments, Sheet metal models - Scoope, Cone, Tray, Preparation weld joints -Lap, butt, T-joints. Study of Gas Welding and Equipments.

**Electrical Wiring & Electronics**

Safety aspects of Electrical wiring, Study of Electrical Materials and wiring components, Wiring circuit for a lamp using single and stair case switches. Wiring circuit for fluorescent lamps, Basic electronic circuit.

**Plumbing**

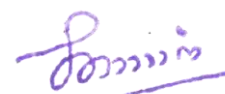
Study of plumbing tools, assembly of G.I. pipes/ PVC and pipe fittings, Cutting of threads in G.I.Pipes /PVC by thread cutting dies.

**Smithy, Plastic moulding and Glass cutting**

Safety aspects in smithy, plastic moulding and glass cutting, Study of tools and equipments.

**Total Hours: 60****Lab Manual :**

- “Engineering Practices Lab Manual”, Department of Mechanical Engineering, KSRCT.



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### III Semester

K.S. Rangasamy College of Technology - Autonomous							R 2018	
50 ME 008 - Elements of Mechanical Engineering								
B.Tech Textile Technology								
Semester	Hours / Week			Total Hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	1	0	60	4	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart the basic knowledge on mechanisms and types of cams which are essential for understanding the textile machineries.</li> <li>To impart the basic knowledge of strength of materials and power transmissions which are essential for understanding the textile machineries.</li> <li>To acquaint the basic properties of steam and functions of steam boilers used in textile industries.</li> <li>To acquire the basic functions of pumps, hydraulic devices used for processes in textile industries.</li> <li>To utilize various air compressors, clutches and brakes used in automobiles.</li> </ul>							
Course Outcomes	<p><b>At the end of the course the students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Design and construct the various cam profile and follower using various follower motions.</li> <li>2. Describe the concepts of stresses and strains, their significant effects in engineering applications.</li> <li>3. Select and design the appropriate power transmission drives for various requirements</li> <li>4. Explain the properties of steam and different kind of steam boilers</li> <li>5. Explain the working principles of pumps, hydraulic devices, air compressors, clutches and brakes.</li> </ol>							
<p><b>Note:</b> Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.</p>								
<p><b>Basics of Mechanisms</b>            Basic concepts of Link, Pair, Machine and Structure- Degree of freedom – Grashoff’s law – Inversion of 4-bar and single slider crank mechanisms. Cams: Types of cams and followers – Motions of the follower: Simple, Harmonic and Cycloidal motion – Design of tappet mechanism – Construction of tappet cam profile. <span style="float: right;">[9]</span></p>								
<p><b>Strength of Materials</b>            Basics of strength of materials: Simple stresses and strains in a bar – Poisson’s ratio – Elastic Moduli – Thermal stress and strain. Torsion of solid, hollow circular shafts and Stepped shafts – Power transmission, strength and stiffness of shafts. Leaf spring – Stresses and deflection in close coiled helical spring. <span style="float: right;">[9]</span></p>								
<p><b>Power Transmission Drives</b>            Belt drives: Flat belts and V-belts – types of belt drives –velocity ratio of belt drive – ratio of tensions – length and power transmitted by a belt. Chain drive: Roller chain drive. Gear drive: Types of gears – Spur, Helical, Bevel and Worm gears – Types of gear trains – Simple, compound and epicyclic gear trains – Differential gear. <span style="float: right;">[9]</span></p>								
<p><b>Properties of Steam and Steam Boilers</b>            Formation of steam – Temperature vs. Enthalpy diagram (T-H diagram) – wet steam, saturated steam and superheated steam – dryness fraction, wetness fraction, specific volume, enthalpy and internal energy of steam – Use of steam tables. Boilers: Classification – Fire tube and Water tube boilers – Cochran boiler, Lancashire boiler, Babcock and Wilcox boiler – Boiler mountings and accessories – Applications of steam boilers. <span style="float: right;">[9]</span></p>								
<p><b>Pumps, Hydraulic Devices, Clutches and Brakes</b>            Pumps: Classification – Components and working of Reciprocating and Centrifugal pumps. Hydraulic devices: Working of Hydraulic press and Hydraulic lift – Air compressors. Clutches and brakes: Types – Construction and working principle – Applications. <span style="float: right;">[9]</span></p>								
<b>Lecture Hours:45, Tutorial Hours:15, Total Hours: 60</b>								
<b>Text Book(s):</b>								
1.	S. Trymbaka Murthy, “Elements of Mechanical Engineering”, 3 <sup>rd</sup> Edition, I. K. International Pvt. Ltd, 2016.							
2.	J.K.Kittur, G.D.Gokak, “Elements of Mechanical Engineering”, Wiley Publications, 2014.							
<b>Reference(s):</b>								
1.	R.K.Rajput, “Elements of Mechanical Engineering”, Firewall Media, 2015.							
2.	Rattan.S.S, “Theory of Machines”, Tata McGraw Hill, 2016.							
3.	Pravin Kumar, “Basic Mechanical Engineering”, First Edition, Pearson India Education, 2014.							
4.	V.Ganesan, “Internal Combustion Engines”, Tata McGraw Hill Education, 2012.							

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## 50 CH 002 - Chemistry for Textile

## B.Tech Textile Technology

Semester	Hours / Week			Total hours	Credit	Maximum marks		
	L	T	P			C	CA	ES
III	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To help the learners about introduction, reaction and mechanism of polymers.</li> <li>To familiarize the learners with the physical and chemical properties of polymers.</li> <li>To enlighten the learners about characterization techniques.</li> <li>To endow with an overview of auxiliaries and colorants.</li> <li>To enlighten the methods of fabrication of polymers and preparation, properties and applications of composites.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the student will be able to:</b></p> <ol style="list-style-type: none"> <li>Recognize the concepts of polymer and analyses the different polymerization mechanisms and techniques.</li> <li>Relate polymer properties to their structure and conformation.</li> <li>Determine the molecular weight and crystallinity of polymer.</li> <li>Interpret the mechanism and conditions of various bleaching agent and theory for colour of the dye.</li> <li>Analyze the various fabrication methods and properties and applications of fiber reinforced composites.</li> </ol>							

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Introduction to Polymer**

Terminology – classification - functionality of monomer – degree of polymerization- types of polymerization - addition, condensation and copolymerization - Mechanisms of polymerization - free radical – ionic – co-ordination - Polymerization techniques – bulk – solution – suspension - emulsion. [9]

**Properties of Polymer**

Structure-property relationship of polymer - Technological function of polymers -fibers, elastomers, plastics - Chemical property - solubility and swelling - chemical reactivity - diffusion and permeability - aging and weathering, electrical property - optical property, mechanical property, strength of polymers - degradation of polymers. [9]

**Characterization of Polymer**

Molecular weight distribution - number average, viscosity average and weight average. Determination of molecular weight by gel permeation chromatography - Ubbelohde viscometer. Glass transition temperature (T<sub>g</sub>) - factors affecting T<sub>g</sub> - significance- Crystallinity- degree of crystallinity- factors affecting crystallinity - effects of crystallinity in properties of polymer. Principle - interpretation and applications of DSC, TGA, TMA and DTGA. [9]

**Auxiliaries and Colorants**

Surfactant: classification and significance. Types of bleaching agents – Reducing bleaching agents – Sulphur dioxide and Sodium hydro sulphite - Oxidising bleaching agents - calcium hypochlorite - hydrogen peroxide - chlorine dioxide - sodium hypochlorite – preparation, bleaching mechanism and conditions of bleaching. Determination of available chlorine in bleaching powder - percentage of hydrogen peroxide. Dyes - Witt's theory of colour and constitution, classification of dyes and applications. [9]

**Fabrication of Polymers and Composites**

Compounding- Additives for polymer – fillers – plasticizers – lubricants – accelerators – stabilizers - flame retarders – pigments - nucleating agents - blowing agents - adhesives. Fabrication of polymer - injection moulding - extrusion moulding - blow moulding - compression moulding - lamination. Composites – classification - Fiber reinforced plastics- preparation, - properties and applications. [9]

**Total Hours: 45****Text Book(s):**

- Gowarikar V.R., Viswanathan N.V and Jayadev Sreedhar, "Polymer Science", New age International (P) Ltd., New Delhi, 2015
- Fred W. Billmeyer "Textbook of Polymer Science" 3<sup>rd</sup> Edition, John Wiley & Sons, 2007

**Reference(s):**

- Joel R.Fried, "Polymer Science and Technology", Prentice Hall of India Pvt. Ltd., India, 2003.
- Hiemenz P.C and Lodge T.P, "Polymer Chemistry", 2<sup>nd</sup> Edition, CRC Press, 2007.
- Trotman, E.R., "Dyeing and Chemical Technology of Textile Fibres", Charles Griffin and Co. Ltd., London, 2001.
- Stoyko Fakirov, "Fundamentals of Polymer Science for Engineers", Wiley-VCH VERLAG GMBH & CO. KGAA, 2017.

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## 50 TT 301 - Fibre Science

## B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	3	0	0	45	3	50	50	100

## Objective(s)

- To impart knowledge on production of natural and regenerated fibres.
- To impart knowledge on applications and properties of natural fibres.
- To impart knowledge on applications and properties of regenerated fibres.
- To impart knowledge on applications and properties of protein fibres.
- To impart knowledge on analysis of various fibres.

## Course outcomes

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

- Explain about polymers and classify the textile fibres and its properties.
- Summarize the cultivation / extraction process, properties and applications of Natural cellulosic fibres and their structure.
- Explain the manufacturing, properties and applications of regenerated cellulosic fibres and their structure.
- Summarize the production, properties and applications of protein and other regenerated fibres with their structure and applications of high performance fibres.
- Explain the Identification of various fibres and blend proportion by various methods.

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Introduction**

Definition - staple fibre, filament; classification of textile fibres; High performance fibres. Essential and desirable properties of fibres. Requirements of fibre forming polymers. Types of polymers; intra polymer bonding, inter polymer forces of attraction, degree of polymerization, glass transition temperature. Principle of manmade spinning systems – Dry, Wet, Melt and Gel spinning. [8]

**Natural Cellulosic Fibres**

Cultivation, properties and applications of cotton; Brief study about BT, coloured and organic cotton. Extraction, properties and application of flax, jute, ramie, hemp, sisal, coir, banana and pine apple fibres. Morphological and chemical structure of natural cellulosic fibres. [10]

**Regenerated Cellulosic Fibres**

Production, properties and applications of viscose rayon, cuprammonium rayon, acetate rayon, bamboo, modal and lyocell fibres; Study of morphological and chemical structures of regenerated cellulosic fibres. [9]

**Protein and other Regenerated Fibres**

Morphological structure and chemical constitution of wool and silk. Types, production, properties and applications of wool, silk, soya bean, casein, alginate, chitin and chitosan fibres. Study on spider silk. [12]

**Identification of Fibres**

Fibre identification- microscope, chemical, burning, feeling, staining, density measurement methods. Determination of blend proportion. Determination of moisture content and moisture regain. [6]

**Total Hours: 45****Text book(s):**

- S.P.Mishra, "A Text book of Fibre science and technology", New age international publishers, Chennai.
- Morton W.E and Hearle J.W.S, "Physical properties of textile fibres", Textile Institute, Manchester

**Reference(s):**

- Mather.R.R, "The Chemistry of Textile Fibres 2<sup>nd</sup> Ed" Hardcover publisher, 2015.
- Gohl, "Textile Science", 2<sup>nd</sup> Edition, Paperback Publisher, 2005.
- Georg Von Georgievic, " The Chemical Technology of Textile Fibres", Paperback Publisher, 2007.
- S. Eichhorn, J.W. S. Hearle, et al.", "Handbook of Textile Fibre Structure, Volume 1" Woodhead Publishing, 2009.

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
III	4	0	0	60	4	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To expose the students to the various methods in structural investigation of fibres.</li> <li>To enable the students to understand the moisture absorption properties of fibres.</li> <li>To enable the students to understand the mechanical properties of fibres.</li> <li>To enable the students to understand the optical and frictional properties of fibres.</li> <li>To enable the students to understand the thermal and electrical properties of fibres.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Review the different methods in the investigation of fibres.</li> <li>Describe the moisture absorption properties of fibres.</li> <li>Discuss the concepts of mechanical properties of fibres.</li> <li>Explain the optical and frictional properties of fibres.</li> <li>Outline the thermal and electrical properties of fibres.</li> </ol>							

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

### Structural Investigation of Fibres

Basic requirements for fibre formation; Models of fibre structure-fringed micelle, fringed fibril and fringed lamellar models. Investigation of fibre structure by X-ray diffraction, SEM, TEM, STEM, FTIR and NMR. [10]

### Moisture Absorption Properties of Fibres

Definitions- humidity, relative humidity, standard testing atmosphere, moisture content and regain; hysteresis in moisture absorption; moisture absorption behaviour of textile fibres; Influence of various factors on regain; absorption in crystalline and amorphous regions.

Heats of sorption-Integral and differential, measurement, effects of heats of sorption; Conditioning of fibres, mechanism of conditioning, factors influencing the rate of conditioning; swelling of fibres, types of swelling and its measurement. [12]

### Mechanical Properties of Fibres

Tensile property- definitions related to tensile property; stress strain curves of various textile fibres and its importance, influence of moisture and temperature on tensile characteristics, Weak-link effect.

Elastic recovery and its relation to stress and strain of various textile fibres; Mechanical conditioning of fibres.

Time dependent effects- creep and stress relaxation phenomena; Directional effects – Brief study on flexural and torsional rigidity of fibres. [14]

### Optical and Frictional Properties of Fibres

Optical property - Refractive index and its measurement; Birefringence and its measurement; Absorption and dichroism; reflection and lustre of fibres.

Frictional property - Amonton's and Bowden's law of friction, various influencing factors- load, area of contact, speed of sliding, state of surface and regain; directional frictional effect of wool. [12]

### Thermal and Electrical Properties of Fibres

Thermal property- structural changes in fibres on heating, thermal transitions and melting; heat setting of fibres and its importance. Electrical property- mass specific resistance; influence of moisture, temperature and impurities on resistance; Dielectric properties-factors influencing dielectric properties of fibre; Static electricity – introduction, problems and elimination techniques. [12]

**Total Hours: 60**

### Text book(s):

- Morton W.E. and Hearle J.W.S., "Physical properties of textile fibres", published by The Textile Institute Manchester, U.K., 4<sup>th</sup> Edition, 2008. ISBN 978-1-84569-220-9.
- Meredith R. and Hearle J.W.S., "Physical methods of investigation of textiles", Wiley Publications, Newyork, 1989.

### Reference(s) :

- Meredith R., "Mechanical Properties of Textile Fibres", North Holland, Amsterdam, 1986.
- Mukhopadhyay S.K., "Advances in fibre science", The Textile Institute, Manchester, U.K., 1992.
- Gordon cook. J., "Hand book of textile fibres –Vol.I - Natural fibers", Wood Head Publishing Limited, Cambridge-England, 2006.
- Sreenivasa Murthy.H.V., "Introduction to Textile Fibers", Revised Edition, Wood Head Publishing India Private Limited, New Delhi.

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## 50 TT 303 - Yarn Manufacturing Technology I

## B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
III	3	0	0	45	3	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>To enable the students to learn the theory of various operations carried out at different stages of pre spinning process.</li> <li>To expose the students to different yarn numbering systems.</li> <li>To know the influence of various parameters on the quality of yarn and its productivity.</li> <li>To educate the inter-relationship of the process of conversion of fibers to yarns and the related machinery features.</li> <li>To know the latest developments, cleaning efficiency and stop motions at different stages of pre spinning process.</li> </ul>
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Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Describe the mechanism of ginning, its performance on yarn quality, classify yarn numbering systems, the mechanism of blow room machineries and its latest developments.</li> <li>Summarise the principle, mechanism, settings, cleaning efficiency, nep removal and latest developments of carding machine.</li> <li>Discuss the principle, settings, auto levelling and types of drafting systems in modern draw frame.</li> <li>Explain the mechanism of modern comber, timing operation and its preparatory machines.</li> <li>Describe the principle, mechanism, settings and latest developments in speed frame.</li> </ol>
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**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Ginning and Blow Room**

Sequence of spinning machinery for Short staple and Long staple spinning. Brief study on Yarn numbering systems. Ginning: preparatory processes for ginning, working of different types of gins; Selection of gins, Effect of ginning performance on yarn quality. Blow room: principle and description of opening, blending and cleaning machines; Mechanism of lap formation; contamination removal; cleaning efficiency and control of nep generation and waste removal; Latest developments in blow room machines. [9]

**Carding**

Chute feed system. Basics of opening, cleaning and fibre individualization; Working of modern flat cards- speeds, settings and functions of different elements, drives; card clothing and its maintenances; concept of autoleveller in carding; Control of waste, cleaning efficiency; Latest developments in carding. [9]

**Drawing**

Introduction to doubling/drafting. Principle and working of modern draw frame; working of various types of drafting systems-concept of roller setting, roller weighing system and distribution of draft; Coiling; micro dust collection; web condensation; roller lapping; Stop motions; Concept of autoleveller in draw frame; Latest developments in drawing. [9]

**Combing**

Preparatory process- Principle and working of sliver lap, ribbon lap and super lap formers; Modern comber: working principle, sequence and timing of operations in combing; comber settings; concept of piecing waves, asymmetric web condensation; Combing efficiency and nep removal efficiency; Latest developments in comber. [9]

**Speed Frame**

Principle and working of modern speed frame; drafting system - components, their functions and specifications, roller setting, Mechanism of winding and bobbin building - mechanical and electro mechanical; Bobbin lead and flyer lead; Stop motions; Latest developments in speed frame. [9]

**Total Hours: 45****Text book(s):**

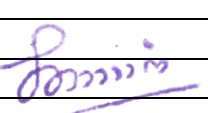
- Klein W., Vol. 2, "A practical guide to Opening and Carding", The Textile Institute, Manchester, U.K., 2000.
- Klein W., Vol. 3, "A practical guide to Combing and Drawing", The Textile Institute, Manchester, U.K., 1987.

**Reference(s) :**

- Klein W., Vol. 1, "The Technology of Short-Staple Spinning", The Textile Institute, Manchester, U.K., 1998.
- Chattopadhyay R, Salhotra K.R, "Spinning: Blow room, Carding", NCUTE Publications, 1998.
- Chattopadhyay R, Rangasamy R, "Spinning: Drawing, Combing & Roving", NCUTE Publications, 1999.
- Pattabhiraman T.K, "Essential Facts of Practical Cotton Spinning", Mahajan Publishers, Ahmedabad, 2005.



