DEPARTMENT OF TEXTILE TECHNOLOGY

ANNA UNIVERSITY, CHENNAI

Vision:

The Vision of the Department of Textile Technology, Anna University is to be recognized as a leader in textile and apparel technology education, research and application of knowledge and skills to benefit the society

Mission:

The mission of the Department of Textile Technology, Anna University is

- To deliver the highest quality textile and apparel technologists with societal values
- To carryout cutting-edge research and develop innovative technology for the benefit of society at national and international level
- To inculcate a sense of highest ethical and professional standards among the students

ANNA UNIVERSITY: CHENNAI: 600 025

UNIVERSITY DEPARTMENTS

B.TECH. TEXTILE TECHNOLOGY

REGULATIONS – 2015

CHOICE BASED CREDIT SYSTEM (CBCS)

PROGRAM EDUCATIONAL OBJECTIVES:

Bachelor of Textile Technology curriculum is designed to prepare the undergraduates to

I. Have attitude and knowledge for the successful professional and technical career
II. Have strong foundation in basic sciences, engineering, management, mathematics and computational platforms
III. Have knowledge on the theory and practices in the field of Textile manufacturing technology and allied areas
IV. Engross in life-long learning to keep themselves abreast of new developments, and practice and inspire high ethical values and technical standards

PROGRAM OUTCOMES:

The Textile Technology Graduates will have the ability to

1. Identify, formulate, review literature and critically analyze the technological problems in the textile industry to reach substantiated conclusion
2. Apply knowledge of mathematics, sciences, engineering and textile technology to get solution for the technological problems in textile industry
3. Design and develop the solutions to the technological and managerial problems in textile industry with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
4. 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 to the technological problems in textile industry
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools for managing textile manufacturing companies with an understanding of the limitations
6. Apply reasoning gained through the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the profession
7. Understand the impact of the developed solutions in societal and environmental contexts, and demonstrate the knowledge for sustainable development

8. Understand ethical and professional responsibilities
9. Function effectively as an individual, and as a member or leader in diverse teams in the profession
10. Communicate effectively on complex engineering activities with the engineering community and with society at large. Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.
11. 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
12. 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.

PROGRAM SPECIFIC OUTCOMES:

The Textile Technology Graduates will have the ability to

1. Understand and apply the technical knowledge for managing textile manufacturing industry
2. Be a successful entrepreneur and textile clothing designer.
3. Design and develop novel textile products and textile manufacturing processes

Mapping of Programme Educational Objective with Programme Outcomes

Program Educational Objectives	Program Outcomes											
	1	2	3	4	5	6	7	8	9	10	11	12
I	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	
II	✓	✓	✓	✓			✓					
III	✓				✓							
IV		✓	✓					✓				✓

S. No.	Course Title	Programme Outcomes														
HUMANITIES AND SOCIAL SCIENCES (HS)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO2**	**PSO3**
1.	Foundational English															
2.	Technical English															
3.	Employability Skills	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-
BASIC SCIENCES (BS)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO2**	**PSO3**
4.	Mathematics – I															
5.	Engineering Physics															
6.	Engineering Chemistry															
7.	Basic sciences Laboratory															
8.	Mathematics – II															
9.	Physics of Materials															
10.	Chemistry for Technologists															

11.	Applied Chemistry Laboratory															
12.	Probability and Statistics	2	2	1	2.8	1	-	-	-	-	-	1.4	1.4	1	-	-
13.	Numerical Methods	-	2	-	2	-	-	-	-	-	-	1	1	-	-	-
14.	Computing Techniques															
ENGINEERING SCIENCES (ES)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO2**	**PSO3**
15.	Engineering Graphics															
16.	Engineering Practices Laboratory															
17.	Engineering Mechanics															
18.	Computer Practices Laboratory															
19.	Principles of Electrical and Electronics Engineering	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
20.	Electrical and Electronics Engineering Laboratory.	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
21.	Solid Mechanics for Technologists	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
22.	Environmental science and engineering	0.8	0.8	0.8	-	-	2.4	2.8	2.8	0.6	-	-	-	2	-	-
PROFESSIONAL CORE (PC)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO2**	**PSO3**
23.	Fundamentals of Polymer Chemistry	2	1.8	2	1.4	-	1.6	1.6	2	-	1.2	-	-	3	-	-
24.	Technology of Pre Spinning Process	2.8	2.8	3	2	2	1	1	2	2	1.8	1.8	1.8	3	1	-