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50 TT 304 - Fabric Manufacturing Technology I								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
III	3	0	0	45	3	50	50	100
Objective (s)	To impart basic knowledge on <ul style="list-style-type: none"> <li>• Sequence of operation in warp and weft preparation.</li> <li>• Objectives and principle of preparation of warp winding.</li> <li>• Objectives and principle of preparation of pirn winding.</li> <li>• Objectives and principle of preparation of warping.</li> <li>• Objectives and principle of preparation of sizing and drawing-in.</li> </ul>							
Course Outcomes	<b>At the end of the course, the students will be able to</b> <ol style="list-style-type: none"> <li>1. State the sequence of weaving preparatory processes and classification of winding machines.</li> <li>2. Explain the working principles of various types of winding machines and their production calculation.</li> <li>3. Describe principle and working of weft winding machines and their production calculation.</li> <li>4. Explain principle and working of various warping machines and their defects and remedies.</li> <li>5. Explain the objectives and working principles of sizing machines and drawing –in.</li> </ol>							
<b>Note:</b> Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.								
<b>Introduction</b> Sequence of operation in warp and weft preparation. Various types of woven fabrics - plain, stripes, checked, dyed, printed and denim; Different types of supply packages; Winding - angle of wind, angle of cone, traverse ratio; classification of winding machines, characteristics of parallel winding, cross winding and precision winding. [6]								
<b>Warp Winding</b> Objects of winding; principles of random and precision winders; working of conventional and modern cone and cheese winding machines; Function of various parts – tension devices, slub catchers, stop motions, types of drum - half accelerated and fully accelerated drums, anti-patterning devices, anti-ballooning devices. Classification of yarn faults and its removal; concepts in yarn clearing – mechanical, optical and electronic yarn clearers; knotters and splicers, clearing efficiency. Air requirements for modern winding machines. Calculations based on winding parameters. [10]								
<b>Pirn Winding</b> Objects and principles of pirn winding; Types of pirn winding machine - modern automatic pirn winders, function of parts. Production calculations in cone, cheese and pirn winding machines. Winding of synthetic and blended yarns, Yarn preparation for hosiery process; Package preparation for dyeing; Winding package faults and remedies - cone, cheese and pirn winding. [9]								
<b>Warping</b> Warping - Objectives; classification of warping machines; working principle of beam warping machine- creel types, stop motion, length measuring motion; working principle of sectional warping machine- creel, stop motion, length measuring motion. Features of modern warping machines; Warping defects - causes and remedies; production calculations in warping machine. [10]								
<b>Sizing &amp; Drawing – In</b> Sizing -Objectives of sizing, sizing ingredients and recipe for various fibres, size paste preparation. Types of sizing machines and its function; marking and measuring motion; Concept of single end sizing. Sizing of blended and filament yarns. Modern developments in sizing. Sizing defects- causes and remedies; Production calculations in Sizing. Drawing –in - Needs and methods of drawing-in process, leasing, knotting and pinning machines. Selection and care of reeds, healds and drop pins; control of cross ends and extra ends. [10]								
						<b>Total Hours: 45</b>		
<b>Text book(s):</b>								
1.	Lord P.R and Mohamed M.H, "Weaving conversion of yarn to fabric", Wood head Publishers Ltd UK, reprint, 1992, ISBN: 090409538X.							
2.	Ajgaonkar D.B., Talukdar M.K. and Wedekar, "Sizing: Material Methods and Machineries", Mahajan Publications, Ahmedabad, 1999.							
<b>Reference(s) :</b>								
1.	Sengupta, "Weaving Calculation", D.P. Taraporewala Sons & Co. Ltd., reprint, 1996.							
2.	Ormerod A, "Modern Preparation and Weaving", Wood head Publishers Ltd UK, reprint, 2004.							
3.	Talukdar M.K., "An Introduction to Winding and Warping" Testing Trade Press, Mumbai, 1998.							
4.	Marks R. and Robinson T.C., "Principles of Weaving", The Textile Institute, Manchester, 1989, ISBN: 0 900739 258							

  
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K.S. Rangasamy College of Technology - Autonomous							R 2018	
50 TT 3P1 - Fibre Science Laboratory								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
III	0	0	4	60	2	60	40	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart knowledge on identification of fibres by physical test.</li> <li>To impart knowledge on identification of fibres by chemical test.</li> <li>To impart knowledge on determination of fibre density.</li> <li>To impart knowledge on determination of moisture regain and moisture content.</li> <li>To impart knowledge on blending of fibres.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>View the given fibre using microscope and identify the textile fibres.</li> <li>Identify the given fibre by burning test and solubility test.</li> <li>Evaluate the fibre maturity using caustic soda swelling method.</li> <li>Compute the amount of spin finish in synthetic fibres.</li> <li>Calculate fibre blend proportion of the given sample by solubility method.</li> </ol>							
<b>List of Experiments</b>								
<ol style="list-style-type: none"> <li>Identification of fibres by microscopic view using projection microscope.</li> <li>Identification of fibres by flammability characteristics (Burning test) of fibers.</li> <li>Identification of fibers by solubility tests.</li> <li>Determination of fibre maturity using caustic soda swelling method.</li> <li>Determination of moisture regain and moisture content of fibers.</li> <li>Estimation of percentage of spin finishes in synthetic fibers through Soxhlet extraction.</li> <li>Determination of blend proportion of P/C blends by solubility method.</li> <li>Determination of blend proportion of C/V blends by solubility method.</li> <li>Determination of blend proportion of P/V blends by solubility method.</li> <li>Determination of blend proportion of P/W blends by solubility method.</li> </ol>								
<b>Total Hours: 60</b>								

## 50 TT 3P2 - Yarn Manufacturing Technology Laboratory I

## B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
III	0	0	4	60	2	60	40	100

## Objective(s)

- To enable the students to handle the preparatory machines and operate them practically.
- To impart knowledge the students to learn material passage and parts of spinning preparatory machines.
- To develop the students to calculate the production of various preparatory machine.
- To make the students to know about optimum settings on various mechanism of preparatory machine based on the process variables.
- To know the draft, draft constant, twist, twist constant, production and working of building mechanism in speed frame.

## Course Outcomes

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

1. Explain the basic working mechanism of ginning machine and calculate the speed of ginning machine.
2. State the principle of opening, cleaning and mixing of fibres in blow room, mechanism of lap formation in scutcher.
3. Practice the working of cards with optimum settings and production, draft calculation.
4. Set the settings and practice the working of draw frame and production, draft calculation.
5. Demonstrate the working of comber, modern speed frame machine, its building mechanism and production, draft calculation.

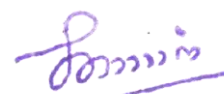
**List of Experiments**

1. Passage of material through double roller McCarthy ginning machine and calculation of the speeds.
2. Passage of material through blow room.
3. Calculation of speed, production and cleaning efficiency in blow room.
4. Passage of material through carding machine, production of sliver and calculation of hank of sliver, draft, production in carding machine.
5. Measurement of settings between various carding elements in carding machine.
6. Passage of material through draw frame, production of sliver and testing of drawn sliver hank. Calculation of draft and production in draw frame.
7. Passage of material through comber and settings in comber.
8. Passage of material through speed frame, production of roving and testing of roving hank.
9. Calculation of twist, twist constant, draft and production in speed frame.
10. Study of builder motion mechanism in speed frame.

**Total Hours: 60**



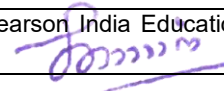
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Department	Textile Technology	Programme Code & Name			TT : B.Tech. Textile Technology				
Semester III									
Course Code	Course Name	Hours/Week			Credit	Maximum Marks			
		L	T	P	C	CA	ES	Total	
50 TP 0P1	Career Competency Development I	0	0	2	0	100	00	100	
<b>Objective(s)</b>	To enhance employability skills and to develop career competency								
<b>Unit – 1</b>	<b>Written Communication – Part 1</b>								<b>Hrs</b>
Usage of noun, pronoun, adjective (Comparative Forms), Verb, Adjectives, Adverb, Tenses, Articles and Preposition - Change of Voice - Change of Speech - Synonyms & Antonyms - One Word Substitution - Using the Same Word as Different Parts of Speech - Odd Man Out <b>Materials:</b> Instructor Manual, Word Power Made Easy Book									8
<b>Unit – 2</b>	<b>Written Communication – Part 2</b>								6
Analogies - Sentence Formation - Sentence Completion - Sentence Correction - Idioms & Phrases - Jumbled Sentences, Letter Drafting (Formal Letters) - Reading Comprehension(Level 1) - Contextual Usage - <b>Materials:</b> Instructor Manual, Word Power Made Easy Book									
<b>Unit – 3</b>	<b>Written Communication – Part 3</b>								4
Jumbled Sentences, Letter Drafting (Formal Letters) - Foreign Language Words used in English - - Spelling & Punctuation (Editing) <b>Materials:</b> Instructor Manual, News Papers									
<b>Unit – 3</b>	<b>Oral Communication – Part 1</b>								6
Self Introduction - Situational Dialogues / Role Play (Telephonic Skills) - Oral Presentations- Prepared -'Just A Minute' Sessions (JAM) <b>Materials:</b> Instructor Manual, News Papers									
<b>Unit – 5</b>	<b>Oral Communication – Part 2</b>								6
Describing Objects / Situations / People, Information Transfer - Picture Talk - News Paper and Book Review <b>Materials:</b> Instructor Manual, News Papers									
								<b>Total</b>	<b>30</b>
<b>Evaluation Criteria</b>									
S.No.	Particular	Test Portion							Marks
1	Evaluation 1 Written Test	50 Questions – 30Questions from Unit 1 & 2, 20 Questions from Unit 5, (External Evaluation)							50
2	Evaluation 2 Oral Communication 1	Self Introduction, Role Play & Picture Talk from Unit-3 (External Evaluation by English and MBA Dept)							30
3	Evaluation 3 Oral Communication 2	Book Review & Prepared Speech from Unit-4 (External Evaluation by English and MBA Dept)							20
								<b>Total</b>	<b>100</b>
<b>Reference Books</b>									
1. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.									
2. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications									
<b>Note :</b>									
<ul style="list-style-type: none"> <li>• Instructor can cover the syllabus by Class room activities and Assignments(5 Assignments/week)</li> <li>• Instructor Manual has Class work questions, Assignment questions and Rough work pages</li> <li>• Each Assignment has 20 questions from Unit 1, 2 and Unit 5 and 5 questions from Unit 3 and 4</li> <li>• Evaluation has to be conducted as like Lab Examination.</li> </ul>									



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## IV Semester

K.S.Rangasamy College of Technology - Autonomous						R 2018		
50 MA 012 - Statistics for Textile Industry								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
IV	3	1	0	60	4	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To acquire skills in handling situations involving random variable</li> <li>To familiarize with the various methods in hypothesis testing</li> <li>To monitor a process and detect a situation when the process is out of control</li> <li>To understand the concept of analysis of variance and use it to investigate factorial dependence</li> <li>To construct an appropriate model using time series approach</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Acquire the knowledge of probability and random variable and apply probability distributions in engineering problems</li> <li>2. Test the statistical hypothesis using normal, t and F distributions and goodness of fit using chi-square test</li> <li>3. Measure the relationship between two variables and construct and interpret quality control charts</li> <li>4. Analyze the variance of factors using CRD and RBD and LSD</li> <li>5. Know the components of time series and methods to measure the trend and construct the time series for moving averages</li> </ol>							
<p><b>Note:</b> Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.</p>								
<p><b>Probability and Distributions</b>            Probability (basic concepts) – Probability distributions – Properties of random variable – Moment generating function – Standard distributions – Binomial, Poisson, Weibull and Normal distributions – properties [9]</p> <p><b>Testing of Hypothesis</b>            Application of Normal distribution for testing mean and proportion – Applications of t, F and <math>\chi^2</math> distribution for testing mean and variance – Goodness of fit – Independence of attributes – Non-parametric test: Mann-Whitney U- test, Kruskal-Wallis (or H test), Test of Concordance [10]</p> <p><b>Correlation and Control Charts</b>            Correlation and Regression (discrete) – Control charts – <math>\bar{X}</math> chart – R chart – np chart – p chart – C chart – AQL chart [8]</p> <p><b>Design of Experiments</b>            One way classification – Completely randomized design – Two way classification – Randomized block design – Latin square design– <math>2^2</math> factorial design [9]</p> <p><b>Time Series</b>            Components of time series – Measurement of trend – Methods of least square: <math>Y = a + bX</math> , <math>Y = a + bX + cX^2</math> , <math>Y = ab^x</math> trends – Method of semi-averages – Method of moving averages(3 and 5 years) [9]</p>								
<b>Lecture Hours:45, Tutorial Hours:15, Total Hours: 60</b>								
<b>Text book(s):</b>								
1	Nagla J.R., "Statistics for Textile Engineers", Wood head Publishing India Limited, New Delhi, 2014							
2	Leaf G.A.V., "Practical Statistics for the Textile Industry: Part I and Part II", The Textile Institute, UK, 1984							
<b>Reference(s):</b>								
1	Montgomery D.C., "Introduction to Statistical Quality Control", John Wiley & Sons Inc., Singapore, 6 <sup>th</sup> edition, 2009							
2	Hayavadana J., "Statistics for textiles and apparel management", Wood head Publishing India Limited, New Delhi, 2012							
3	P.N.Arora, S.Arora., "Statistics for Management", S.Chand and Company Limited,5th edition, 2009							
4	Johnson R.A. and Gupta C.B., "Miller and Freund's Probability and Statistics for Engineers", Pearson India Education, Asia, 9th Edition, New Delhi, 2017							

  
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## 50 TT 401 - Yarn Manufacturing Technology II

## B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
IV	3	0	0	45	3	50	50	100

## Objective(s)

- Theory of yarn formation by different spinning systems.
- Effect of process parameters used in the spinning system on yarn quality.
- Principles and mechanism of advanced spinning systems.
- Provide the knowledge method of yarn plying and calculation of resultant count.
- Raw material requirement, yarn structure and preparation of different types of yarn.

## Course Outcomes

- At the end of the course, the students will be able to**
1. Describe the mechanism and working principles of various parts of ring frame and compact spinning, compare the properties of compact yarn with ring yarn.
  2. Discuss the raw material requirement, yarn structure and preparation for rotor spinning, summarizes its working mechanism.
  3. Discuss the raw material requirement, yarn structure and preparation for friction spinning, summarizes its working mechanism.
  4. Describe the principle of yarn production in self twist, wrap, core, siro and solo spinning systems.
  5. Summarize the twist level, methods of plying and count calculation in ply yarn and discuss the fancy yarn production.

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Ring and Condensed Yarn Spinning**

Principles and working of ring spinning machine; drafting system- components, their functions and specifications, roller settings; functions of yarn guide, balloon control ring, separators; types of rings and travellers; spindle and drives. Working principle of builder motion; auto doffing mechanism; control of end breakage rate; power consumption; control of hard waste. Latest developments in ring spinning.

Principle of compacting, different methods of condensed yarn manufacture, comparison of condensed yarn properties with that of ring yarn, applications. [10]

**Rotor Spinning**

Raw material requirement and preparation; principle of operation - feeding, opening, cleaning, drafting, twisting and winding; process parameters influencing spinning performance and yarn quality; yarn structure, properties of ring and rotor spun yarns; limitations; applications, Latest developments in rotor spinning. [9]

**Friction Spinning**

Principle of opening, cleaning, drafting, twisting and winding in DREF II and DREF III spinning; structure, properties and applications of friction spun yarns. [8]

**Other Spinning Systems**

Air-Jet and Air-Vortex Spinning- Principles of drafting, twisting and winding in air-jet and air-vortex spinning; structure, properties and applications of air-jet and air-vortex yarns.

Principle of yarn production in self-twist, wrap, core, siro and solo spinning systems. Properties and applications. [10]

**Yarn Plying and Fancy Yarns**

Merits of plying; methods of plying-TFO, ring twisting; selection of twist level for plying; calculation of resultant count of plied yarns; Fancy yarns-types and production methods, applications. [8]

**Total Hours: 45**

**Text book(s):**

1. Klein W., Vol. 4 & 5, "A Practical Guide to Ring Spinning" and "New Spinning Systems" The Textile Institute, Manchester, 1987.
2. Mahendra Gowda, "New Spinning Systems", NCUTE Publications, 2006.

**Reference(s) :**

1. Lawrence C.A. and Chen K.Z, "Rotor Spinning", Textile Progress, Vol. 13, No.4, Textile Institute, U.K., 1981.
2. Carl A.Lawrence, "Fundamentals of Spun Yarn Technology", CRC Press, 2003.
3. Lord P.R., "Handbook of yarn production", Wood Head publishing, 2003.
4. Salhotra K.R, Alagirusamy, Chattopadhyay R, "Ring Spinning, Doubling and Twisting", NCUTE Publications 2000

## 50 TT 402 - Fabric Manufacturing Technology II

## B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
IV	3	0	0	45	3	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>To impart basic knowledge in the concepts involved in various mechanisms used in weaving</li> <li>To train on the aspects of different mechanisms in loom.</li> <li>To educate on the features of jacquard, dobby and drop box mechanism.</li> <li>To make the students understand the selection and control of process variables during fabric formation.</li> <li>To give the knowledge about the different shuttleless looms.</li> </ul>
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Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Explain the functioning of weaving machine and its parts.</li> <li>2. Comprehend the various types of shedding mechanism and its requirements.</li> <li>3. Demonstrate knowledge of primary and secondary motions of weaving machines.</li> <li>4. Acquire the knowledge of Auxiliary motion, drop box and terry mechanism.</li> <li>5. Describe requirements and weft insertion principles of different shuttleless looms.</li> </ol>
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**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Introduction**

Weaving – Principles of weaving, Classification of looms, passage of material through a loom, Types of weaving motions - primary, secondary and auxiliary motions. Loom timing diagram for different motions. Driving of plain power loom; Yarns quality requirements for different types of shuttle looms; Weaving accessories- Types and function of heald wires, heald frames, reeds, shuttle, picker, Temples. [8]

**Shedding**

Shedding – Types of shed, Shedding mechanisms - positive and Negative. Principle and types of tappet, dobby and jacquard mechanism. Tappet shedding – positive and negative. Dobby shedding- climax, cross-border, cam and electronic dobby, designing and pegging. Jacquard shedding - Single lift, Double lift, Cross-border and electronic jacquard. Harness mounting, card punching. Reversing mechanism and limitations of shedding mechanism. [10]

**Picking, Beat up and Secondary Motion**

Picking: Cone over pick, Under pick: side lever and side shaft - Shuttle flight and timing, Checking Devices, swell checking and hydraulic swell checking; check straps. Beat-up – 4 bar linkage beat up mechanism, cam beat up mechanism. Kinematics of sley, sley eccentricity and loom timing diagram. Take up motion: Negative - positive - continuous. Let-off motion: Negative - Positive - Electronic. Types of Back rest. [9]

**Auxiliary Motions**

Weft stop motion – different types and feelers, side weft fork and centre weft fork mechanisms; warp protector mechanism - loose reed and fast reed; warp stop motion – mechanical and electrical; shuttle changing mechanism; cop changing mechanism; Drop box mechanism - 2x1, 4x1 and 4 x 4. Terry mechanism – principle and types – loose reed terry and fast reed terry mechanism. [9]

**Shuttleless Loom**

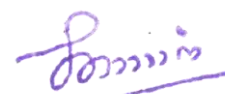
Yarn quality requirements for shuttleless loom; weft preparation for shuttleless loom; weft insertion principle of shuttleless looms in projectile, rapier, air jet, water jet and multiphase looms; weft accumulators; types of selvages; techno-economics of shuttleless loom; weaving of blended yarns and filament yarns. [9]

**Total Hours: 45****Text book(s) :**

1.	Talukdar M.K., Sriramulu P.K. and Ajaonkar D.B., "Weaving: Machines, Mechanisms, Management", Mahajan Publishers, Ahmedabad, 1998, ISBN: 81-85401-16-0
2.	Marks R. and Robinson T.C., "Principles of Weaving", The Textile Institute, Manchester, 1989, ISBN: 0 900739 258

**Reference(s) :**

1.	Lord P.R. and Mohamed M.H., "Weaving: Conversion of Yarn to Fabric", Merrow Publications, 1992.
2.	Ormerod, "Modern Preparation and Weaving", Butterworths & Co. Ltd., 1983.
3.	"Woven Fabric production-I (The Plain Power Loom), Woven fabric Production-II (Dobby, Drop box, Jacquard and Terry Looms)", NCUTE Publications.
4.	Sengupta, "Weaving Calculation", D.P. Taraporewala Sons & Co. Ltd., Reprint, 1996.



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## 50 TT 403 - Textile Chemical Processing I

## B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
IV	3	0	0	45	3	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>To impart technical knowledge on desizing and scouring process.</li> <li>To impart technical knowledge on bleaching and mercerizing process.</li> <li>To impart technical knowledge on cellulosic material dyeing process.</li> <li>To impart technical knowledge on synthetic material dyeing process.</li> <li>To impart knowledge on the construction and working principles of wet processing and machineries.</li> </ul>
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Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Explain the wet process sequences for various fabrics and summarize the pretreatment processes and their efficiency for cotton, wool and silk material.</li> <li>2. Describe the objectives and types of bleaching and mercerization of different materials also evaluate their efficiency and select suitable chemicals and other auxiliaries.</li> <li>3. Explain the classification and applications of various dyes and analyze their fastness properties.</li> <li>4. Summarize the principle of dyeing of synthetic fibres with various techniques.</li> <li>5. Demonstrate the working principles involved in preparatory and dyeing machineries.</li> </ol>
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**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Desizing and Scouring**

Wet process sequences for cotton, wool, silk, jute, polyester and blended fabrics (P/C, P/V).

Desizing: Desizing methods, enzymatic desizing-mechanism and process conditions, desizing efficiency.

Scouring: mechanism and machines, process conditions and scouring efficiency. Wool carbonizing and degumming of silk. [8]

**Bleaching and Mercerizing**

Bleaching: Hypochlorite and hydrogen peroxide bleaching - effect of process parameters; per-acidic, sodium chlorite, ozone, enzymatic bleaching; batch, semi-continuous and continuous processes; continuous scouring and bleaching machines; bleaching of viscose/linen, cotton/viscose, and polyester/cotton blends; evaluation of bleaching process.

Mercerization: objectives, methods, process conditions and their effects; yarn mercerizer; fabric mercerizing machine – chain, chainless and circular; evaluation of mercerizing process. [10]

**Dyeing of Cellulose Fibres and Protein Fibres**

Classification of Dyes, Pigments and their properties; Dye selection, Theory of dyeing. Affinity and Substantivity of dyes. Dyeing mechanism of cellulosic materials with direct dyes, reactive dyes and vat dyes.

Dyeing mechanism of wool and silk materials with acid dyes. Wash, rub and light fastness measurements. [9]

**Dyeing of Synthetic Fibres**

Mass coloration of synthetic fibres. Dyeing of polyester with Disperse dyes - Carrier, HTHP and Thermosol dyeing methods. Dyeing of nylon and acrylic fabrics with cationic dyes. Dyeing of elastomeric fibres and dyeing of blends. [8]

**Dyeing Machineries**

Mechanical and economic aspects of fibre, yarn, and fabric processing machines; scouring, bleaching and dyeing machines -loose stock, bale, hank, package, jigger, winch, soft flow, soft-over flow, air flow machines; padding mangles; garment dyeing machines- paddle, rotary drum, tumbler, jet dyeing. [10]

**Total Hours: 45****Text book(s):**

1.	Trotman, E.R., "Dyeing and Chemical Technology of Textile Fibres", Charles Griffin and Co. Ltd., London. 2001.
2.	Bhagwat R.S "Handbook of Textile Processing Machinery", Colour Publication, Mumbai, 1999.

**Reference(s) :**

1.	Kesav V.Datye and A.A.Vaidya, "Chemical processing of synthetic fibers and Blends", John wiley & Sons, 2004.
2.	Bhagwat R.S "Handbook of Textile Processing", Colour Publication, Mumbai, 1999.
3.	T.L.Vigo, "Textile Processing and Properties", Elsevier, New York, 1994.
4.	L. Ashok Kumar and M Senthil kumar, "Automation in Textile Machinery: Instrumentation and Control System Design Principles", 2018.



## 50 MY 002 – Environmental Science

## Common to all Branches

Semester	Hours / Week			Total Hrs	Credit	Maximum Marks		
	L	T	P			CA	ES	Total
IV	2	0	0	30	-	100	-	100

Objective(s)	<ul style="list-style-type: none"> <li>To help the learners to analyze the importance of ecosystem and biodiversity.</li> <li>To familiarize the learners with the impacts of pollution and control.</li> <li>To enlighten the learners about waste and disaster management.</li> <li>To endow with an overview of food resources, human health, population awareness.</li> <li>To recognize the social responsibility in environmental issues.</li> </ul>
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Course Outcomes	<p><b>At the end of the course, the student will be able to</b></p> <ol style="list-style-type: none"> <li>Recognize the concepts and issues related to environment, ecosystem and biodiversity.</li> <li>Analyze the source, effects, and control measures of pollution.</li> <li>Enlighten of solid waste and disaster management.</li> <li>Awareness about food resources, population and health issues.</li> <li>Analyze the social issues and civic responsibilities.</li> </ol>
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**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

### Environment, Ecosystem and Biodiversity

Environmental studies - Scope and multidisciplinary nature - Need for public awareness - Ecosystem - Food chain - Food web- Structure and function. Biodiversity - Values of biodiversity - Endangered and endemic species - Hot spots - India a mega biodiversity nation - Threats - Conservation - In-situ and ex-situ - Case studies. [6]

### Environmental Pollution

Pollution - Air, water, soil, noise and nuclear - sources, effects and control measures - Impacts of mining. - Environment protection act- Case studies. [6]

### Waste and Disaster Management

Waste – wealth from waste - Solid waste - e-waste - sources, effects and control measures. Disaster management - Earth quakes - Landslides - Floods - Cyclones - Tsunami - Disaster preparedness - Case studies. [5]

### Food Resources, Human Population and Health

World food problems - over grazing and desertification - effects of modern agriculture. Population - Population explosion and its impacts - HIV/AIDS - Cancer- Role of IT in environment and human health - Case studies. [6]

### Social Issues and the Environment

Unsustainable to sustainable development - Use of alternate energy sources - Rain water harvesting - Water shed management - Deforestation - Green house effect - Global warming - Climate change - Acid rain - Ozone layer depletion - Waste land reclamation. Consumerism and waste products - Role of an individual in conservation of natural resources – Case studies. [7]

**Total Hours: 30**

### Text book(s):

1.	Anubha Kaushik and C P Kaushik, "Perspectives in Environmental Studies", New Age International Publishers, New Delhi, 6 <sup>th</sup> edition, January 2018.
2.	Tyler Miller. G, "Environmental Science", Cengage Publications, Delhi, 16 <sup>th</sup> edition, 2018.

### Reference(s):

1.	Gilbert M.Masters and Wendell P. Ela,"Environmental Engineering And Science", PHI Learning Private Limited, New Delhi, 3 <sup>rd</sup> Edition, 2013.
2.	Rajagopalan. R, "Environmental Studies" Oxford University Press, New Delhi, 2 <sup>nd</sup> edition, 2012.
3.	Deeksha Dave and Katewa. S.S, "Environmental Studies",Cengage Publications, Delhi, 2 <sup>nd</sup> edition, 2013
4.	Cunningham, W.P. and Saigo, B.W. Environment Science, Mcgraw-Hill, USA. 9 <sup>th</sup> edition, 2007.

## 50 TT 4P1 - Yarn Manufacturing Technology Laboratory II

## B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
IV	0	0	4	60	2	60	40	100
Objective(s)	<ul style="list-style-type: none"> <li>To enable the students to learn material passage in the machine.</li> <li>To know the important parts of machines, draft, twist and production calculations in spinning machines.</li> <li>To train the students to handle machine and operate them practically.</li> <li>To make the students to know about optimum settings on various mechanism of spinning machine based on the process variables.</li> <li>To Know the production and characteristics of fancy yarns and doubled yarn</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Demonstrate the working of ring spinning frame and builder motion Calculate the speed and production of ring spinning frame.</li> <li>Calculate the twist and set the machine variables in ring spinning frame.</li> <li>Select optimum process variables and produce two ply yarn using two-for-one twister. and calculate the twist and production of two-for-one twister.</li> <li>Produce fancy yarns on two-for-one twister. Set the variables and produce quality yarns using open end spinning machine.</li> <li>Calculate the twist and production of rotor spinning machine and production of multiply yarns.</li> </ol>							

## LIST OF EXPERIMENTS

- Passage of material through ring frame, production of yarn and testing of yarn count.
- Different settings in ring frame and selection of ring travellers.
- Calculation of twist, twist constant, draft and production in ring frame.
- Study of builder mechanism in ring frame.
- Passage of material through open end spinning machine, production of yarn and testing of yarn count.
- Calculation of production and twist in open end spinning.
- Passage of material through ring doubling machine, production of yarn and testing of yarn count. Process sequence for production of sewing threads.
- Passage of material through Two-For-One twister (TFO), production of ply yarn and measurement of ply yarn count. Calculation of twist in TFO.
- Production and quality characterization of two-fold yarns.
- Production of fancy yarns using fancy doublers.

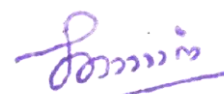
Total Hours: 60

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50 TT 4P2 - Fabric Manufacturing Technology Laboratory									
B.Tech. Textile Technology									
Semester	Hours / Week			Total hrs	Credit	Maximum Marks			
	L	T	P		C	CA	ES	Total	
IV	0	0	4	60	2	60	40	100	
Objective(s)	<ul style="list-style-type: none"> <li>To develop skills in the operation and maintenance of weaving preparatory machines.</li> <li>To develop practical knowledge of dismantling, assembling and setting of basic weaving mechanisms.</li> <li>To prepare the pattern card for a given design.</li> <li>To develop the design using drop box mechanism.</li> <li>To know about the working principles of circular weft knitting machine.</li> </ul>								
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Set the optimum process variables and carry out winding using supply package winding machine and calculate the production.</li> <li>Practice dismantling, assembling and setting of primary motions.</li> <li>Perform dismantling, assembling and setting of secondary motions.</li> <li>Perform dismantling, assembling and setting of auxiliary motions.</li> <li>Comprehend the production in circular weft knitting machine.</li> </ol>								
<b>LIST OF EXPERIMENTS</b>									
<ol style="list-style-type: none"> <li>(a) Passage of material through the cone winding machine. Setting of tensioners and slub catchers in cone winding machine. Calculation of drum speed, traverse speed, production in cone winding machine. (b) Passage of material through the pirn winding machine. Calculation of production in pirn winding machine.</li> <li>Passage of material through sectional warping machine.</li> <li>Dismantling and assembling of tappet shedding mechanism in plain power loom.</li> <li>Dismantling and assembling of cone over pick / under pick mechanism and study the adjustment of picking force.</li> <li>Dismantling and assembling of beat –up mechanism and calculation of sley eccentricity.</li> <li>Dismantling and assembling of negative let-off mechanism and adjustment of warp tension.</li> <li>Dismantling and assembling of seven wheel take-up mechanism and calculation of dividend.</li> <li>(a) Dismantling and assembling of weft stop motion. (b) Dismantling and assembling of warp stop motion.</li> <li>Designing of pegging plan on wooden lags and preparation of punched card for 4x4 drop box mechanism for a given design.</li> <li>Material passage and production calculation for single jersey / rib / interlock weft knitting machine.</li> </ol>									
<b>Total Hours: 60</b>									



<b>K.S.Rangasamy College of Technology - Autonomous</b>			<b>R 2018</b>
<b>Department</b>	<b>Textile Technology</b>	<b>Programme Code &amp; Name</b>	<b>TT : B.Tech. Textile Technology</b>

Semester IV									
Course Code	Course Name	Hours/Week			Credit	Maximum Marks			
		L	T	P		C	CA	ES	Total
50 TP 0P2	Career Competency Development II	0	0	2	0	100	00	100	
<b>Objective(s)</b>	To enhance employability skills and to develop career competency								
<b>Unit – 1</b>	<b>Written Communication – Part 3</b>								<b>Hrs</b>
Reading Comprehension Level 2 (Paraphrasing Poems) - Letter Drafting - Email Writing - Paragraph Writing - News paper and Book Review Writing - Skimming and Scanning - Interpretation of Pictorial Representations. <b>Practices:</b> Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Editing <b>Materials:</b> Instructor Manual, Word power Made Easy Book, News Papers									6
<b>Unit – 2</b>	<b>Oral Communication – Part 3</b>								4
Self Introduction - Miming (Body Language) - Introduction to the Sounds of English - Vowels, Diphthongs & Consonants, Introduction to Stress and Intonation - Extempore - News Paper and Book Review - Technical Paper Presentation. <b>Material:</b> Instructor Manual, News Papers									
<b>Unit – 3</b>	<b>Verbal Reasoning – Part 1</b>								8
Analogies - Alphabet Test - Theme Detection - Family Tree - Blood Relations (Identifying relationships among group of people) - Coding & Decoding - Situation Reaction Test - Statement & Conclusions <b>Material:</b> Instructor Manual, Verbal Reasoning by R.S.Agarwal									
<b>Unit – 4</b>	<b>Quantitative Aptitude – Part 1</b>								6
Problem on Ages - Percentages - Profit and Loss - Simple & Compound Interest - Averages - Ratio, Proportion <b>Material:</b> Instructor Manual, Aptitude Book									
<b>Unit – 5</b>	<b>Quantitative Aptitude – Part 2</b>								6
Speed, Time & Work and Distance - Pipes and Cisterns - Mixtures and Allegations - Races - Problem on Trains - Boats and Streams <b>Practices :</b> Puzzles, Sudoku, Series Completion, Problem on Numbers <b>Material:</b> Instructor Manual, Aptitude Book									
<b>Total</b>								<b>30</b>	
<b>Evaluation Criteria</b>									
S.No.	Particular	Test Portion						Marks	
1	Evaluation 1 Written Test	15 Questions Each from Unit 1, 3, 4 & 5 (External Evaluation)						60	
2	Evaluation 2 Oral Communication	Extempore & Miming – Unit 2 (External Evaluation by English, MBA Dept.)						20	
3	Evaluation 3 Technical Paper Presentation	Internal Evaluation by the Dept.						20	
<b>Total</b>								<b>100</b>	
<b>Reference Books</b>									
1. Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand & Co Ltd., New Delhi.									
2. Abhijit Guha, "Quantitative Aptitude", TMH, 3 <sup>rd</sup> edition									
3. Objective Instant Arithmetic by M.B. Lal & Goswami, Upkar Publications.									
4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications									
<b>Note :</b>									
• Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)									
• Instructor Manual has Class work questions, Assignment questions and Rough work pages									
• Each Assignment has 20 questions from Unit 1, 3, 4 and Unit 5 and 5 questions from Unit 2.									
• Evaluation has to be conducted as like Lab Examination.									