25.	Technology of Pre Weaving Process	2.2	2	1.4	2	2.2	1.4	1.4	1.6	1.4	1.2	1.8	2	2.6	2.6	2.6
26.	Characteristics of Textile Fibres	2.8	3	2	1	-	1	1	1	1.8	1.8	1.4	1	3	1.8	2
27.	Pre Spinning Process Laboratory	1.25	2.5	1.5	1.75	1.25	-	-	-	2.5	2.25	2.5	-	2.5	2	-
28.	Technology of Woven Fabric Manufacture	2.4	2.2	2.2	2.2	1.8	2.2	1.4	2	2	2	2.4	2.4	3	3	3
29.	Technology of Yarn Spinning	2.2	2.2	2.2	2.4	1.2	1.4	1.4	2.2	2.4	2.2	2.2	2.2	3	2	3
30.	Technology of Manufactured Fibre Production	3	3	2	2	1.4	1.4	1.8	1.4	2	2	2	2	3	2.6	2.8
31.	Woven Fabric Structure	1	1	1.8	-	2.8	1	1	1	2	1	1	1	2	2	2
32.	Fibre Science Laboratory	2.6	2.2	2	1.4	1.2	1	2	1.4	1	2	1	1	2.8	2.2	2
33.	Spinning Process Laboratory	1.33	2.33	1.33	1.66	1.33	-	-	-	2.33	2	2.66	-	2.33	2	-
34.	Fabric Analysis Laboratory	3	1	2	1	1	1	1	-	1	1	1	-	2	2	3
35.	Knitting Technology	3	2.4	2	2.4	1.8	2	2	2	1	2	2	2.4	2	3	3
36.	Chemical Processing of Textile Materials I	2.4	2.4	1.6	1.8	-	1.6	1.8	2	2	2	2	1.6	3	2	2
37.	Process control in spinning	3	2.6	2.6	3	1.4	1.2	1.2	1.2	2.2	2.2	2.2	2	2.6	2.4	1.2
38.	Quality Evaluation of Fibres and Yarns	2.2	2.6	1.2	2.2	1.8	-	-	1.2	-	1	1.8	-	2.8	3	2
39.	Technology of Bonded	1.6	2.4	2.4	2.2	2	1.6	1.4	2.2	1.4	2	2	2.4	2	2	3

	Fabrics															
40.	Fabric Manufacture Laboratory	3	3	2	2	2	2	2	2	3	2	1.6	1.6	3	3	3
41.	Fibre and Yarn Quality Evaluation Laboratory	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
42.	Chemical Processing of Textile Materials II	3	2	2	2	1.4	1.8	1.8	2	2	2	2	1	3	3	3
43.	Garment Manufacturing Technology	1.5	1.25	1	0.75	1.25	0.5	1	1	0.25	1.75	2.25	1	1.75	2.5	2.5
44.	Mechanics of Textile Machinery	2.8	2.8	2.8	2	2	1.2	1.2	2	1.2	1.2	1.2	2	2	2	1
45.	Fabric Quality Evaluation	2.8	2.4	1.4	2.4	1.8	1.6	-	1.6	-	2.6	2.6	-	2.6	3	3
46.	Textile Chemical Processing Laboratory	2	1	2	2.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	-	3	2	2
47.	Fabric Quality Evaluation Laboratory	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
48.	Structural Mechanics of Yarns and Fabrics	2.4	3	2	2	1.2	1	-	1.4	1.6	2.2	1	1	1	2	1
49.	Financial Management for Textile and Apparel Industries	-	-	2.5	-	2.5	1	-	2	2	2	2.5	1	-	2	-
EMPLOYABILITY ENHANCEMENT COURSES (EEC)		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO2**	**PSO3**
50.	Technical Seminar	3	2	2.6	2.8	2	2	2.4	2.4	3	2.4	2.6	2.6	2.8	-	2
51.	Industrial Training*	3	2	2.6	2.8	2	2	2.4	2.4	3	2.4	2.6	2.6	2.8	2.4	2
52.	Project work	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3
PROFESSIONAL		**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO2**	**PSO3**