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## 50 MA 015 – Operations Research

## B.Tech -Textile Technology

Semester	Hours / Week			Total hrs	Credit C	Maximum Marks		
	L	T	P			CA	ES	Total
V	3	1	0	60	4	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To familiarize with the basic concepts and models of the operations research</li> <li>To analyze the real world problems using operations research techniques</li> <li>To impart knowledge about optimization techniques and take effective managerial decisions</li> <li>To develop mathematical skills to solve the linear programming models arising from a wide range of applications</li> <li>To emphasize the optimization techniques for the effective utilization of available resources in engineering field</li> </ul>							
Course Outcomes	<ol style="list-style-type: none"> <li>Form the Linear programming model and solve by simplex algorithms</li> <li>Apply the transportation and assignment models and predict the optimum solution</li> <li>Apply CPM and PERT techniques to control project activities</li> <li> <ol style="list-style-type: none"> <li>Predict the optimal replacement policy for machineries</li> <li>Determine an optimal order in which n jobs can be processed</li> </ol> </li> <li> <ol style="list-style-type: none"> <li>Explain the Game theory, zero sum game and dominance property</li> <li>Describe the Simulation model and Monte- Carlo Technique</li> </ol> </li> </ol>							

**Note:** The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the numbers hours indicated.

**Linear Programming Problems**

Formulation of LP problem - Solution of LP problem by graphical method - Simplex method - Big-M method – Duality [9]

**Transportation and Assignment Problems**

Transportation problems: North-west corner rule - Least cost method - Vogel's approximation method - MODI method - Assignment problems: balanced and unbalanced assignment problems - Travelling salesman problems [9]

**Network Analysis**

Network construction - Computation of earliest start time, latest start time, total, free and independent float time – PERT- computation of optimistic, most likely, pessimistic and expected time [9]

**Sequencing and Replacement Models**

Processing n jobs on 2 machines - processing n jobs on 3 machines - processing n jobs on m machines. Replacement models - Individual replacement - Group replacement [9]

**Game Theory and Simulation Model**

Game theory: Saddle point determination - Dominance property - graphical method - Simulation model - Monte - Carlo Technique. [9]

**Text book(s):**

- KantiSwarup, P.K. Gupta, Man Mohan, "Operations Research", Sultan Chand & Sons, 15th Edition, New Delhi, 2010
- V.Sundaresan, K.S.Ganapathy Subramanian, K.Ganesan., "Resource Management Techniques" AR Publications, 8th Edition, Chennai, 2014

**Reference(s):**

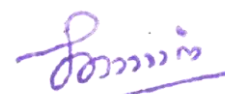
- Taha, H.A. "Operations Research: An Introduction", Pearson Education Edition, Asia, 10th Edition, New Delhi, 2016
- Sharma J. K., "Operations Research: Theory and Applications", Trinity Press, 6th Edition, New Delhi, 2017
- Gupta P. K. and Hira D.S., "Problems in Operations Research", S. Chand and Company, 3rd Edition, New Delhi, 2013
- Dr.G. Srinivasan, "Introduction to Operations Research", NPTEL online video courses

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## 50 TT 501 – Knitting Technology

## B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
V	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To explain the mechanism of weft knitting of various knitted structures.</li> <li>To demonstrate the mechanism of warp knitting of various knitted structures.</li> <li>To impart the knowledge on basic knitted structures of various knitted fabrics.</li> <li>To explain the modern development in mechanism of various knitted fabric production.</li> <li>To impart the knowledge on recent trends in knitted garment production.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Demonstrate the construction and function of various knitting elements, machines, choose yarns for knitting and mechanism of knitting of plain, rib, interlock, and purl structures.</li> <li>Draw the structures of plain, rib, interlock, purl, relate characteristics, end uses of fabrics with their structures, mechanism of needle selection and formation of knit, tuck, float stitches and draw the structure of derivatives.</li> <li>Calculate optimum knitting conditions and production; explain dimensional state of knitted fabrics and the mechanism of knitting of various structures using flat knitting machine and socks knitting.</li> <li>Explain construction and function of various warp knitting elements and the mechanism of knitting using Tricot and Rachel knitting machines.</li> <li>Draw the warp knitted structures and explain their characteristics and the influence of various factors on quality of knitted fabric.</li> </ol>							
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the numbers hours indicated.</p>								
<p><b>Weft Knitting</b> Characteristics of woven and knitted fabrics; classification of weft knitting machines; comparison of warp and weft knitting; yarn quality requirements for knitting; weft knitting elements; single jersey, rib, interlock and purl knitting machines – construction and knitting operation. Needle selection in weft knitting - multi-cam tracks, pattern wheels, pattern drums, programmed and punched tapes. Knitting of technical textiles. [9]</p> <p><b>Weft and warp Knitted Structures</b> Single jersey, rib, purl and interlock structures – characteristics and their derivatives – lecoste, accordian type, Swiss and derby ribs, half and full cardigan, eight lock, single pique; fundamentals of formation of knit, tuck and float stitches; warp knit structures - chain stitch, tricot, lock knit structures, satin, blind lap and inlay. [9]</p> <p><b>Flat Knitting</b> 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; mechanism of socks knitting. [9]</p> <p><b>Warp Knitting</b> Classification of warp knitting machines; preparation of yarns for warp knitting; knitting elements and working of Raschel and Tricot knitting machines, production of elementary warp knitted structures -lapping diagrams and notations. Open lap, closed lap, overlap, underlap, swinging, shogging. [9]</p> <p><b>Recent development in knitted garments and Quality Control</b> Seamless garments, Fascinated garments; Process control in knitting; Effect of loop length and its shape on fabric properties and factors affecting the formation of loop; defects in knitted fabrics- causes and remedies; dimensional stability, dimensional states and dimensional parameters, spirality; production calculations in weft knitting. [9]</p>								
								<b>Total Hours: 45</b>
<b>Text book(s):</b>								
1.	Ajgaonkar. D.B., "Knitting Technology", Universal Publication Corporation, Mumbai, 1998.							
2.	Spencer. D.J., "Knitting Technology", Textile Institute, Manchester, 1989.							
<b>Reference(s) :</b>								
1.	N. Anbumani., "Knitting fundamentals, machines, structures and developments", New Age International (P) Ltd.,Publisher, 2007.							
2.	Samuel Raz., "Flat Knitting; The new generation", Meisenbach GmbH, Bamberg, 1992.							
3.	Samuel Raz., "Warp Knitting Production", Melliland Textilberichte GmbH, Rohrbacher, 1987.							
4.	P. K. Banerjee, "Knitting Technology", NPTEL web course.							



## 50 TT 502 - Textile Chemical Processing II

## B.Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
V	3	0	0	45	3	50	50	100
Objective (s)	<ul style="list-style-type: none"> <li>To impart knowledge on methods and styles of printing.</li> <li>To impart knowledge on various printing process.</li> <li>To impart knowledge on various methods of finishing.</li> <li>To impart knowledge on various functional finishing process.</li> <li>To impart knowledge on effluent treatment.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Explain the ingredients, methods of printing and styles of printing. Printing defects and limitations</li> <li>Describe the printing procedure of cotton, polyester, silk, wool and garment. Discuss its faults- cause &amp; remedies</li> <li>Explain the procedure involved in finishing of cotton materials using various machines and procedure involved in finishing of denims.</li> <li>Describe the procedure involved in crease resistance, water proof, water repellent, flame proof and value added finishing.</li> <li>Summarize the various treatments of textile effluents, waste disposal &amp; solid waste reduction techniques and concepts of ISO14000.</li> </ol>							

**Note:** The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

**Methods and Styles of Printing**

Essential ingredients and properties of printing paste; methods of printing- roller, screen (manual and flatbed) and rotary printing method; styles of printing-direct, discharge and resist; making of screens for flat bed and rotary screen machines; defects and limitations of screen printing; transfer printing; foam printing; ink jet printing, UV printing and 3D printing.

[9]

**Printing of Fabrics**

Printing of cotton fabric using direct, reactive, Natural dyes and pigment; printing of polyester with disperse dyes; printing of silk and wool with acid and basic dyes; digital printing; garment printing; printing faults- causes and remedies.

[9]

**Finishing**

Introduction to finishing- objectives- mechanical and chemical finishing; durable and temporary finishes on cotton fabrics; back filling; raising and brushing; calendaring; anti shrink finish; relaxation shrinkage, felt compacting; softening, felting, non-felting; Denim finishing- stone, enzyme wash; bio-polishing.

[9]

**Functional Finishes**

Crease resist finish; cross linking agents – DMDHEU, poly carboxylic acids (BTCA & citric acid) for cotton; water proof and repellent finishes for cotton and synthetics; flame resistance finishes for cellulosic's and blends; antimicrobial finishes; softeners; finishing of knits; value added finishing of garments; herbal finishes and nano finish.

[9]

**Effluent Treatment**

Textile effluent–textile waste water problems, textile waste water characteristics, chemicals used in textile industry; treatment of textile effluents – primary, secondary and tertiary techniques for effluent treatment; solid waste reduction and disposal; concepts of ISO 14000.

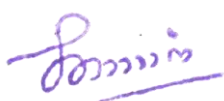
[9]

**Total Hours: 45****Text book(s):**

- Marie Christine Noel and Michael Cailloux, "Printed Textile Design" Paperback publisher, 2015
- K.L.Mittal and Thomas Bhaners,"Textile Finishing: Recent development and Future Trends" ISBN 9781119426769, 2017.

**Reference(s) :**

- Peter J. Hauser, "Advances in Treating Textile Effluent", InTech, October 2011
- Padmavankar, "Textile Effluent NCUTE", IIT, Publication, 2002.
- W.D.Schindler, "Chemical Finishing of Textiles", Wood Head Publishing Ltd, 2004.
- Prof. Dr. rer. nat. Hans-Karl Rouette, "Encyclopedia of Textile Finishing", Springer Verlag, 2002.

  
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## 50 TT 503 - Woven Fabric Structure

## B. Tech. Textile Technology

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
V	3	0	0	45	3	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>To teach the basic of woven fabric design and its influence on fabric properties</li> <li>To teach the different weaves and methods of production</li> <li>To impart knowledge on colour theory and application to woven fabrics</li> <li>To understand the different concept in pile and multi layer fabrics</li> <li>To impart knowledge on advanced fabric structures</li> </ul>
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Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Describe about the elements of fabric structure and elementary weaves.</li> <li>Explain the loom requirements for special weave and colour theory also analyze the concept of colour and weave effects.</li> <li>Explain the loom requirements and uses of extra thread figuring also analyze the backed fabrics and concept of bed ford cords.</li> <li>Analyze the designing concept of pile fabrics, multilayer fabrics and double cloths.</li> <li>Analyze the advanced weave structures and their loom requirements.</li> </ol>
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**Note:** The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

**Elements of Simple Structure**

Elements of fabric structure and the devices used for analyzing the fabrics; elementary weaves – plain weave and its derivatives, twill weave and its derivatives, twill and twist interaction, twill angle; satin, sateen weaves and their derivatives; methods of representation on point paper; different types of drafts; loom requirements for producing primary weaves. [9]

**Special Weaves and Colour Theory**

Design, characteristics, loom requirements and uses of special weaves – ordinary honey comb, brighton honey comb, huck –a – back and its modifications, mock leno, crepe weaves; colour theory – light and pigment theory, modification of colours, application of colours, colour and weave effects. [9]

**Compound Structure**

Design, characteristics, loom requirements and uses of extra warp, extra weft figuring and backed fabrics; extra warp and extra weft figuring with single and two colours; backed fabrics, bed ford cords, plain faced, twill faced and wadded bed ford cords; welts, piques and wadded piques. [9]

**Pile Fabrics and Multi Layer Fabrics**

Design, characteristics, loom requirements and uses of pile fabrics and multilayer fabrics –Warp pile: wire pile, fast wire pile, terry weaves, terry stripe and terry check. Weft Pile: plain back, twill back velveteen; Double cloths-classification, types of stitches, wadded double cloth, warp and weft wadded double cloth, centre stitched warp and weft way double cloth; multi layer fabrics. [9]

**Advanced Structures**

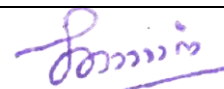
Design, characteristics, loom requirements and uses of advanced structures – damask, brocades, tapestry, gauze and leno weaves, types of sheds, doup wire, easer bar motion and jumper motion; Russian cords – net leno. [9]

**Total Hours: 45****Text book(s):**

1.	Grosicki Z.J, "Textile Design and Colour" – Textile Institute, Universal book publisher, Mumbai 2004.
2.	Grosicki Z.J, "Advanced Textile Design" - Textile Institute, Universal book publisher ltd, Mumbai 2007.

**Reference(s) :**

1.	Goerner D, "Woven Structure and Design", Part-I - WIRA, 1986.
2.	Goerner D, "Woven Structure and Design", Part-II – BTT6, 1989.
3.	Marks and A.T.C. Robinson, "Woven cloth construction", Textile Institute, Manchester, 1969.
4.	N.Gokarneshan, "Fabric Structure and Design", New Age International Publishers, 1 <sup>st</sup> Edition, New Delhi, 2004.



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## 50 MY 003 - Ethics for Engineers

## Common to all Branches

Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
V	2	0	0	30	-	100	-	100

Objectives	<ul style="list-style-type: none"> <li>To enable the students to create an awareness on Engineering and Human Values,</li> <li>To instill Moral and Social Values and Loyalty</li> <li>To inculcate the habits of appreciate the right of others</li> <li>To impart knowledge on safety and risk</li> <li>To know the global issues and its importance</li> </ul>
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Course Outcomes	<p><b>Students will be able to:</b></p> <ol style="list-style-type: none"> <li>Practice the moral values that ought to guide the Engineering profession.</li> <li>Apply the core values towards the ethical behaviour of an engineer.</li> <li>Apply the ethical and moral principles in engineering experimentation.</li> <li>Apply the ethical and moral principles in engineering for safety and standard codes of moral conduct towards the ethical behaviour of an engineer.</li> <li>Apply ethical and moral principles for engineers as managers, consultants, expert witness and resolve global issues of ethics concerning weapon development and multinational companies</li> </ol>
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**Human Values**

Morals values and Ethics-Integrity-Work ethic-Service learning-Civic virtue-Respect for others-Living peacefully-caring-Sharing-Honesty-Courage-Valuing time-Cooperation-commitment-Empathy-Self-confidence- Character-Spirituality – Introduction to yoga and meditation for professional excellence and stress management. [6]

**Engineering Ethics**

Senses of „Engineering Ethics“-Variety of moral issues-Types of inquiry-Moral dilemmas – Moral Autonomy – Kohiberg’s theory – Gilligan’s theory – Consensus and Controversy – Models of professional roles – Theories about right action – Self – interest – Customs and Religion – Uses of Ethical Theories. [6]

**Engineering as social experimentation**

Engineering as Experimentation – Engineers as responsible Experimenters – Codes of Ethics A Balanced Outlook on Law. [6]

**Safety, Responsibilities and rights**

Safety and Risk – Assessment of Safety and Risk Benefit Analysis and Reducing Risk - Respect for Authority– Collective Bargaining – Confidentiality – Conflicts of Interest – Occupational Crime – Professional Right – Employee Right – Intellectual Property Rights (IPR) – Discrimination. [6]

**Global Issues**


Multinational Corporations – environmental Ethics – Computer Ethics – Weapons Development – Engineers as Managers – Consulting Engineering – Engineers as Expert Witnesses and Advisors – Moral Leadership – Code of Conduct – Corporate Social Responsibility. [6]

**Total Hours: 30****Text book(s):**

1.	Mike W. Martin and Roland Schinzing, “Ethics in Engineering”, Tata McGraw Hill, New Delhi 2003
2.	Gail Baura, “Engineering Ethics 1st Edition An Industrial Perspective” Imprint: Academic Press Published Date: 11th April 2006

**Reference(s):**

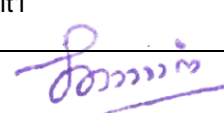
1.	Charies B. Fleddermann, “Engineering Ethics”, Pearson Prentice Hall New Jersey, 2004.
2.	Charies E. Harris, Michael S. Pritchard and Michael J. Rabins, “Engineering Ethics – Concepts and Cases”, Cengage Learning, 2009
3.	John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003
4.	Steve Starrett, “Engineering Ethics: Real World Case Studies”, ASCE Book Series, 2014



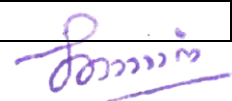
K.S. Rangasamy College of Technology–Autonomous							R2018	
50 TT 5P1 - Textile Chemical Processing Laboratory								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
V	0	0	4	60	2	60	40	100
Objective(s)	<ul style="list-style-type: none"> <li>To acquire practical knowledge on pretreatment.</li> <li>To acquire practical knowledge on dyeing of various fabrics.</li> <li>To acquire practical knowledge on printing.</li> <li>To acquire practical knowledge on finishing.</li> <li>To acquire practical knowledge on testing.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Practice the pretreatments desizing, scouring and bleaching.</li> <li>Perform the dyeing process on cotton, wool and silk.</li> <li>Apply disperse dyeing process, direct style of printing and pigment printing.</li> <li>Practice discharge style, resist style and Tie &amp; Dye style of printing</li> <li>Determine the various colour fastness, shrinkage and Soft finishing of cotton fabric using cationic softeners.</li> </ol>							
<b>LIST OF EXPERIMENTS</b>								
<ol style="list-style-type: none"> <li>Desizing of grey cotton fabric using enzymes &amp; Scouring of cotton</li> <li>Bleaching of cotton using hypochlorite and hydrogen peroxide</li> <li>Dyeing of cotton using               <ol style="list-style-type: none"> <li>Reactive dyes</li> <li>Vat dyes</li> <li>Natural dyes</li> </ol> </li> <li>Dyeing of wool and silk with               <ol style="list-style-type: none"> <li>Acid dyes</li> <li>Basic dyes</li> </ol> </li> <li>Dyeing of polyester using disperse dyes (HTHP)</li> <li>Direct style of printing on cotton fabric using               <ol style="list-style-type: none"> <li>vinyl sulphone reactive dyes</li> <li>pigment printing</li> </ol> </li> <li>Discharge style and Resist style of printing on cotton fabric – white &amp; colour base</li> <li>Tie &amp; Dye style of printing on cotton fabric</li> <li>Determination of colour fastness to               <ol style="list-style-type: none"> <li>Washing</li> <li>Rubbing</li> <li>Bleaching agents (Chlorine)</li> <li>Perspiration</li> </ol> </li> <li>Determination of cotton fabric shrinkage and Soft finishing of cotton fabric using cationic Softeners</li> </ol>								
								<b>Total Hours: 60</b>

K.S.Rangasamy College of Technology–Autonomous							R2018	
50 TT 5P2 - Fabric Structure Laboratory								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
V	0	0	4	60	2	60	40	100
Objective(s)	<ul style="list-style-type: none"> <li>To teach the structure of different weaves.</li> <li>To impart knowledge on how different types of fabric parameters can be used for designing fabrics given an application.</li> <li>To provide fundamentals of colour theory in order to apply in fabric design and construction.</li> <li>To impart exposure on the analysis different fabric structures with its construction details.</li> <li>To impart exposure about colour theory relevant to production of fabrics with various colour combinations and designs.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Gain knowledge about the elements of fabric structure and elementary weaves.</li> <li>Explain the loom requirements for special weave and colour theory.</li> <li>Explain the loom requirements and uses of extra thread figuring.</li> <li>Analyze the backed fabrics and gain knowledge on concept of mock leno and bed ford cords.</li> <li>Explain the loom requirements and uses of advanced weave structures.</li> </ol>							
<b>LIST OF EXPERIMENTS</b>								
Analysis of fabric structure of the following weaves:								
<ol style="list-style-type: none"> <li>Different types of plain weave fabrics (Casement, poplin, cambric, long cloth, &amp; mull cloth).</li> <li>Twill, herring bone and pointed twill weaves</li> <li>Satin and Sateen weaves</li> <li>Honey comb weave, Huck-a-back weave &amp; Mock Leno</li> <li>Extra thread figuring – extra warp and weft figuring</li> <li>Backed and Velvet fabrics</li> <li>Double cloth</li> <li>Gauze and Leno</li> <li>Terry fabrics and Bedford cords</li> <li>Single jersey, rib, interlock and purl structures and derivatives of jersey structures.</li> </ol>								
<b>Total Hours: 60</b>								

K.S.Rangasamy College of Technology - Autonomous Regulation							R 2018	
Semester V								
Course Code	Course Name	Hours/Week			Credit	Maximum Marks		
		L	T	P	C	CA	ES	Total
50 TP 0P3	CAREER COMPETENCY DEVELOPMENT III	0	0	2	0	100	00	100
Objective(s)	To enhance employability skills and to develop career competency							
Unit – 1	Written and Oral Communication – Part 1							Hrs
Reading Comprehension Level 3 - Self Introduction - News Paper Review - Self Marketing - Debate- Structured and Unstructured GDs Psychometric Assessment – Types & Strategies to answer the questions <b>Practices:</b> Sentence Completion - Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Interpretation of Pictorial Representations-Editing-GD-Debate. <b>Materials:</b> Instructor Manual, Word power Made Easy Book, News Papers							6	
Unit – 2	Verbal & Logical Reasoning – Part 1							8
Syllogism - Assertion and Reasons - Statements and Assumptions - Identifying Valid Inferences - identifying Strong Arguments and Weak Arguments - Statements and Conclusions - Cause and Effect - Deriving Conclusions from Passages - Seating Arrangements <b>Practices:</b> Analogies - Blood Relations - Statement & Conclusions <b>Materials:</b> Instructor Manual, Verbal Reasoning by R.S.Aggarwal								
Unit – 3	Quantitative Aptitude – Part 3							6
Probability - Calendar- Clocks - Logarithms - Permutations and Combinations <b>Materials:</b> Instructor Manual, Aptitude Book								
Unit – 4	Quantitative Aptitude – Part 4							6
Algebra - Linear Equations - Quadratic Equations - Polynomials <b>Practices:</b> Problem on Numbers - Ages - Train - Time and Work - Sudoku - Puzzles <b>Materials:</b> Instructor Manual, Aptitude Book								
Unit – 5	Technical & Programming Skills – Part 1							4
Core Subject – 1,2 3 <b>Practices :</b> Questions from Gate Material <b>Materials:</b> Text Book, Gate Material								
Total							30	
Evaluation Criteria								
S.No.	Particular	Test Portion						Marks
1	Evaluation1 WrittenTest	15 Questions each from Unit 1, 2, 3, 4 & 5 (External Evaluation)						50
2	Evaluation 2 - Oral Communication	GD and Debate (External Evaluation by English, MBA Dept& External Trainers)						30
3	Evaluation 3 – Technical Paper Presentation	Internal Evaluation by the Dept.						20
Total							100	
Reference Books								
<ol style="list-style-type: none"> <li>1. Aggarwal,R.S.“A Modern Approach to Verbal and Non-Verbal Reasoning”, Revised Edition 2008, Reprint2009, S.Chand&amp; Co Ltd., NewDelhi.</li> <li>2. AbhijitGuha, “Quantitative Aptitude”, TMH,3<sup>rd</sup>edition</li> <li>3. Objective Instant Arithmetic by M.B. Lal &amp; GoswamiUpkar Publications.</li> <li>4. Word Power Made Easy by Norman Lewis W.R. GOYAL Publications</li> </ol>								
Note :								
<ol style="list-style-type: none"> <li>1. Instructor can cover the syllabus by Class room activities and Assignments(5Assignments/week)</li> <li>2. Instructor Manual has Class work questions, Assignment questions and Rough workpages</li> <li>3. Each Assignment has 20 Questions from Unit 1,2,3,4 and 5 and 5 Questions fromUnit1</li> <li>4. Evaluation has to be conducted as like Lab Examination.</li> </ol>								

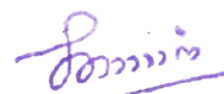
  
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K.S. Rangasamy College of Technology - Autonomous							R 2018		
50 TT 601 - Textile and Apparel Quality Evaluation									
B.Tech. Textile Technology									
Semester	Hours / Week			Total hrs	Credit	Maximum Marks			
	L	T	P			C	CA	ES	Total
VI	3	0	0	45	3	50	50	100	
Objective(s)	<ul style="list-style-type: none"> <li>To study the importance of quality evaluation.</li> <li>To know in detail the various aspects of testing fibre properties.</li> <li>To know in detail the various aspects of testing yarn properties.</li> <li>To know in detail the various aspects of testing fabric properties.</li> <li>To know in detail the various aspects of garment properties.</li> </ul>								
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Explain the fibre, yarn and fabric sampling methods.</li> <li>Describe the working of fibre testing equipment.</li> <li>Describe yarn fundamental properties and handle yarn testing equipment.</li> <li>Describe the fabric basic properties and handle fabric testing equipment.</li> <li>Implement the concept of garment checking procedure and assess the seam and accessories properties</li> </ol>								
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.</p>									
<p><b>Introduction</b>  Definition of quality; types of quality – quality of design, quality of conformance, quality of performance, quality control and quality assurance; factors influencing quality; reasons for textile quality evaluation; random and biased sampling, fibre sampling from bulk, combed slivers and rovings; yarn sampling; fabric sampling; standard testing atmosphere; testing methods. [9]</p> <p><b>Fibre Quality Evaluation</b>  Determination of fibre length and its uniformity- digital fibrograph; determination of fibre fineness and its importance; determination of fibre strength and elongation - stelometer; high speed fibre measurement- High Volume Instrument, Advanced Fibre Information System; evaluation of man-made fibre properties - single fibre fineness - vibroscope method; determination of trash; fibre maturity- caustic soda swelling method and air flow method; determination of moisture content and regain in fibres, Drying methods. [9]</p> <p><b>Yarn Quality Evaluation</b>  Linear density – Direct &amp; Indirect systems and its determination; evaluation of twist in single and ply yarns; crimp; determination of evenness- capacitance method, spectrogram , variance-length curve; yarn hairiness, principles of tensile testing, tensile testing of yarn at higher speeds, factors influencing tensile characteristics; classification of yarn faults- Classimat; yarn appearance assessment – ASTM yarn grades, electronic inspection board. [9]</p> <p><b>Fabric Quality Evaluation</b>  Fabric Sampling; Determination of tensile and tear strength; bursting strength; Impact strength; dimensional stability; air permeability; water repellency-spray test, drop penetration test, wetting time test and shower test; thermal conductivity; abrasion resistance; snagging; pilling; crease recovery; stiffness; drape; fabric weight, colour fastness (light, washing, bleaching agents, perspiration and rubbing); Flammability. [9]</p> <p><b>Fabric Assessment Requirement for Apparel</b>  Fabric checking procedure - 4 point system,10 point system; seam slippage and strength testing; Comfort- subjective and objective evaluation of fabric handle - FTT,FAST, KES; Button pull strength test, button impact test, zipper strength test. Fabric inspection machine. Testing for harmful substances in apparel. [9]</p>									
							<b>Total Hours: 45</b>		
<b>Text book(s):</b>									
1.	V. K. Kothari (Ed.), "Testing and Quality Management", Vol.1, IAFL Publications, New Delhi, 1999.								
2.	B. P. Saville, "Physical Testing of Textiles", Wood head Publishing Ltd., England, 1999.								
<b>Reference(s) :</b>									
1.	J.E. Booth, "Textile Testing", Butterworth Heinemann Ltd., U.K, 1996.								
2.	A. Basu, "Textile Testing; Fibre, Yarn and Fabric", SITRA, Coimbatore, 2001.								
3.	V.Sundaram, "Hand book of Textile Testing", CTRL Publications, Bombay, 2004.								
4.	Pradip V. Mehta., "Managing Quality in the Apparel Industry", NIFT Publication, India, 1998.								



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K.S. Rangasamy College of Technology-Autonomous						R 2018		
50 TT 602 - Garment Manufacturing Technology I								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
VI	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart knowledge on fabric spreading and cutting</li> <li>To impart knowledge on stitches, seams and sewing machine</li> <li>To impart knowledge on human anatomy and body measurements</li> <li>To impart knowledge on basic pattern making</li> <li>To impart knowledge on pattern grading and marker planning</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Understand the fabric spreading process and various types of cutting machines</li> <li>Sketch various head theories and difference between normal figure and fashionfigure</li> <li>Classify the different stitches, seams, sewing threads and Basics of SNLS</li> <li>Demonstrate the skills acquired on basic patterns for mens, womens and childrens</li> <li>Demonstrate the skills acquired on grading patterns for different garments and marker planning and marker making.</li> </ol>							
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.</p>								
<p><b>Fabric Spreading and Cutting</b> Methods of fabric spreading, spreading equipment's, computerized spreaders. Types of cutting machines, straight knife, round knife and band knife cutting machines; notchers, drills, computerized cutting machines. [9]</p> <p><b>Stitches, Seams and Basic Sewing Machine</b> Classification of stitches and seams; stitch and seam properties; sewing threads – functions of sewing thread, characteristics of threads, thread size and ticket number; classification of sewing machines; basic parts and working of SNLS sewing machine, over lock and flat lock sewing machines. [9]</p> <p><b>Anatomy and body measurements</b> Anatomy - Importance of anatomy in garment making; proportion - eight head theory and ten head theory; joints and their effects on garment; Illusion created by clothing; normal figure and fashion figure - its differences; body measurements - measurements needed for the construction of children's, men's and ladies garments; method and sequence of taking measurements; recording of measurements; meaning of the men's, women's size charts and control dimensions. [9]</p> <p><b>Basic Pattern Making</b> Basic pattern making – Importance of paper pattern; pattern making tools; Methods of pattern making –Draft pattern technique, flat paper pattern making technique and draping; Drafting of basic pattern – bodice front, back, sleeve, skirt front and back. Drafting of men's shirt components like front, back, yoke and sleeves; pattern grain line and its importance; pattern making for leg garments – front and back for trouser, skirt front and back. [9]</p> <p><b>Pattern Grading and Marker Planning</b> Pattern grading – definition and general rules; grading patterns for shirt, trousers, skirt and midi top; basics of computerized pattern making; Advantages of grading technology; Marker planning and marker making. [9]</p>								
						<b>Total Hours: 45</b>		
<b>Text book(s):</b>								
1.	Helen Joseph Armstrong, "Pattern Making for Fashion Design", Harper Collins N.Y., 1995, 11 <sup>nd</sup> edition.							
2.	Sumathi G.J. "Elements of Fashion and Apparel Design" New Age International Publishers, New Delhi 2002.							
<b>Reference(s) :</b>								
1.	Gini Stephens Frings, "Fashion-from concept to consumer" 7 <sup>th</sup> Edition, Prentice Hall 2005.							
2.	Ruth.E. Glock / Grace I.Kunz, "Apparel manufacturing and sewn product analysis" fourth edition Prentice hall, 2005							
3.	Sharon Lee Tate, "Inside Fashion Design", 5 <sup>th</sup> Edition, Pearson Prentice Hall, Delhi 2004.							
4.	Geerycooklin" Pattern grading for women's clothes the technology of sizing" OM Books Services, New Delhi, 2000.							



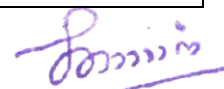
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K.S.Rangasamy College of Technology–Autonomous							R2018	
50TT603 - Nonwoven Technology								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To realize the basics of nonwoven fabrics</li> <li>To know various methods of manufacturing nonwoven fabrics</li> <li>To acquire knowledge on their applications in various fields</li> <li>To test the performance of nonwovens fabrics</li> <li>To gain knowledge on finishing of nonwovens materials</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the student will be able to</b></p> <ol style="list-style-type: none"> <li>Classify the nonwoven fabric and fibres and other materials used in manufacturing</li> <li>Demonstrate the web forming techniques in non-woven.</li> <li>Analyze and compare the properties of fabrics produced from various bonding methods</li> <li>Explain the finishing methods and end uses of non-woven fabrics</li> <li>Evaluate the performance of non-woven fabrics by various testing methods</li> </ol>							
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.</p>								
<p><b>Introduction</b>  Definitions and classification of nonwoven fabrics; fibres used for making nonwovens and their characteristics ;polymer powders, pigments, stabilizers, binder fluids, binder fibres-adhesive fibres (soluble and hot melt) and their characteristics; worldwide production and consumption of nonwoven fabrics. [9]</p> <p><b>Web Forming</b>  Web preparation-methods of making the web using carding machines-parallel laying and cross laying, factors influencing the web quality; various air laid principles and factors influencing web quality; wet laid principles–methods of binder addition and methods of drying nonwoven batt, factors influencing web quality; synthetic web formation principles-spun bonded and melt blown method; Non-woven layering-MSM and SMS, applications; structure-property relationship in nonwoven fabrics. [9]</p> <p><b>Bonding</b>  Mechanical bonding techniques-working principle of needle punching machine, surface structuring, needle characteristics, needle parts and influence of needling conditions on nonwoven batt; stitch bonding-working principle(with and without thread); hydro entangling (spun laced)-working principle and process influence on nonwoven batt; thermal bonding-principles of calendaring, ultrasound, contact drying, radiation drying; chemical bonding-principles of adhesion, cohesion bonding and methods of adhesive bonding(doctor blade, engraved cylinder, spraying and foam application). [9]</p> <p><b>Finishing and End Uses</b>  Finishing-dry finishing-shrinkage, wrenching and creping, calendaring, perforating, slitting and splitting; wet finishing–printing, softening, flameproof coating, laminating and flocking; introduction to nonwoven composites; end uses of nonwoven fabrics in technical textiles and home textiles and lining fabrics. [9]</p> <p><b>Testing</b>  CBR cone puncture test, liquid strike through time, bacterial filtration test(wet &amp; dry), porosity test, free formaldehyde, abrasion test, demand absorbency, opacity, super absorbency test-centrifuge retention capacity, geo textiles-resistance to weathering, microbiological resistance by soil burial test, home textiles-flammability, bending rigidity, resistance to static electricity of floor fabrics. [9]</p>								
								<b>Total Hours: 45</b>
<b>Text book(s):</b>								
1.	S.J. Russell (Ed.), "Handbook of Nonwovens", Wood head Publishing, CRC Press, Washington DC, 2007							
2.	Albrecht Wilhelm, "Non-woven fabrics: Raw material, Manufacture, Applications". Wiley VCH, 2008. <a href="https://www.inda.org/about-nonwovens/nonwovens-glossary-of-terms/">https://www.inda.org/about-nonwovens/nonwovens-glossary-of-terms/</a>							
<b>Reference(s) :</b>								
1.	Purdy.A.T., "Developments in Non-woven fabrics", Textile progress, vol.12, No.47, Textile Institute 1983							
2.	M.S. Casper, "Nonwoven Textiles", Noyes Data Corp. (Park Ridge, N.J), 1975							
3.	M. Mcdonald, "Nonwoven Fabric Technology", Park Ridge, NJ: Noyes Data, 1971							
4.	Wilhelm Albrecht, "Nonwoven Fabrics: Raw Materials, Manufacture, Applications, Characteristics, Testing Processes", Wiley-VCH; 1st edition (10 December 2002)							

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K.S.Rangasamy College of Technology-Autonomous							R 2018	
50 TT 604 - Technical Textiles								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
VI	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart the knowledge on various technological aspects of technical textiles.</li> <li>To provide an overview on the medical textile requirements and applications.</li> <li>To figure out the applications and properties for Geo and Agro Textiles</li> <li>To taught the smart garments technology</li> <li>To inculcated the various industrial and sports textile applications</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>1. Explain the scope, classification &amp; application of technical textiles &amp; also to Outline the material requirement used in technical textiles</li> <li>2. Conclude the role of textile materials in the medical textiles product development.</li> <li>3. DescribethethepropertiesrequiredtouseinAgrotextiles&amp;Geotextilesandtheapplicationof Geo &amp; Agro textiles.</li> <li>4. Summarize the selection requirements, functions &amp; applications of protective &amp; smart textiles.</li> <li>5. Outline the Industrial applications and sports textile products.</li> </ol>							
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.</p>								
<p><b>Introduction, Fibres &amp; Structures</b>            Technical Textiles: Introduction - Definition, Scope of technical textiles, Classification &amp; Application of Technical textiles. Fibres– Conventional Fibres, High Strength &amp; High Modulus Fibres, High Performance fibres, Ultra-fine and Novelty fibres in Technical textiles. Engineering Textile Structures for Technical Textiles. [9]</p> <p><b>Medical Textiles</b>            Medical Textiles: Introduction, Materials used &amp; its requirements. Classification of Medical textiles - Textiles for implantations, Non-implantations textiles, Extra-corporeal devices, Healthcare &amp; Hygiene Products. [9]</p> <p><b>Geo &amp; Agro Textiles</b>            Geo Textiles: Geo textile, Geo synthetics, Fibres and its selection for Geo textiles, Functions of Geo textiles, Engineering properties of Geo textiles, Geo textile structure, Applications for natural Geo textiles.            Agro Textiles - Textiles in Agriculture - Fibres details &amp; Properties, Applications of Agro textiles [9]</p> <p><b>Protective &amp; Smart Textiles</b>            Protective Textiles: Introduction, Selection of protective clothing materials, fibres and fabrics for Protective Textiles, Textiles for environmental protection; Thermal insulation materials; Biological and chemical warfare protection, Nuclear protective fabrics.            Smart Textiles - Role of smart materials in textiles, Shape Memory Fibres, Shape Memory Material, Concepts associated with shape memory materials, SMM in smart fabrics and garments. [9]</p> <p><b>Miscellaneous Industrial applications of textiles</b>            Textiles in Electronics, Textile reinforcement products, Textiles for Banners and Flags. Transport Bags and Sheets, Canvas Covers and Tarpaulins, Ropes and Nets, Home and Office Furnishings, Textiles in sportswear - Fabrics for sportswear and recent developments in sportswear. [9]</p>								
								<b>Total Hours: 45</b>
<b>Text book(s):</b>								
1.	A.R.Horrocks& S.C. Anand (Eds.), "Handbook of Technical Textiles", The Textile Institute, Manchester, U.K., WoodheadPublishing Ltd., Cambridge, England, 2000.							
2.	E.Willusz, "Military Textiles", Woodhead Publishing Ltd, 2008.							
3.	Richard. A.Scott, "Textiles for Protection", CRC press, Woodhead Publication, USA, 2005.							
<b>Reference(s):</b>								
1.	N.W.M. John, "Geotextiles", Blackie, London, ISBN: 0-216-91995-9, 1987.							
2.	S. Adanur "Wellington Sears Handbook of Industrial Textiles", Technomic Publishing Co. Inc., Lancaster, Pennsylvania, ISBN: 1-56676-340-1, 1995.							
3.	S. Anand, "Medical Textiles", Text. Inst., 1996, ISBN: 185573317X.							
4.	T.Matsuo, "Fiber materials for Advanced Technical Textiles", CRC publication, 2008.							