ELECTIVES (PE)																
53.	Technical Textiles	1.5	1.25	3	3	-	2.5	2	2	1	2	3	3	2	3	3
54.	Clothing Comfort	1.8	2.4	2.6	2.8	1.6	2	2.2	1	1	1.8	1	1	2.2	2.6	2.6
55.	Operations Research for Textile Industry	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
56.	Total Quality Management for Textile Industry	1.25	2.25	2	-	2	1	1.25	2	1.8	2.5	2.25	2	2	2	-
57.	Characterization of Polymers	1.6	-	-	2	-	1	1	2	1	2.4	1	1.2	3	1	1
58.	Coated Textiles	1.8	1.4	1.8	1.8	-	1.4	1.4	1.4	1	1.8	1.8	1.8	2	2	3
59.	High Performance Fibres	1.4	2.8	2	3	1	1	1	1	1	2	2	1	1.6	2	3
60.	Long Staple Spinning Technology	2.6	2	2.2	2.4	-	1.2	1.4	1	1.4	1.2	1.2	1.4	3	1.2	2.2
61.	Medical Textiles	0.8	-	2.8	2.6	-	2.4	2.4	2.6	0.8	1.4	1.6	2.6	0.8	2	2.4
62.	Textile Costing	-	-	1	-	2.2	1	-	2	2	-	2	0.4	-	2	-
63.	Textile Reinforced Composites	1	2.4	3	3	1	2	1	1	1	3	1	2	1	2	2
64.	Colour Science	2.2	2.4	1.4	2	1.4	0.8	-	0.4	1.4	1.4	1.4	1	2	-	-
65.	Supply Chain Management for Textile Industry	-	-	2.4	1.4	2.4	-	-	2	2.4	2	2.5	1	2	1	-
66.	Textile and Apparel EXIM Management	-	1.2	2	1	2.6	-	-	2	2.2	1.2	2.2	1	2	1	-
67.	Engineering Ethics and Human Values	-	-	1	-	-	3	-	3	3	-	2	-	-	2	-
68.	Smart Textiles	-	-	2.25	-	-	2.25	2.25	2	1	1	2.5	2	-	2	2

69.	Garment Production Machinery	2.5	2.5	1.25	1	1	1	1	1	1	2	2	1	2	3	3
70.	Production and Application of Sewing Threads	2.25	2.25	2	2	1.25	1.25	1.25	-	2	1.5	1.5	2.25	3	2.25	2.25
71.	Industrial Engineering in Apparel Industry	1.6	2.6	3	3	2.2	1.4	1	2	2.2	1.4	2.4	2	1	1	-
72.	Protective Textiles	-	0.8	3	2.2	-	1.6	1.6	1.8	0.8	1.2	1	1.6	-	2.4	2.6
73.	Apparel Marketing and Merchandising	-	1	2.6	2	2	1	1	2.4	2	1.2	1	-	2	2	2
74.	Disaster Management	-	-	1	-	1	2	1	1.8	2.6	1	1	2	1	-	-
75.	Human Rights	-	-	2	-	-	2	-	3	2	-	-	1	-	-	-
76.	Functional finishes	2	1	1	2.4	1	1.8	1.8	2	-	1	-	2	2	1	2
77.	3D Weaving	2	2.6	2	2.4	1.4	1.2	1.8	1.6	2.2	2.6	2.6	2.6	3	3	3
78.	Mini Project	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3
79.	Introduction to pattern Engineering	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
80.	Advanced Pattern Engineering	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
81.	ERP for textile industry	-	-	2	-	3	-	-	2.33	2	1.33	2	1	-	2	-
82.	Foundation Skills in Integrated Product Development	2	3	3	1	-	-	1	-	1	1	2	2	2	3	3

ANNA UNIVERSITY, CHENNAI

UNIVERSITY DEPARTMENTS

B. TECH. TEXTILE TECHNOLOGY

REGULATIONS – 2015

CHOICE BASED CREDIT SYSTEM

CURRICULA AND SYLLABI I – VIII SEMESTERS

SEMESTER I

S.No	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	HS7151	Foundational English	HS	4	4	0	0	4
2.	MA7151	Mathematics – I	BS	4	4	0	0	4
3.	PH7151	Engineering Physics	BS	3	3	0	0	3
4.	CY7151	Engineering Chemistry	BS	3	3	0	0	3
5.	GE7152	Engineering Graphics	ES	5	3	2	0	4
PRACTICALS								
6.	BS7161	Basic Sciences Laboratory	BS	4	0	0	4	2
7.	GE7162	Engineering Practices Laboratory	ES	4	0	0	4	2
			TOTAL	**27**	**17**	**2**	**8**	**22**