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K.S.Rangasamy College of Technology-Autonomous								R 2018
50 MY 014 Start-ups and Entrepreneurship								
Common to all branches								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
VI	2	0	0	30	-	100	--	100
Objective(s)	<ul style="list-style-type: none"> <li>To provides practical proven tools for transforming an idea into a product or service that creates value for others.</li> <li>To build a winning strategy, how to shape a unique value proposition, prepare a business plan</li> <li>To impart practical knowledge on business opportunities</li> <li>To inculcate the habit of becoming entrepreneur</li> <li>To know the financing, growth and new venture &amp; its problems</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Transform ideas into real products, services and processes, by validating the idea, testing it, and turning it into a growing, profitable and sustainable business.</li> <li>Identify the major steps and requirements in order to estimate the potential of an innovative idea as the basis of an innovative project.</li> <li>Reach creative solutions via an iteration of a virtually endless stream of world-changing ideas and strategies, integrating feedback, and learning from failures along the way.</li> <li>Apply the 10 entrepreneurial tools in creating a business plan for a new innovative venture.</li> <li>Apply methods and strategies learned from interviews with startup entrepreneurs and innovators.</li> </ol>							
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.</p>								
<p><b>Introduction to Entrepreneurship &amp; Entrepreneur:</b>  Meaning and concept of Entrepreneurship, the history of Entrepreneurship development, Myths of Entrepreneurship, role of Entrepreneurship in Economic Development, Agencies in Entrepreneurship Management and Future of Entrepreneurship.  The Entrepreneur: Meaning, the skills required to be an entrepreneur, the entrepreneurial decision process, Role models, Mentors and Support system. [6]</p>								
<p><b>Business Opportunity Identification and Preparing a Business Plan:</b>  Business ideas, methods of generating ideas, and opportunity recognition, Idea Generation Process, Feasibility study, preparing a Business Plan: Meaning and significance of a business plan, components of a business plan. [6]</p>								
<p><b>Innovations:</b>  Innovation and Creativity - Introduction, Innovation in Current. Environment, Types of Innovation, School of Innovation, Analysing the Current Business Scenario, Challenges of Innovation, Steps of Innovation Management, Experimentation in Innovation Management, Participation for Innovation, Co-creation for Innovation, Proto typing to Incubation. Blue Ocean Strategy-I, Blue Ocean Strategy-II. Marketing of Innovation, Technology Innovation Process. [6]</p>								
<p><b>Financing &amp; Launching the New Venture:</b>  Importance of new venture financing, types of ownership, venture capital, types of debt securities, determining ideal debt-equity mix, and financial institutions and banks.  Launching the New Venture: Choosing the legal form of new venture, protection of intellectual property, and formation of the new venture [6]</p>								
<p><b>Managing Growth &amp; Rewards in New Venture:</b>  Characteristics of high growth new ventures, strategies for growth, and building the new ventures.  Managing Rewards: Exit strategies for Entrepreneurs, Mergers and Acquisition, Succession and exit strategy, managing failures – bankruptcy. [6]</p>								
								<b>Total Hours: 30</b>
<b>Text book(s):</b>								
1.	Robert Mellor, Entrepreneurship for Everyone: A Student Textbook, SAGE Publications Ltd; First edition (26 December 2008, Pages: 256 pages							
2.	David S. Landes; Joel Mokyr; William J. Baumol, The Invention of Enterprise: Entrepreneurship from Ancient Mesopotamia to Modern Time, Princeton University Press, 2010							
<b>Reference(s) :</b>								
1.	Philip Auerswald, "The Coming Prosperity: How Entrepreneurs Are Transforming the Global Economy", Oxford University Press, 2012.							
2.	Janet Kiholm Smith; Richard L. Smith; Richard T. Bliss, "Entrepreneurial Finance: Strategy, Valuation, and Deal Structure", Stanford Economics and Finance, 2011							
3.	Edward D. Hess, "Growing an Entrepreneurial Business: Concepts and Cases", Stanford Business Books, 2011							
4.	Howard Love, "The Start-Up J Curve: The Six Steps to Entrepreneurial Success", Book Group Press 2011.							

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K.S. Rangasamy College of Technology- Autonomous						R 2018		
50 TT 6P1 - Garment Construction Laboratory I								
B. Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
VI	0	0	4	60	2	60	40	100
Objective(s)	<ul style="list-style-type: none"> <li>To give hands on training in constructing stitches and seams</li> <li>To give hands on training in darts, tucks and pleats</li> <li>To give hands on training in sleeves, collars and pockets</li> <li>To give hands on training in pattern making for children's wear</li> <li>To give hands on training in constructing basic children's and ladies garments</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Construct types of seams and stitches</li> <li>Construct types of pleats, gathers, darts and tucks</li> <li>Demonstrate the pattern drafting and constructions of baby and children wear</li> <li>Demonstrate the pattern drafting and constructions of men's wear</li> <li>Demonstrate the pattern drafting of women's wear</li> </ol>							
<p><b>LIST OF EXPERIMENTS</b></p> <ol style="list-style-type: none"> <li>Construction of different types of stitches and seams.</li> <li>Construction of different types of embroidery stitches.</li> <li>Construction of different types of Pleats and gathers.</li> <li>Construction of different types of darts, tucks and yokes.</li> <li>Construction of different types of sleeves, collars and pockets.</li> <li>Drafting pattern and construction of baby's romper.</li> <li>Drafting pattern and construction of children's summer frock.</li> <li>Drafting pattern and construction of men's T-Shirt.</li> <li>Drafting pattern and construction men's pyjama.</li> <li>Drafting pattern for ladies skirt and blouse.</li> </ol>								
<b>Total Hours:60</b>								

K.S. Rangasamy College of Technology – Autonomous							R 2018	
50 TT 6P2 - Textile and Apparel Quality Evaluation Laboratory								
B.Tech. Textile Technology								
Semester	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
VI	0	0	4	60	2	60	40	100
Objective(s)	<ul style="list-style-type: none"> <li>To study the different sampling techniques</li> <li>To study the evaluation procedure for determining various fibre properties</li> <li>To study the evaluation procedure for determining various yarn properties</li> <li>To study the evaluation procedure for determining various fabric properties</li> <li>To study the evaluation procedure for determining various apparel properties</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Analyse the fibre length, fibre fineness and bundle fibre strength</li> <li>Evaluate the linear density of sliver, roving and yarn Determine single yarn and ply yarn twist using manual and electronic twist tester</li> <li>Evaluate the single yarn strength and lea strength</li> <li>Analyse fabric abrasion and pilling</li> <li>Evaluate fabric tensile and tearing strength and seam slippage</li> </ol>							
<p><b>LIST OF EXPERIMENTS</b></p> <ol style="list-style-type: none"> <li>Determination of fibre length using fibrograph</li> <li>Determination of fibre fineness using Sheffield micronaire and Determination of bundle fibre strength and elongation using Stelometer</li> <li>Determination of fibre trash content using Shirley trash analyzer</li> <li>Determination of linear density of sliver, roving and yarn using wrap block and automatic wrap reel</li> <li>Determination of single yarn and ply yarn twist using electronic twist tester</li> <li>Determination of single yarn strength and elongation using single thread strength tester, Determination of lea strength using mechanical lea tester</li> <li>Determination of fabric GSM and fabric stiffness using stiffness tester</li> <li>Determination of crease recovery angle using crease recovery tester</li> <li>Determination of fabric pilling using ICI pill box tester and Determination of fabric abrasion using Martindale abrasion tester</li> <li>Determination of fabric strength using fabric strength tester and tearing strength using Elmendorf tear tester</li> <li>Determination of fabric seam slippage using seam slippage tester</li> <li>Determination of button and snap pull strength using button snap pull tester</li> </ol> <p style="text-align: right;"><b>Total Hours:60</b></p>								

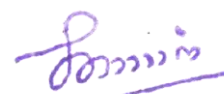
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K.S. Rangasamy College of Technology - Autonomous Regulation							R 2018		
Semester VI									
Course Code	Course Name	Hours/Week			Credit	Maximum Marks			
		L	T	P		C	CA	ES	Total
50 TP 0P4	Career Competency Development IV	0	0	2	0	100	00	100	
Objective(s)	To enhance employability skills and to develop career competency								
Unit – 1	Written and Oral Communication – Part 2								Hrs
	Self-Introduction – GD - Personal Interview Skills <b>Practices</b> on Reading Comprehension Level 2 – Paragraph Writing - Newspaper and Book Review Writing - Skimming and Scanning – Interpretation of Pictorial Representations - Sentence Completion- Sentence Correction - Jumbled Sentences - Synonyms & Antonyms - Using the Same Word as Different Parts of Speech - Editing <b>Materials:</b> Instructor Manual, Word power Made Easy Book, News Papers								4
Unit – 2	Verbal & Logical Reasoning – Part 2								8
	Analogies – Blood Relations – Seating Arrangements – Syllogism - Statements and Conclusions, Cause and Effect–Deriving Conclusions from Passages –Series Completion (Numbers, Alphabets & Figures) – Analytical Reasoning – Classification – Critical Reasoning <b>Practices:</b> Analogies – Blood Relations - Statement & Conclusions <b>Materials:</b> Instructor Manual, Verbal Reasoning by R.S.Aggarwal								
Unit – 3	Quantitative Aptitude - Part – 5								6
	Geometry-StraightLine–Triangles–Quadrilaterals–Circles–Co-ordinateGeometry–Cube–Cone– Sphere. <b>Materials:</b> Instructor Manual, Aptitude book								
Unit – 4	Data Interpretation and Analysis								6
	Data Interpretation based on Text – Data Interpretation based on Graphs and Tables. Graphs can be Column Graphs, Bar Graphs, Line Charts, Pie Chart, Graphs representing Area, Venn Diagram & Flow Charts. <b>Materials:</b> Instructor Manual, Aptitude Book								
Unit – 5	Technical & Programming Skills – Part 2								6
	Core Subject – 4,5,6 <b>Practices :</b> Questions from Gate Material <b>Materials:</b> Text Book, Gate Material								
								Total	30
Evaluation Criteria									
S.No.	Particular	Test Portion							Marks
1	Evaluation 1 Written Test	15 Questions each from Unit 1, 2, 3, 4 & 5 (External Evaluation)							50
2	Evaluation 2 - Oral Communication	GD and HR Interview (External Evaluation by English, MBA Dept.)							30
3	Evaluation 3 – Technical Interview	Internal Evaluation by the Dept. – 3 Core Subjects							20
								Total	100
Reference Books									
<ol style="list-style-type: none"> <li>Aggarwal, R.S. "A Modern Approach to Verbal and Non-verbal Reasoning", Revised Edition 2008, Reprint 2009, S.Chand &amp; Co Ltd., New Delhi.</li> <li>Abhijit Guha, "Quantitative Aptitude", TMH, 3rd Edition</li> <li>Objective Instant Arithmetic by M.B. Lal &amp; Goswami Upkar Publications.</li> <li>Word Power Made Easy by Norman Lewis W.R. GOYA L Publications</li> </ol>									
Note:									
<ul style="list-style-type: none"> <li>Instructor can cover the syllabus by Class room activities and Assignments (5 Assignments/week)</li> <li>Instructor Manual has Class work questions, Assignment questions and Rough Work pages</li> <li>Each Assignment has 20 questions from Unit 1, 2, 3, 4, 5 and 5 questions from Unit 1 (Oral Communication) &amp; Unit 5 (Programs)</li> <li>Evaluation has to be conducted as like Lab Examination.</li> </ul>									

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K.S.Rangasamy College of Technology – Autonomous							R2018		
50 TT E 11 - High Performance Fibres									
B.Tech. Textile Technology									
Elective	Hours / Week			Total hrs	Credit	Maximum Marks			
	L	T	P			C	CA	ES	Total
I	3	0	0	45	3	50	50	100	
Objective(s)	<ul style="list-style-type: none"> <li>To comprehend the basics of advanced spinning technology</li> <li>To know various methods of manufacturing high performance fibres</li> <li>To acquire knowledge on their applications in various fields</li> <li>To gain concepts on testing procedure of materials</li> <li>To obtain information on special fibres</li> </ul>								
Course Outcomes	<p><b>At the end of the course, the student will be able to</b></p> <ol style="list-style-type: none"> <li>Compare the conventional and advanced spinning process</li> <li>Demonstrate the manufacturing process of high performance fibres.</li> <li>Analyze the properties of fabrics produced using chemical and thermal resistant fibres</li> <li>Explain the application of high performance fibres in Medical field</li> <li>Evaluate the performance of specialty fibres</li> </ol>								
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.</p>									
<p><b>Advanced Spinning Technology</b>  Advances in conventional fiber forming process; gel spinning; Dry-jet-wet spinning; liquid crystal spinning; electro-spinning. [9]</p>									
<p><b>High Performance Fibres For Industrial Applications</b>  Manufacturing, properties and applications of glass fibers, basalt fibers; carbon fibers, high performance polyethylene fibers. [9]</p>									
<p><b>Chemical and Thermal Resistant Fibres</b>  Manufacture of aramid fibers; properties and application of aramid fibers; Basofil and Ceramic fibers, Sulphur fibers, properties and applications of PBO, PBI and PI fibers. [9]</p>									
<p><b>High Performance Fibres for Medical Applications</b>  Manufacturing, properties and applications of alginate fibers; chitin and chitosan fibers; regenerated silk and wool protein fibers; synthetic biodegradable fibers like PLA and SAF. [9]</p>									
<p><b>Specialty Fibres</b>  Hollow and profile fibers; blended and bi-component fibers; film fibers and functionalized fibers for specific applications. [9]</p>									
<b>Total Hours: 45</b>									
<b>Text book(s):</b>									
1.	Kothari V.K., "Textile Fibers: Development and Innovations", Vol. 2, Progress in Textiles, IAFL Publications, 2000.								
2.	Peebles L.H., "Carbon Fibers", CRC Press, London, 1995.								
<b>Reference(s) :</b>									
1.	Hearle J.W.S., "High Performance Fibres", Wood head Publishing Ltd., Cambridge, England, 2001								
2.	Hongu T. and Phillips G.O., "New Fibers", Wood head Publishing Ltd., England, 1997								
3.	J Gordon Cook, "Handbook of Textile Fibres: Man-Made Fibres: 2", Wood head Publishing Series in Textiles, 1984								
4.	T. Nakajima, "Advanced Fiber Spinning Technology", 1st Edition, Wood head Publishing, 1994.								



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## 50 TT E 12 - Man Made Fibre Technology

## B.Tech. Textile Technology

Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
I	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To enable the students to learn about the polymer rheology and the laws</li> <li>To acquire knowledge on melt spinning</li> <li>To gain knowledge on solution spinning</li> <li>To comprehend the post spinning operations</li> <li>To obtain ideas on new developments in fibre spinning</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Understand polymer rheology and the laws</li> <li>List various spinning techniques of polymers and parameter involved in spinning synthetic yarn</li> <li>Explain Properties and application of synthetic yarns</li> <li>Outline the need of various post spinning operations</li> <li>Describe advances in the spinning process</li> </ol>							

**Note:** The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

**Polymer Rheology**

Spinability of liquids, rheology of spinning, formation of fibre structure.

[7]

**Melt Spinning**

Melt Spinning- Polymer Selection and Preparation, equipment, properties and applications of polyester, polyamide and polypropylene fibres.

[9]

**Solution Spinning**

Solution spinning- Polymer Selection and Preparation, equipment, properties and applications of aramid, acrylic, polyurethane and regenerated cellulose fibres..

[9]

**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 fibrebehaviour; Spin finish composition and application; Evaluation methods; Texturising – Need and methods. Textured yarn characteristics.

[10]

**Developments in Fiber Spinning**

Liquid crystal spinning; Gel spinning, Electro spinning; Profile fibres, hollow and porous fibres; Specialty fibres poly glycolic acid, polylactic acid, chitosan fibres preparation properties and applications.

[10]

**Total Hours: 45****Text book(s):**

- Kothari V. K., "Textile Fibres: Development and Innovations", Vol. 2, Progress in Textiles, IAFL Publications, New Delhi, 2000
- Vaidya A. A., "Production of Synthetic Fibres", Prentice Hall of India Pvt. Ltd., New Delhi, 1988

**Reference(s) :**

- Gupta V. B. and Kothari V. K. (Editors), "Manufactured Fibre Technology", Kluwer Academic Publishers, 1997.
- Cook J. G., "Handbook of Textile Fibres: Vol. 2: Man Made Fibres", The Textile Inst., 5<sup>th</sup> Ed. 1984.
- Srinivasa Murthy H. V., "Introduction to Textile Fibres", Textile Association, India, 1987.
- Nakasjima (English edition, edited by Kajiwara K. and McIntyre J. E.), "Advanced Fibre Spinning Technology", Wood head Publication Ltd., England, 1994.

## 50 TT E13 -Textured Yarn Technology

## B.Tech. Textile Technology

Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P			C	CA	ES
I	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart knowledge on heat setting and mechanism of texturing.</li> <li>To understand the different methods of texturing</li> <li>To impart the knowledge on characteristics and various end uses of texturing</li> <li>To explain the concepts of different textured yarns</li> <li>To enable the students to prepare technological solutions for challenges in the area of texturing</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Explain the raw materials required for texturing and explain basic principles and methods of texturing.</li> <li>Describe the factors involved and mechanism of heat setting, discuss the fiber morphology and yarn properties during heat setting.</li> <li>Explain about the twisting device ,heating ,cooling and take-up systems of false twist texturing and discuss about characteristics of feed yarns and process parameter like time and temperature</li> <li>Describe the air jet texturing yarn production, express airflow pattern in different types of nozzles, loop formation mechanism and analyze the evaluation of air-jet textured yarn.</li> <li>Describe the working procedure of stuffer box, edge crimping, and knit-de-knit, gear crimping, bi-component filament texturing and differential shrinkage texturing.</li> </ol>							

**Note:** The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

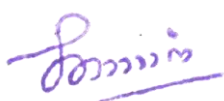
<b>Introduction</b> Need for bulking of synthetic yarns; texturability of fibres, state and quality of raw material required; classifications, basic principles and methods of texturing.	[8]
<b>Heat Setting</b> Heat setting – need, types of setting, mechanism, factors involved; effect on fibre morphology and yarn properties; evaluation of heat setting processes; fundamentals of thermo-mechanical texturing, Helanca process.	[9]
<b>False Twist Texturing</b> Draw texturing - simultaneous and sequential draw texturing; twisting devices; heating and cooling systems; take-up systems; characteristics of feed yarns; process parameters-time, temperature, twist, tension; evaluation of false-twist textured yarns; end-uses.	[9]
<b>Air Jet Texturing</b> Types of yarns produced; airflow pattern in different types of nozzles; loop formation mechanism, factors involved; evaluation of air-jet textured yarn; comparison of air-jet textured yarn with spun and false twist textured yarns; end-uses.	[10]
<b>Other Methods of Yarn Texturing</b> Stuffer box, edge crimping, knit-de-knit and gear crimping methods; bi-component filament texturing; differential shrinkage texturing; chemo - mechanical texturing; limitations and applications.	[9]
<b>Total Hours: 45</b>	

**Text book(s):**

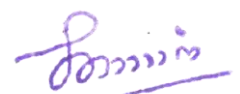
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| 1. | Hes L. Ursiny P., "Yarn Texturing Technology", Eurotex, U.K., 1994.   |
| 2. | Behery H.M. and Demir A., "Synthetic Filament Yarn Texturing Technology", Prentice Hall, 1996, ISBN 0134400259. |

**Reference(s) :**

- |    |  |
|----|--|
| 1. | Guirajani M.L. (Edr.), "Annual Symposium of Texturing", I.I.T Delhi, 1977.   |
| 2. | Wilson D.K. and Kollu T., "Production of Textured Yarns by the False Twist Technique", Textile Progress, Vol. 21, No.3, Textile Institute, Manchester, U.K., 1991. |
| 3. | Gupta V.B. (Edr.), "Winter School on Man-made Fibers – Production, Processing, Structure, Properties and Applications", Vol. 1, 1988.                              |
| 4. | J.W.S. Hearle, L.Hollick, D.K.Wilson, "Yarn Texturing Technology", Wood head, 2001, ISBN 0849313104, 9780849313103.  |

  
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K.S.Rangasamy College of Technology – Autonomous						R2018		
50 TT E 14 - Process Control in Spinning								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hours	Credit C	Maximum marks		
	L	T	P			CA	ES	Total
I	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To make the student to be conversant with following studies of process and quality control in spinning.</li> <li>To know the scope of process control and statistical application.</li> <li>To know the control of waste generation, yarn quality, raw material and productivity.</li> <li>To select suitable raw material and machinery set-up for the manufacturing of the yarn and fabrics with required quality.</li> <li>To know about outline of parameters for the satisfactory performance of various intermediate processes involved in spinning.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Understand the concept of process control and know the process control in mixing, spinning preparatory, HVI, AFIS.</li> <li>Analyze the characteristic of fibre quality and spinnability and explain the concept of nep and hook generation and nep removal.</li> <li>Know the estimation of yarn realization, cleaning efficiency and cleaning intensity, understand the concept of waste control.</li> <li>Explain the assessment of yarn unevenness and imperfections and know the yarn faults and their remedies</li> <li>Analyze the cause for maximizing the production and identify parameters for satisfactory performance of intermediate processes in spinning.</li> </ol>							
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.</p>								
<p><b>Process Control Concept and Statistical Application</b>  Scope of process control in spinning - Identification of process variables and product characteristics to control process in the blow room, card, draw frame, comber, speed frame and yarn spinning - Concepts of developing norms and standards for spinning process. Application of statistical techniques in process and quality control. Use of HVI and AFIS for process control operation. [9]</p> <p><b>Control of Raw Material Quality</b>  Quality control of mixing quality through fibre quality characteristics – Concept of fibre quality index and its application – Prediction of spinnability and yarn quality – Blending irregularity;- fibre rupture analysis- Causes of nep and hook generation –.nep removal in carding and combing machines. Online monitoring and control of neps and hooks on modern cards; Measurement of neps and hooks. [9]</p> <p><b>Control of Yarn Realization and Waste</b>  Estimation of yarn realization – Determination of trash content and cleaning efficiency, cleaning intensity in blow room and carding – Determination of comber noil and combing efficiency – Control of waste in blow room, carding and comber - Control of hard waste. [9]</p> <p><b>Yarn Quality Control</b>  Assessment of within and between bobbin count variations, Assessment and control of count variations in preparatory machines and ring frame –Assessment of yarn unevenness and imperfections - causes for unevenness and imperfections- analysis and interpretation spectrograms – unevenness caused by random fibre arrangement – Drafting waves – Periodic variation. Yarn faults – classification – assessment of faults – causes and methods to reduce faults. Causes for variability in strength, elongation and hairiness and measures for their control. [9]</p> <p><b>Production Control</b>  Factors affecting the productivity in ring spinning. Productivity indices. Methods for maximizing production in spinning machinery – New concepts. Effect of Machinery maintenance and Humidity on production; balancing of machineries. [9]</p>								
						<b>Total Hours: 45</b>		
<b>Text Book(S) :</b>								
1.	Garde. A. R. & Subramaniam T. A., “Process Control in Spinning”, ATIRA, Ahmedabad 1989.							
2.	Ratnam T.V. & Chellamani. K. P., “Quality Control in Spinning”, SITRA Coimbatore							
<b>Reference(S) :</b>								
1.	Chattopadhyay R., “Advances in Technology of Yarn Production”, NCUTE Publication, New Delhi, 2002.							
2.	Lord P.R, “Yarn Production; Science, Technology, and Economics”, The Textile Institute, Manchester,1999.							
3.	Furter.R., “Strength and Elongation Testing of Single and Ply Yarns”,&“ Eveness Testing in Yarn Production”, (Part II), The Textile Institute, Manchester, U.K., 1985.							
4.	Furter.R., “ Eveness Testing in Yarn Production”, (Part II), The Textile Institute, Manchester, U.K., 1982							



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## 50 TT E 15 - Home Textiles

## B.Tech. Textile Technology

Elective	Hours / Week			Total hours	Credit	Maximum Marks		
	L	T	P			CA	ES	Total
I	3	0	0	45	3	50	50	100
Objectives	<ul style="list-style-type: none"> <li>To acquire knowledge on recent developments in furnishing and other home textile products.</li> <li>To analyze textiles based products used in home textiles.</li> <li>To acquire knowledge on various flammability requirements of home textiles.</li> <li>To acquire knowledge on recent developments in floor covering home textile products.</li> <li>To know the various designs / styles of bed linen classification, types of mattresses and mattresses covers.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Describe different types fabrics, finishes and surface ornamentation on home textiles.</li> <li>Compare different furnishings and analyzing factors influencing in the selection of home furnishings for different products.</li> <li>Discuss the type sand end uses of different floor coverings and analyze the types and factors influencing of different floor coverings.</li> <li>Describe the types of doors, windows and their choice of fabrics used in curtains and draperies.</li> <li>Evaluate the properties of home textiles and describe the home decoration articles and bed linens.</li> </ol>							

**Note:** The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

**Introduction**

Introduction to home textiles; definition and classification of home textiles, Furnishing materials - woven, non-woven and knitted; different types of fibres used for home textile; eco-friendly home textiles; Special finishes and surface ornamentation on home textile products; Indian home textiles industry and its future prospects.

[9]

**Furnishings**

Types of furnishings used for different interiors- living room, dining room, kitchen, bed room, bathroom and kids room. Home decorations- sofa covers, cushion, cushion cover, upholsteries, wall hangings, bolster, bolster covers and throws;

Factors influencing the selection of home furnishings for different interiors; Requirements of furnishing for different interiors, role of fabrics in interior furnishing.

[9]

**Floor Coverings**

Types of flooring; Types of floor covering -carpet, rugs, pads and carpet cushion; Fibres used; salient of features of carpet, rugs, cushions and pads ; Factors influencing the selection of different floor covering and its maintenance, recent developments.[9]

**Curtains and Draperies**

Different types of doors and windows used; Curtains and draperies- types and choice of fabrics, calculating the material required for curtains, construction of curtains for different types of windows and doors; Method of finishing draperies; Developments in tucks, pleats, uses of drapery rods, hooks, tape rings and pins.

[9]

**Linens**

Bed linens- classification and types of mattresses and mattresses covers; quilt, quilt cover, bed spreads, blankets, comforts and comfort covers, pads, pillows ; Properties required for hotel and hospital linens; recent developments. Testing of home textile-abrasion, antimicrobial, flammability, shrinkage and color fastness.

[9]

**Total Hours: 45****Text Book(S) :**

- Alexander. N. G., "Designing Interior Environment", Mas Court Brace Covanorich, New York, 2001
- Wingate IB & Mohlen J.F. "Soft Furnishings". Prentice Hall Inc, New York, 2000

**Reference(S) :**

- Donserkery K. G., "Interior Decoration in India", D. B. Taraporevala Sons and Co. Pvt Ltd., 1993
- Robert Harding, "Curtains, Blinds and Valances", Egatemoos, Ohio, 1998
- Brian D Coleman, "Luxurious Home Interiors", Gibbs Smith Publication, Hong Kong, 2004
- Wingate IB & Mohlen J.F. "Textile Fabrics and Their Selection," Prentice Hall Inc, New York, 2000

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## 50 TT E 21 - Theory of Textile Structures

## B.Tech Textile Technology

Elective	Hours / Week			Total hrs	Credit		Maximum Marks	
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart the fundamental knowledge about yarn geometry</li> <li>To impart the fundamental knowledge about fibre migration</li> <li>To impart knowledge on mechanics of staple fibre and filament yarns</li> <li>To impart knowledge on geometry of fabric structure</li> <li>To impart knowledge on geometry of knitted and non woven fabrics</li> </ul>							
Course Outcome	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Explain the geometry of twisted yarn and concept of packing of yarn</li> <li>Explain the mechanism of migration behavior of spun yarn and concept of yarn twisting</li> <li>Discuss the tensile behavior of yarn and concept of yarn slippage and its influencing factors</li> <li>Explain the geometry of fabric in various models and deformation of fabric during tensile, shear and drape.</li> <li>Discuss the geometry of knitted structures and load extension behaviour of knitted fabric and non woven fabric.</li> </ol>							

**Note:** The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.

**Yarn Geometry**

Basic geometry of twisted yarn; Idealized helical yarn structure; Yarn count & twist factor; Twist contraction; Limits of twist; Packing of fibres in yarn - idealized packing, packing in yarns, specific volume of yarns; Relation between twist, diameter and twist angle. [9]

**Fibre Migration**

Ideal migration; Characterization of migration behavior; Migration in spun rayon yarns; Mechanism of migration; Form of yarn twisting: Cylindrical and ribbon twisting. [9]

**Mechanics of Filament / Staple Fibre Yarns**

Filament Yarn: Analysis of tensile behavior; Analysis for large extension; Prediction of breakage; Analysis of yarn mechanics by energy method; Observed extension and breakage of continuous filament yarns. Staple fibre yarn: Theoretical analysis of yarn geometry; Stress-strain distribution in yarn; Fibre obliquity and slippage; Influence of fibre length, fineness and friction on fibre slippage and yarn strength. [9]

**Geometry of Fabric Structure**

Geometry of Pierce, Olofson and Hamalton's models; cover factor; crimp interchange; Modification to Pierce model- race track, saw tooth and bilinear models; Application of cloth geometry; Geometrical solution during extension of cloths; Load - extension modulus; Concept of maximum weavability in woven fabrics; Deformation on shear and drape of fabrics. [9]

**Geometry of Knitted Fabrics and Non Wovens**

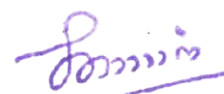
Geometry of plain knitted structures and complex knitted structures; Mechanics of knitted fabrics- warp wise load extension, biaxial stress behavior, weft wise extension. Geometry of non-woven fabrics. [9]

**Total Hours: 45****Text book(s):**

1. J.W.S.Hearle, P.Grosberg, and S.Backer, "Structural Mechanics of Fibres, Yarns and fabrics", Willre Interscience, New york, 1969.
2. B.C. Goswami, J. Martindale and Scandio, "Textile Yarns: Technology, Structure and Application", Wiley-Interscience, New York, 1977.

**Reference(s) :**

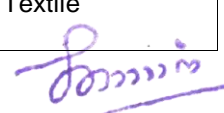
1. Peirce F T and Womersley J R, "Cloth Geometry", reprint, The Textile Institute, Manchester 1978.
2. Clifton G.Overholser, "Theory of Textile Structure", Random Publications, 2013.
3. B K Behera Professor and P K Hari, "Woven Textile Structure: Theory and Applications", Wood head Publishing Ltd., 2010.
4. Jinlian Hu, "Structure and Mechanics of Woven Fabrics", Wood head Publishing Ltd., 2004.



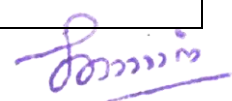
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K.S.Rangasamy College of Technology- Autonomous							R 2018	
50 TT E 22 - Process Control In Weaving and Chemical Processing								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit		Maximum Marks	
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart the knowledge on process control in winding.</li> <li>To impart the knowledge on process control in warping and sizing.</li> <li>To impart the knowledge on process control in weaving</li> <li>To impart the knowledge on process control in preparatory process.</li> <li>To impart the knowledge on process control in dyeing, printing and finishing.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>State the process control in warp and weft winding.</li> <li>Describe the process control of warping and sizing</li> <li>Explain the control of loom shed, loss of efficiency by snap reading and hard waste control.</li> <li>Organize process control measures in preparatory process.</li> <li>Develop process control measures in dyeing, printing and finishing process.</li> </ol>							
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.</p>								
<p><b>Process control in winding</b> Scope and approach of process control in warp winding - control of quality of knot, producing good packages, control of efficiency of fault removal, process parameters, performance in winding; Process control in pirn winding-Scope and approach, Minimising end breaks, stoppages due to mechanical failures. [9]</p>								
<p><b>Process control in warping and sizing</b> Scope and approach of process control in warping and sizing- minimising end breaks in warping, performance, quality and productivity in warping; Choice of size recipe and size pick- up, preparation of size recipe, control of size pick-up, control of yarn stretch and moisture in sized yarns, quality of sized beams, control of productivity and size losses. [9]</p>								
<p><b>Process control in weaving</b> Scope and approach of process control in weaving- control of loom speed and loom efficiency, control of loss of efficiency by snap reading, loom performance, quality of yarn and loom allocation; Fabric defects, causes, control measures. Inspection standard, cloth realization. Online and off-line process control; Cost control in weaving. [9]</p>								
<p><b>Process control in Wet processing (Preparatory Process)</b> Process control in Preparatory Process- Grey Inspection of Fabrics, Process control measures in desizing, scouring, souring, bleaching and mercerization; Important functions of a control laboratory in a modern process house. Quality evaluation of preparatory processed material. [9]</p>								
<p><b>Process control in Dyeing , Printing and Finishing</b> Process control measures in dyeing, printing and finishing - Process control in dyeing of various materials; Process control in various printing methods; Process control in various finishing methods. [9]</p>								
								<b>Total Hours: 45</b>
<b>Text book(s):</b>								
1.	AbihijitMajumdar, Apurba Das, Algarsamy.R and Kothari.V.K, "Process control in Textile manufacring", Woodhead Publishing Ltd, New Delhi, 2013.							
2.	Thilagavathi.G and Karthi.T "Process control and yarn quality in Spinning" Woodhead Publishing, 2015.							
<b>Reference(s) :</b>								
1.	Stanley Bernard Brahams, "The Fundamentals of Quality Assurance in the Textile Industry" Hardcover publisher, 2016							
2.	Georgi Damyanov and Diana Germanova-Krasteva, "Textile Processes: Quality Control and Design of Experiments" Hard cover publisher, 2013.							
3.	Process control in weaving, ATIRA Publications, ATIRA.1974							
4.	Chemical Processing Tablet, "Process and Quality Control in Chemical Processing" – Textile Association of India publication, 1984.							

  
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K.S.Rangasamy College of Technology-Autonomous							R2018	
50 TT E 23 - Protective Textiles								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To provide an overview about the material selection, design and standard for protective textiles.</li> <li>To taught the various hazards and treatment methods to vanquish the hazards</li> <li>To educate the scope and functions of intelligent textiles in protective applications.</li> <li>To inculcated the construction of various protective garments.</li> <li>To enlighten the requirement for defense application and to evaluate the protective garment.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Understand the functional requirements, Standards and Garment Designing for different protective applications</li> <li>Classify the various types of hazards &amp; contour the Surface treatments required for protective textiles</li> <li>Outline the functions of smart textiles &amp; categorize the various protective textiles application.</li> <li>Designate the civilian, chemical &amp; biological protective textiles.</li> <li>Encapsulate the protective materials for defense &amp; other industries.</li> </ol>							
<p><b>Note:</b> The hours given against each topic are of indicative. The faculty has the freedom to decide the hours required for each topic based on importance and depth of coverage required. The marks allotted for questions in the examinations shall not depend on the number of hours indicated.</p>								
<p><b>Materials, Standards and Design for Protective Textiles</b> Introduction, Definition, Classification, Materials and technologies, Fibres and Fabrics for protective textiles. Steps in the selection of protective clothing materials. Market potential of protective textiles, Standards -Requirements, International standards, Certification. Design - Factors influencing the design development process, Clothing systems and functionality, Harmonize fashion and function. [9]</p> <p><b>Hazards &amp; Surface treatments for protective textiles</b> Introduction, Types of hazards, Mechanical hazards - Ballistic and knife protection, Blunt impact protection. Chemical and biological hazards. Electrical and radiation hazards Environmental and fire hazards, Surface treatment – Types, pre treatments for protective textiles, Different finishes for protective textiles, Fundamental &amp; Modern treatment process. [9]</p> <p><b>Intelligent textiles and Protection against UV, Thermal, Ballistic &amp; other hazards</b> Smart textiles, Applications of smart textiles for protective purposes, Sensor function, Data processing, Actuators, Energy, Communication, Electric actuation. Textiles for UV protection, Textiles for protection against cold, Thermal (heat and fire) protection, Ballistic protection, Microorganism protection, Textiles for respiratory protection, Electrostatic protection. [9]</p> <p><b>Protection against Civilian, Chemical and biological protection</b> Classification of chemical protective clothing, Garment types, materials, design features and sizing, Garment material chemical resistance testing, Chemical protective clothing integrity performance &amp; properties. Protective clothing for Firefighters and Protection for workers in the oil and gas industries. [9]</p> <p><b>Protective textiles for defense and Evaluation of Protective Garments</b> Introduction, General requirements for military protective textiles, Camouflage, concealment and deception, NBC protection. Evaluation of protective fabrics – desirable properties of protective textiles, method of testing for thermal protective performance, water, cold, abrasion and wear resistance; evaluation of resistance to electrostatic and electrical resistivity, impact properties. [9]</p>								
								<b>Total Hours: 45</b>
<b>Text book(s):</b>								
1.	Richard. A.Scott, Textiles for Protection, CRC press, Woodhead Publication, USA, 2005.							
2.	F. Wang and C. Gao., "Protective Clothing Managing Thermal Stress" Woodhead Publishing Series in Textiles, 2014.							
<b>Reference(s):</b>								
1.	ASTM Standards on Protective Clothing Textbook Solutions							
2.	Cherilyn N. Nelson, Norman W. Henry., Performance of Protective Clothing: Issues and Priorities for the 21st Century. ASTM International, 2000.							
3.	Kriester Forsberg, Ann Van den Borre, Norman Henry, III, James P. Zeigler , Quick Selection Guide to Chemical Protective Clothing, 6th Edition, Wiley, June 2014.							
4.	T.Matsuo, "Fiber materials for Advanced Technical Textiles", CRC publication, 2008.							