SEMESTER II

S.No.	COURSE CODE	COURSE TITLE	CATE GORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	MA7251	Mathematics – II	BS	4	4	0	0	4
2.	GE7153	Engineering Mechanics	ES	4	4	0	0	4
3.	HS7251	Technical English	HS	4	4	0	0	4
4.	PH7257	Physics of Materials	BS	3	3	0	0	3
5.	CY7255	Chemistry for Technologists	BS	3	3	0	0	3
6.	GE7151	Computing Techniques	BS	3	3	0	0	3
PRACTICALS								
7.	CY7261	Applied Chemistry Lab	BS	4	0	0	4	2
8.	GE7161	Computer Practices Laboratory	ES	4	0	0	4	2
			TOTAL	**29**	**21**	**0**	**8**	**25**

SEMESTER III

S. No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	MA7357	Probability and Statistics	BS	4	4	0	0	4
2.	EE7254	Principles of Electrical and Electronics Engineering	ES	3	3	0	0	3
3.	TT7301	Fundamentals of Polymer Chemistry	PC	3	3	0	0	3
4.	TT7302	Technology of Pre Spinning Process	PC	3	3	0	0	3
5.	TT7303	Technology of Pre Weaving Process	PC	3	3	0	0	3
6.	TT7351	Characteristics of Textile Fibres	PC	4	4	0	0	4
PRACTICALS								
7.	EE7261	Electrical and Electronics Engineering Laboratory	ES	4	0	0	4	2
8.	TT7311	Pre Spinning Process Laboratory	PC	4	0	0	4	2
			TOTAL	**28**	**20**	**0**	**8**	**24**

SEMESTER IV

S. No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	MA7354	Numerical Methods	BS	4	4	0	0	4
2.	CH7351	Solid Mechanics for Technologists	ES	3	3	0	0	3
3.	TT7401	Technology of Manufactured Fibre Production	PC	3	3	0	0	3
4.	TT7402	Technology of Woven Fabric Manufacture	PC	4	4	0	0	4
5.	TT7403	Technology of Yarn Spinning	PC	3	3	0	0	3
6.	TT7451	Woven Fabric Structure	PC	3	3	0	0	3
PRACTICALS								
7.	TT7411	Fibre Science Laboratory	PC	2	0	0	2	1
8.	TT7412	Spinning Process Laboratory	PC	2	0	0	2	1
9.	TT7461	Fabric Analysis Laboratory	PC	4	0	0	4	2
			TOTAL	**28**	**20**	**0**	**8**	**24**

SEMESTER V

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	TT7501	Chemical Processing of Textile Materials I	PC	3	3	0	0	3
2.	TT7502	Knitting Technology	PC	4	4	0	0	4
3.	TT7503	Process Control in Spinning	PC	3	3	0	0	3
4.	TT7504	Quality Evaluation of Fibres and Yarns	PC	3	3	0	0	3
5.	TT7551	Technology of Bonded Fabrics	PC	3	3	0	0	3
6.	GE7251	Environmental Science and Engineering	HS	3	3	0	0	3
PRACTICALS								
7.	TT7511	Fabric Manufacture Laboratory	PC	4	0	0	4	2
8.	TT7512	Fibre and Yarn Quality Evaluation Laboratory	PC	4	0	0	4	2
			TOTAL	**27**	**19**	**0**	**8**	**23**

SEMESTER VI

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	TT7601	Chemical Processing of Textile Materials II	PC	3	3	0	0	3
2.	TT7602	Garment Manufacturing Technology	PC	4	4	0	0	4
3.	TT7603	Mechanics of Textile Machinery	PC	3	3	0	0	3
4.	TT7651	Fabric Quality Evaluation	PC	3	3	0	0	3
5.	HS7551	Employability Skills	HS	3	3	0	0	3
6.		Professional Elective I	PE	3	3	0	0	3
PRACTICALS								
7.	TT7561	Textile Chemical Processing Laboratory	PC	4	0	0	4	2
8.	TT7661	Fabric Quality Evaluation Laboratory	PC	2	0	0	2	1
			TOTAL	**25**	**19**	**0**	**6**	**22**