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K.S.Rangasamy College of Technology-AutonomousR2018								
50 TT E 24 - Medical Textiles								
B.Tech. Textile Technology								
Elective	Hours / Week			Total hrs	Credit		Maximum Marks	
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart the knowledge on selection of fibers for making medical textiles.</li> <li>To explain the knowledge on fabrics and its requirements for medical textiles.</li> <li>To understand the manufacturing techniques of various medical textile products.</li> <li>To impart the knowledge on characteristics and various end uses of medical textile products.</li> <li>To understand the limitations of various herbals used in medical textile industries.</li> </ul>							
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Discuss the properties of biomaterials for medical textiles and the properties of specialty medical fibres.</li> <li>Describe the production techniques and properties of healthcare products and understand the materials and treatment needed for hygiene product development.</li> <li>Explain the manufacturing technique of bandages and evaluate the characteristics of bandages.</li> <li>Discuss the requirements of wound dressing and explain the kinds of wound care dressing.</li> <li>Describe the materials and properties required for sutures, vascular grafts and explain the properties of ligaments, tendons and scaffolds.</li> </ol>							
<p><b>Bio Materials</b></p> <p>Bio materials – metals, ceramics, composites and textile materials; specialty medical fibres Biopolymers: classification and their properties, requirements, and applications, testing methods. Herbal textiles for medical applications. [9]</p> <p><b>Health Care Textiles</b></p> <p>Healthcare and hygiene products types; advanced textile materials in healthcare; infection control and barrier materials; study of non-woven hygienic products; plasma treated barrier materials. [9]</p> <p><b>Bandages</b></p> <p>Specification, properties and manufacture of range of bandages and pressure garments - elastic and non elastic compression bandages, support and retention bandages, bandaging textiles, evaluation of bandage and bandages for various end uses. Drug delivery textiles: classification – mechanism various fabrication methods – characterization – applications. [9]</p> <p><b>Wound Care</b></p> <p>Wound – types, healing process; requirement of wound dressing; an overview of wound care materials - study of various kinds of wound care dressing and advanced wound dressings. Wound compression textiles; Reusable medical textiles: types, advantages, physical properties and performance - reusable processing methods. [9]</p> <p><b>Implantable Products</b></p> <p>Implantable products; sutures – requirements, classifications, specifications, materials used –their properties and application; vascular grafts, artificial ligaments, artificial tendons and scaffolds; intelligent textiles for medical applications. [9]</p>								
								<b>Total Hours: 45</b>
<b>Text book(s):</b>								
1.	Allison Mathews and Martin Hardingham ., “Medical and Hygiene Textile Production - A hand book”, Intermediate Technology Publications, 1994.							
2.	Anand S.C., Kennedy J.F. Miraftab M. and Rajendran S., “Medical Textiles and Biomaterials for Healthcare”, Wood head Publishing Ltd. 2006.							
<b>Reference(s) :</b>								
1.	Anand S., “ Medical Textiles”, Textile Institute, 1996, ISBN: 185573317X							
2.	Horrocks A.R. and Anand S.C, “Technical Textiles”, Textile Institute, 1999, ISBN: 185573317X.							
3.	Adanur S., “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co., Inc., Lancaster Pennsylvania 1995, ISBN 1-56676-340-1.							
4.	Joon B. Park. and Joseph D. Bronzino., “Biomaterials – Principles and Applications”, CRC Press BocaRaton London, NewYork, Washington , D.C. 2002							

Elective	Hours / Week			Total hrs	Credit		Maximum Marks	
	L	T	P		C	CA	ES	Total
II	3	0	0	45	3	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>To impart the knowledge of apparel marketing.</li> <li>To impart the knowledge of apparel merchandising.</li> <li>To impart the knowledge of time management</li> <li>To impart the knowledge of pricing and sourcing.</li> <li>To impart the knowledge of documentation in apparel business.</li> </ul>
Course Outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Comprehend the basic concepts of apparel marketing, types of marketing research, marketing strategies and various types of advertising and labeling.</li> <li>Discuss the role &amp; responsibilities of a merchandiser and requirements of a merchandiser. Types of buyers and concepts of visual merchandising techniques</li> <li>Practice the pricing theory and the concepts of sourcing of different materials, Manufacturing Resources Planning , JIT and lean manufacturing</li> <li>Discuss the various production scheduling techniques and process follow up for yarn, knitting and processing, the application of computer in marketing and merchandising.</li> <li>Know the various documents used for export, terms of payment and export incentives, the functions &amp; objectives of IMF, WTO, GATT, MFA and concepts of exchange control regulations.</li> </ol>

**Apparel Marketing**

Apparel Marketing - definition, responsibilities of a marketing division, marketing objectives and strategi Marketing research – types of marketing research; Retails and wholesale marketing strategies; Domestic international markets; Advertising - types of advertising, different media in apparel marketing; Brand loyalty identity: Labelling and licensing. [9]

**Apparel Merchandising**

Merchandising - definition, types of merchandising, functions of merchandising division-importance of lead time and implications of lead time, role and responsibilities of a merchandiser, quality of a merchandiser; Types of buyers ; Visual merchandising – definition, objectives, purpose of visual merchandising. [9]

**Time Management In Merchandising**

Production scheduling – route card format, time and action calendar: Process follow up – yarn, knitting, processing, sewing & labels; Practical check points; Computer applications in marketing and merchandising. [9]

**Pricing and Sourcing**

Pricing theory – factors affecting price structure in apparels, mark up and mark down.

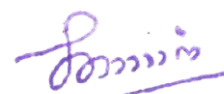
Sourcing: Definition, need for sourcing, method of sourcing; Sourcing of accessories – linings, buttons, zippers, labels, etc.; Manufacturing resources planning (MRP); JIT – philosophy; Lean manufacturing - concepts and its application in garment industry. [9]

**Documentation and Incentives**

Various types of export documents – Pre-shipment & post-shipment documentation; Terms of payment; Export incentives – Advance authorization scheme, DFIA, Duty drawback scheme, RoSCTL, EPCG scheme; DEPb scheme; I/E license; Exchange control regulation; Export risk management; ECGC schemes; Export finance; IMF / WTO / GATT / MFA – functions, objectives, success & failures. [9]

**Total Hours: 45**

<b>Text Book(s):</b>	
1.	Patric Nassif ,“The art of Visual Merchandising; Advanced visual merchandising book” Kindle Edition, 2017.
2.	Gopalakrishnan N., “Simplified Lean Manufacture: Elements, Rules, Tools and Implementation”, Prentice Hall India 2013.
<b>Reference(s) :</b>	
1.	Gilbert, “ Retail Marketing Management” Pearson India, 2014
2.	Sarah Bailey and Jonathan Baker, “Visual Merchandising for Fashion” . 2019.
3.	Jan seal, “Textile and wearing apparel Documentation and Procedures” Paperback publisher, 2011.
4.	Jeremy A.Rosenau, David L Wilson, " Apparel Merchandising-The line starts here ' 2006.



**K.S. Rangasamy College of Technology - Autonomous R 2018**

**50 TT L01 - Fibre Science and Technology**

**Common to all Branches (Open Elective Course)**

Semester	Hours / Week			Total Hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	50	50	100

Objective(s)	<ul style="list-style-type: none"> <li>To impart knowledge on the basic textile terms.</li> <li>To impart knowledge on the production of natural, fibres.</li> <li>To impart knowledge on the production of synthetic and regenerated fibres.</li> <li>To impart knowledge on applications and properties of natural and synthetic fibres.</li> <li>To impart knowledge on applications and properties of regenerated cellulosic fibres.</li> </ul>
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Course outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Classify the textile fibres and its identification.</li> <li>Summarize the cultivation / extraction process, properties and applications of cellulosic fibres.</li> <li>Explain the production, properties and applications of manmade regenerated cellulosic fibres.</li> <li>Summarize the production, properties and applications of protein fibres.</li> <li>Describe the production, properties and applications of synthetic fibres.</li> </ol>
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**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Introduction**

Definitions–Fibre: Textile fibre, staple fibre, filament; Yarn: Spun, Continuous filament, Monofilament and Multifilament; Fabric: Woven, Knitted and Non-woven. Classification of textile fibres with examples. Essential and desirable properties of textile fibres. Standard moisture regain of common fibres. Identification of textile fibres by Microscopic test, burning test and solubility test. [7]

**Cellulosic Fibres**

Cultivation, properties and applications of cotton; Extraction, properties and application of flax and jute. Study of morphological and chemical structure of natural cellulosic fibres. [9]

**Man made Regenerated Cellulosic Fibres**

Production process, properties and applications of viscose rayon, modal, lyocell and bamboo fibres; Study of morphological and chemical structure of regenerated cellulosic fibres. [10]

**Protein Fibres**

Morphological structure and chemical constitution of wool and silk. Types, production process, properties and applications of wool and silk fibres. [9]

**Synthetic Fibres**

Production, properties and applications of Polyester, Nylon and Polypropylene. Study of morphological and chemical structures of synthetic fibres. [10]

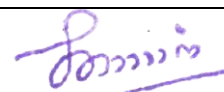
**Total Hours: 45**

**Text book(s):**

1.	S.P.Mishra, "A Text book of Fibre science and Technology", New Age International Publishers, New Delhi. ISBN: 8122412505.
2.	H.V.Srinivasamoorthy, "Introduction to Textile Fibres", Revised Edition, Wood head Publishing India ISBN: 93850 59572.

**Reference(s):**

1.	E.P.G.Gohl and L.D.Vilensky, "Textile Science", CBS Publishers and Distributors, New Delhi.
2.	Cook, J. Gordon, "Hand Book of Textile Fibres: Man-Made Fibres", Vol. 1 and 2, Merrow Publishing Co. Ltd., England.
3.	Morton W.E and Hearle J.W.S, "Physical properties of textile fibres", Textile Institute, Manchester.
4.	S.Eichhorn, J.W. S. Hearle, et al.", "Handbook of Textile Fibre Structure, Volume 1" Wood head Publishing, 2009.



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**K.S. Rangasamy College of Technology - Autonomous R 2018**

**50 TT L02 - Basics of Textile Technology**

**Common to all Branches (Open Elective Course)**

Semester	Hours / Week			Total Hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart knowledge on the basic textile terms and spinning systems</li> <li>To impart basic knowledge in the concepts involved in various mechanisms used in weaving</li> <li>To impart knowledge on geometry of knitted and non woven fabrics</li> <li>To impart knowledge on chemical processing of goods</li> <li>Understand the functional requirements and basic of Garment manufacturing</li> </ul>							
Course outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Classify the textile fibres and its identification.</li> <li>Explain the functioning of weaving machine and its parts</li> <li>Summarize the non woven and knitted fabric types and process.</li> <li>Explain the wet process sequences for various fabrics and summarize the pretreatment processes and their efficiency.</li> <li>Understand the basic garment manufacturing process and fabric pattern process.</li> </ol>							

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Fibre Science and Spinning**

Definition of fibre, classification of textile fibers; sequence of machineries in short staple yarn spinning from ginning to cone winding and their objectives; yarn numbering system [9]

**Woven Fabric Production**

Woven fabric – warp, weft, weaving, path of warp; looms – classification, handloom and its parts, power loom, automatic looms, shuttleless looms, special type of looms; preparatory machines for weaving process and their objectives; basic weaving mechanism - primary, secondary and auxiliary mechanisms [13]

**Non Woven and Knitted Fabric Production**

Knitting – classification, principle, types of fabrics; nonwoven process –classification, principle, types of fabrics. [5]

**Chemical Processing**

Objectives of the processes - singeing, desizing, scouring, bleaching, mercerization; dyeing classification of dyes, types of dyeing techniques; printing - types and styles of printing; finishing treatments – chemical and mechanical finishing. [13]

**Garment Manufacturing**

Anthropometry, basic principles of pattern making and grading, marker planning, spreading, cutting, sorting, sewing, finishing and packing. [5]

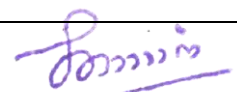
**Total Hours: 45**

**Text book(s):**

1.	. Hornberer M., Eberle H., Kilgus R., Ring W. and Hermeling H., "Clothing Technology: From Fibre to Fabric", Europa Lehrmittel Verlag, 2008, ISBN: 3808562250 / ISBN: 978-3808562253.
2.	Carr H. and Latham B., "The Technology of Clothing Manufacture" Backwell Science, U.K., 1994, ISBN: 0632037482 / ISBN:13: 9780632037483

**Reference(s):**

1.	Cook, J. Gordon, "Hand Book of Textile Fibres: Man-Made Fibres", Vol. 1 and 2, Merrow Publishing Co. Ltd., England.
2.	Ormerod A, "Modern Preparation and Weaving", Wood head Publishers Ltd UK, reprint, 2004.
3.	Wynne A., "Motivate Series-Textiles", Maxmillan Publications, London, 1997
4.	Ruth.E. Glock / Grace I.Kunz, "Apparel manufacturing and sewn product analysis" fourth edition Prentice hall, 2005



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**K.S. Rangasamy College of Technology - Autonomous R 2018**

**50 TT L03 - Introduction to Fashion Design**

**Common to all Branches (Open Elective Course)**

Semester	Hours / Week			Total Hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart knowledge on the basic fashion design</li> <li>To impart basic knowledge in the clothing</li> <li>To impart knowledge on the Wardrobe cloth planning</li> <li>To impart knowledge on the basics Elements of design</li> <li>Understand the functional requirements of Designer boards and portfolio presentation</li> </ul>							
Course outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Define and discuss the fashion and related terms and reason for change in fashion and the classification</li> <li>Describe clothing and its purpose, Role of clothing and its status.</li> <li>Describe the selection of clothing for various age groups, Fashion apparel and wardrobe planning.</li> <li>Explain the elements and principles of the design, with the effects in the apparel</li> <li>Bounce out the theme and development of portfolio.</li> </ol>							

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Introduction to Fashion**

Origin of fashion - terms and definitions - reasons for change in fashion - classification of fashion – Style, Classic, FAD, Trend – theories of fashion – movement of fashion - fashion cycle. [9]

**Introduction to Clothing**

Understanding clothing - Purpose of clothing: protection, modesty, attraction etc - Importance of clothing - Clothing Culture, Men and Women clothing and ornamentation - Role and status of clothing - Clothing according to climatic conditions – factors to be considered in the selection of clothing [9]

**Wardrobe planning**

Selection of clothes for children, middle-aged and adults. Types of clothes according to different types of human figure, Different materials for different clothes, Fabrics and colours suitable for different garments. Planning for clothing needs: Formal clothing, Clothes for parties, Clothes for sports, Casual Clothes for casualwear. Wardrobe Planning: Wardrobe for men and women [9]

**Elements and Principle of Design**

Elements of Design: Introduction on basics Elements of design - Silhouette, Details, Texture, Color, Lines, Principle of design: Introduction to principles of Elements of design - Proportion, Balance, Rhythm, Center of Interest, Harmony [9]

**Design and Development**

Designer boards - Mood board, fabric board, colour board, accessory board. Fashion illustration – head theories, Illustration techniques – strokes, hatching, shading; Colouring techniques – Medias for colouring. Portfolio presentation – styles of presentation - Fashion shows. [9]

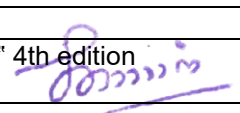
**Total Hours: 45**

**Text book(s):**

1.	Munslow, Janine, McKelvey, Kathryn "Fashion Design Process Innovation and Practice", 2nd Edition, wiley, 2012.
2.	Nicola White, Ian Griffiths, "The Fashion Business Theory, Practice, Image", Berg, 2000.

**Reference(s):**

1.	Sumathi, G.J. "Elements of Fashion and Apparel Design" New Age International Publishers, New Delhi.
2.	Kathryn McKelvey "Fashion Source Book" Balckwell Publishing New Delhi.
3.	Jane Mills and Janet K.Smith "Design Concepts" Fairchild Publications, New York.
4.	Jeannette A.Jarnow, Mirianr Guerreiro & Beatrice Judelle, "Inside the fashion business" 4th edition Mac Millan Publishing Company, NewYork.

  
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**50 TT L04 - Industrial Textiles**

**Common to all Branches (Open Elective Course)**

Semester	Hours / Week			Total Hrs.	Credit	Maximum Marks		
	L	T	P		C	CA	ES	Total
	3	0	0	45	3	50	50	100
Objective(s)	<ul style="list-style-type: none"> <li>To impart the knowledge on various fibers used in Industrial textile</li> <li>To impart the knowledge on medical textiles</li> <li>Understand the basic materials of geo and agro textiles</li> <li>To impart the knowledge on protective and smart textiles</li> <li>Understand the industrial application of textiles</li> </ul>							
Course outcomes	<p><b>At the end of the course, the students will be able to</b></p> <ol style="list-style-type: none"> <li>Explain the scope, classification &amp; application of industrial textiles</li> <li>Conclude the role of textile materials in the medical textiles product development.</li> <li>Describe the properties required to use in Agro textiles &amp; Geo textiles and the application of Geo &amp; Agro textiles.</li> <li>Summarize the functions &amp; applications of protective &amp; smart textiles.</li> <li>Outline the miscellaneous &amp; Industrial applications of textile products.</li> </ol>							

**Note:** Hours notified against each unit in the syllabus are only indicative but are not decisive. Faculty may decide the number of hours for each unit depending upon the concepts and depth. Questions need not be asked based on the number of hours notified against each unit in the syllabus.

**Introduction of Industrial Textile**

Industrial Textiles: Introduction - Definition, Scope of Industrial textiles, Classification & Application of Industrial textiles. Fibres – Conventional Fibres, High Performance fibres, Ultra fine and Novelty fibres. [9]

**Medical Textiles**

**Medical Textiles:** Introduction, Materials used & its requirements. Classification of Medical textiles - Textiles for implantations, Non-implantations textiles, Extra-corporeal devices, Healthcare & Hygiene Products. [9]

**Geo & Agro Textiles**

**Geo Textiles:** Geo textile, Geo synthetics, Fibres and its selection for Geo textiles, Functions of Geo textiles, Engineering properties of Geo textiles, Geo textile structure, Applications for natural Geo textiles.

**Agro Textiles** - Textiles in Agriculture - Fibres details & Properties, Applications of Agro textiles [9]

**Protective & Smart Textiles**

**Protective Textiles:** Selection of protective clothing materials, fibres and fabrics for Protective Textiles, Textiles for environmental protection; Thermal insulation materials; Nuclear protective fabrics.

Smart Textiles - Role of smart materials in textiles, Shape Memory Fibres, Shape Memory Material, Concepts associated with shape memory materials. [9]

**Industrial Applications of Textiles**

Textiles in Electronics, Textile reinforcement products, Textiles for Banners and Flags, Canvas Covers and Tarpaulins, Ropes and Nets, Home and Office Furnishings, Textiles in sportswear. [9]

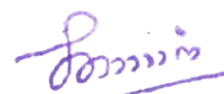
**Total Hours: 45**

**Text book(s):**

- A.R.Horrocks & S.C. Anand (Eds.), Handbook of Technical Textiles, The Textile Institute, Manchester, U.K., Woodhead Publishing Ltd., Cambridge, England, 2000.
- T.Matsuo, "Fiber materials for Advanced Technical Textiles", CRC publication, 2008.

**Reference(s):**

- N.W.M. John, "Geotextiles", Blackie, London, ISBN: 0-216-91995-9, 1987.
- S. Adanur "Wellington Sears Handbook of Industrial Textiles", Technomic Publishing Co. Inc., Lancaster, Pennsylvania, ISBN: 1-56676-340-1, 1995.
- S. Anand, "Medical Textiles", Text. Inst., 1996, ISBN: 185573317X.
- Richard. A.Scott, Textiles for Protection, CRC press, Woodhead Publication, USA, 2005.



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