SEMESTER VII

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.	TT7701	Structural Mechanics of Yarns and Fabrics	PC	3	3	0	0	3
2.	TT7652	Financial Management for Textile and Apparel Industries	PC	3	3	0	0	3
3.		Professional Elective II	PE	3	3	0	0	3
4.		Professional Elective III	PE	3	3	0	0	3
5.		Professional Elective IV	PE	3	3	0	0	3
6.		Open Elective* I	OE	3	3	0	0	3
PRACTICALS								
7.	TT7711	Industrial Training*	EEC	0	0	0	0	3
8.	TT7712	Technical Seminar	EEC	0	0	0	0	2
			TOTAL	**18**	**18**	**0**	**0**	**23**

*Course from the curriculum of other UG Programmes

SEMESTER VIII

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
THEORY								
1.		Professional Elective V	PE	3	3	0	0	3
2.		Open Elective* II	OE	3	3	0	0	3
PRACTICALS								
3.	TT7811	Project work	EEC	20	0	0	20	10
			TOTAL	**26**	**6**	**0**	**20**	**16**

TOTAL NO. OF CREDITS: 179

PROFESSIONAL ELECTIVES (PE)

S.No	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	TT7001	3D Weaving	PE	3	3	0	0	3
2.	TT7002	Characterization of Polymers	PE	3	3	0	0	3
3.	TT7003	Coated Textiles	PE	3	3	0	0	3
4.	TT7004	Functional finishes	PE	3	3	0	0	3
5.	TT7005	High Performance Fibres	PE	3	3	0	0	3
6.	TT7006	Long Staple Spinning Technology	PE	3	3	0	0	3
7.	TT7008	Technical Textiles	PE	3	3	0	0	3
8.	TT7007	Medical Textiles	PE	3	3	0	0	3
9.	TT7009	Textile Costing	PE	3	3	0	0	3
10.	TT7010	Textile Reinforced Composites	PE	3	3	0	0	3
11.	TT7071	Clothing Comfort	PE	3	3	0	0	3

12.	TT7072	Colour Science	PE	3	3	0	0	3
13.	TT7073	Operations Research for Textile Industry	PE	3	3	0	0	3
14.	TT7074	Supply Chain Management for Textile Industry	PE	3	3	0	0	3
15.	TT7075	Textile and Apparel EXIM Management	PE	3	3	0	0	3
16.	TT7076	Total Quality Management for Textile Industry	PE	3	3	0	0	3
17.	GE7351	Engineering Ethics and Human Values	PE	3	3	0	0	3
18.	AT7073	Smart Textiles	PE	3	3	0	0	3
19.	AT7552	Garment Production Machinery	PE	3	3	0	0	3
20.	AT7071	Production and Application of Sewing Threads	PE	3	3	0	0	3
21.	AT7651	Industrial Engineering in Apparel Industry	PE	3	3	0	0	3
22.	AT7072	Protective Textiles	PE	3	3	0	0	3
23.	AT7751	Apparel Marketing and Merchandising	PE	3	3	0	0	3
24.	GE7071	Disaster Management	PE	3	3	0	0	3
25.	GE7074	Human Rights	PE	3	3	0	0	3
26.	TT7013	Mini Project	PE	3	3	0	0	3
27.	AT7451	Introduction to pattern Engineering	PE	3	3	0	0	3
28.	AT7551	Advanced Pattern Engineering	PE	3	3	0	0	3
29.	GE7072	Foundation Skills in Integrated Product Development	PE	3	3	0	0	3
30.	TT7014	ERP for Textile Industry	PE	3	3	0	0	3

HUMANITIES AND SOCIAL SCIENCES (HS)

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	HS7151	Foundational English	HS	4	4	0	0	4
2.	HS7251	Technical English	HS	4	4	0	0	4
3.	HS7551	Employability Skills	HS	3	3	0	0	3

BASIC SCIENCES (BS)

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	MA7151	Mathematics – I	BS	4	4	0	0	4
2.	PH7151	Engineering Physics	BS	3	3	0	0	3
3.	CY7151	Engineering Chemistry	BS	3	3	0	0	3

4.	BS7161	Basic science Laboratory	BS	4	0	0	4	2
5.	MA7251	Mathematics – II	BS	4	4	0	0	4
6.	PH7257	Physics of Materials	BS	3	3	0	0	3
7.	CY7255	Chemistry for Technologists	BS	3	3	0	0	3
8.	CY7261	Applied Chemistry Laboratory	BS	4	0	0	4	2
9.	MA7357	Probability and Statistics	BS	4	4	0	0	4
10.	MA7354	Numerical Methods	BS	4	4	0	0	4
11.	GE 7151	Computing Techniques	BS	3	3	0	0	3

ENGINEERING SCIENCES (ES)

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	GE7152	Engineering Graphics	ES	5	3	2	0	4
2.	GE7162	Engineering Practices Laboratory	ES	4	0	0	4	2
3.	GE7153	Engineering Mechanics	ES	4	4	0	0	4
4.	GE7161	Computer Practices Laboratory	ES	4	0	0	4	2
5.	EE7254	Principles of Electrical and Electronics Engineering	ES	3	3	0	0	3
6.	EE7261	Electrical and Electronics Engineering Laboratory.	ES	4	0	0	4	2
7.	CH7351	Solid Mechanics for Technologists	ES	3	3	0	0	3

PROFESSIONAL CORE (PC)

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	CONTACT PERIODS	L	T	P	C
1.	TT7301	Fundamentals of Polymer Chemistry	PC	3	3	0	0	3
2.	TT7302	Technology of Pre Spinning Process	PC	3	3	0	0	3
3.	TT7303	Technology of Pre Weaving Process	PC	3	3	0	0	3
4.	TT7351	Characteristics of Textile Fibres	PC	4	4	0	0	4
5.	TT7311	Pre Spinning Process Laboratory	PC	4	0	0	4	2
6.	TT7402	Technology of Woven Fabric Manufacture	PC	4	4	0	0	4
7.	TT7403	Technology of Yarn Spinning	PC	3	3	0	0	3
8.	TT7401	Technology of Manufactured Fibre Production	PC	3	3	0	0	3
9.	TT7451	Woven Fabric Structure	PC	3	3	0	0	3
10.	TT7411	Fibre Science Laboratory	PC	2	0	0	2	1
11.	TT7412	Spinning Process Laboratory	PC	2	0	0	2	1
12.	TT7461	Fabric Analysis Laboratory	PC	4	0	0	4	2
13.	TT7502	Knitting Technology	PC	4	4	0	0	4

14.	TT7501	Chemical Processing of Textile Materials I	PC	3	3	0	0	3
15.	TT7503	Process control in spinning	PC	3	3	0	0	3
16.	TT7504	Quality Evaluation of Fibres and Yarns	PC	3	3	0	0	3
17.	TT7551	Technology of Bonded Fabrics	PC	3	3	0	0	3
18.	TT7511	Fabric Manufacture Laboratory	PC	4	0	0	4	2
19.	TT7512	Fibre and Yarn Quality Evaluation Laboratory	PC	4	0	0	4	2
20.	TT7601	Chemical Processing of Textile Materials II	PC	3	3	0	0	3
21.	TT7602	Garment Manufacturing Technology	PC	4	4	0	0	4
22.	TT7603	Mechanics of Textile Machinery	PC	3	3	0	0	3
23.	TT7651	Fabric Quality Evaluation	PC	3	3	0	0	3
24.	TT7561	Textile Chemical Processing Laboratory	PC	4	0	0	4	2
25.	TT7661	Fabric Quality Evaluation Laboratory	PC	4	0	0	4	2
26.	TT7701	Structural Mechanics of Yarns and Fabrics	PC	3	3	0	0	3
27.	TT7652	Financial Management for Textile and Apparel Industries	PC	3	3	0	0	3
28.	GE7251	Environmental science and engineering	PC	3	3	0	0	3

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

S.No.	COURSE CODE	COURSE TITLE	CATEGORY	L	T	P	C
1.	TT7712	Technical Seminar	EEC	0	0	0	2
2.	TT7711	Industrial Training*	EEC	0	0	0	3
3.	TT7811	Project work	EEC	0	0	20	10

SUMMARY

S.No.	SUBJECT AREA	CREDITS AS PER SEMESTER								CREDITS TOTAL
		I	II	III	IV	V	VI	VII	VIII	
	HS	4	4	-	-	3	3	-	-	**14**
	BS	12	15	4	4	-	-	-	-	**35**
	ES	6	6	5	3	-	-	-	-	**20**
	PC	-	-	15	17	20	16	6	-	**74**
	PE	-	-	-	-	-	3	9	3	**15**
	OE	-	-	-	-	-	-	3	3	**6**
	EEC	-	-	-	-	-	-	5	10	**15**
	Total	**22**	**25**	**24**	**24**	**23**	**22**	**23**	**16**	**179**
	Non Credit / Mandatory	-	-	-	-	-	-	-	-	0

HS7151 **FOUNDATIONAL ENGLISH** **L T P C**
4 0 0 4

COURSE DESCRIPTION:
This course aims at developing the language skills necessary for the first year students of Engineering and Technology.

OBJECTIVES:
- To develop the four language skills – Listening, Speaking, Reading and Writing.
- To improve the students' communicative competence in English.
- To teach students the various aspects of English language usage.

CONTENTS

UNIT I GREETING AND INTRODUCING ONESELF 12

Listening- Types of listening – Listening to short talks, conversations; **Speaking** – Speaking about one's place, important festivals etc. – Introducing oneself, one's family/ friend;**Reading** – Skimming a passage– Scanning for specific information;**Writing**- Guided writing - Free writing on any given topic (My favourite place/ Hobbies/ School life, writing about one's leisure time activities, hometown, etc.); **Grammar** – Tenses (present and present continuous) -Question types - Regular and irregular verbs; **Vocabulary** – Synonyms and Antonyms.

UNIT II GIVING INSTRUCTIONS AND DIRECTIONS 12

Listening – Listening and responding to instructions; **Speaking** – Telephone etiquette - Giving oral instructions/ Describing a process – Asking and answering questions; **Reading** – Reading and finding key information in a given text - Critical reading - **Writing –**Process description(non-technical)- **Grammar** – Tense (simple past& past continuous) - Use of imperatives – Subject – verb agreement – Active and passive voice; - **Vocabulary** – Compound words – Word formation – Word expansion (root words).

UNIT III READING AND UNDERSTANDING VISUAL MATERIAL 12

Listening- Listening to lectures/ talks and completing a task; **Speaking** –Role play/ Simulation – Group interaction; **Reading** – Reading and interpreting visual material;**Writing**- Jumbled sentences – Discourse markers and Cohesive devices – Essay writing (cause & effect/ narrative);**Grammar** – Tenses (perfect), Conditional clauses –Modal verbs; **Vocabulary** –Cause and effect words; Phrasal verbs in context.

UNIT IV CRITICAL READING AND WRITING 12

Listening- Watching videos/ documentaries and responding to questions based on them; **Speaking**Informal and formal conversation;**Reading** –Critical reading (prediction & inference);**Writing**–Essay writing (compare & contrast/ analytical) – Interpretation of visual materials;**Grammar** – Tenses (future time reference);**Vocabulary** – One word substitutes (with meanings) – Use of abbreviations & acronyms – Idioms in sentences.

UNIT V LETTER WRITING AND SENDING E-MAILS 12

Listening- Listening to programmes/broadcast/ telecast/ podcast;**Speaking** – Giving impromptu talks, Making presentations on given topics- Discussion on the presentation;**Reading** –Extensive reading;**Writing**- Poster making – Letter writing (Formal and E-mail) ;**Grammar** – Direct and Indirect speech – Combining sentences using connectives;**Vocabulary** –Collocation;

TEACHING METHODS:
Interactive sessions for the speaking module.
Use of audio – visual aids for the various listening activities.
Contextual Grammar Teaching.

EVALUATION PATTERN:
Internals – 50%
End Semester – 50%

TOTAL:60 PERIODS

LEARNING OUTCOMES:

- Students will improve their reading and writing skills
- Students will become fluent and proficient in communicative English
- Students will be able to improve their interpersonal communication

TEXTBOOK:

1. Richards, Jack.C with Jonathan Hull and Susan Proctor **New Interchange : English for International Communication. (level2, Student's Book)** Cambridge University Press,New Delhi: 2010.

REFERENCES:

1. Bailey, Stephen. **Academic Writing: A practical guide for students**. New York: Rutledge,2011.
2. Morgan, David and Nicholas Regan. **Take-Off: Technical English for Engineering**. London: Garnet Publishing Limited, 2008.
3. Redston, Chris & Gillies Cunningham **Face2Face** (Pre-intermediate Student's Book& Workbook) Cambridge University Press, New Delhi: 2005
4. Comfort, Jeremy, et al. **Speaking Effectively : Developing Speaking Skillsfor Business English.** Cambridge University Press, Cambridge: Reprint 2011.

MA7151 **MATHEMATICS – I** **L T P C**
4 0 0 4

(Common to all branches of B.E. /B.Tech. Programmes in I Semester)

COURSE OBJECTIVES

- The goal of this course is for students to gain proficiency in calculus computations. In calculus, we use three main tools for analyzing and describing the behavior of functions: limits, derivatives, and integrals. Students will use these tools to solve application problems in a variety of settings ranging from physics and biology to business and economics.
- To make the student acquire sound knowledge of techniques in solving ordinary differential equations that model engineering problems.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their usage.

UNIT I DIFFERENTIAL CALCULUS 12

Representation of functions - New functions from old functions - Limit of a function - Limits at infinity - Continuity - Derivatives - Differentiation rules - Polar coordinate system - Differentiation in polar coordinates - Maxima and Minima of functions of one variable.

UNIT II FUNCTIONS OF SEVERAL VARIABLES 12

Partial derivatives – Homogeneous functions and Euler's theorem – Total derivative – Differentiation of implicit functions – Change of variables – Jacobians – Partial differentiation of implicit functions – Taylor's series for functions of two variables – Errors and approximations – Maxima and minima of functions of two variables – Lagrange's method of undetermined multipliers.

UNIT III INTEGRAL CALCULUS 12

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.

UNIT IV MULTIPLE INTEGRALS 12

Double integrals – Change of order of integration – Double integrals in polar coordinates – Area enclosed by plane curves – Triple integrals – Volume of solids – Change of variables in double and triple integrals.

UNIT V DIFFERENTIAL EQUATIONS 12

Method of variation of parameters – Method of undetermined coefficients – Homogenous equation of Euler's and Legendre's type – System of simultaneous linear differential equations with constant coefficients.

TOTAL : 60 PERIODS

COURSE OUTCOMES

CO1: Understanding of the ideas of limits and continuity and an ability to calculate with them and apply them.
CO2: Improved facility in algebraic manipulation.
CO3: Fluency in differentiation.
CO4: Fluency in integration using standard methods, including the ability to find an appropriate method for a given integral.
CO5: Understanding the ideas of differential equations and facility in solving simple standard examples.

TEXT BOOKS

1. James Stewart, "Calculus with Early Transcendental Functions", Cengage Learning, New Delhi, 2008.
2. Narayanan S. and Manicavachagom Pillai T. K., “Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2007.
3. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, New Delhi, 2014.
4. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 43rd Edition, 2014.

REFERENCE BOOKS

1. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., New Delhi, 11th Reprint, 2010.
2. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 3rd Edition, 2007.
3. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
4. Greenberg M.D., “Advanced Engineering Mathematics”, Pearson Education, New Delhi, 2nd Edition, 5th Reprint, 2009.
5. Peter V.O’Neil, “Advanced Engineering Mathematics”, Cengage Learning India Pvt., Ltd, New Delhi, 2007.

PH7151 **ENGINEERING PHYSICS** **L T P C**

(Common to all branches of B.E / B.Tech programmes) **3 0 0 3**

OBJECTIVE:

- To introduce the concept and different ways to determine moduli of elasticity and applications.
- To instill the concept of sound, reverberation, noise cancellation, and ultrasonic generation, detection and applications
- To inculcate an idea of thermal properties of materials, heat flow through materials and quantum physics
- To promote the basic understanding of interferometers, principles and applications of lasers, optical fibers and sensors
- To establish a sound grasp of knowledge on the basics, significance and growth of single crystals

UNIT I PROPERTIES OF MATTER 9

Elasticity – Poisson's ratio and relationship between moduli (qualitative) - stress-strain diagram for ductile and brittle materials, uses - factors affecting elastic modulus and tensile strength - bending of beams - cantilever - bending moment - Young's modulus determination - theory and experiment - uniform and non-uniform bending - I shaped girders - twisting couple - hollow cylinder - shaft - torsion pendulum - determination of rigidity modulus- moment of inertia of a body (regular and irregular).

UNIT II ACOUSTICS AND ULTRASONICS 9

Classification of sound - loudness and intensity - Weber-Fechner Law - standard intensity and intensity level - decibel - reverberation - reverberation time - calculation of reverberation time for different types of buildings – sound absorbing materials - factors affecting acoustics of buildings : focussing, interference, echo, echelon effect, resonance - noise and their remedies. Ultrasonics: production - magnetostriction and piezoelectric methods - detection of ultrasound - acoustic grating – ultrasonic interferometer - industrial applications – Non-destructive testing - ultrasonic method: scan modes and practice.

UNIT III THERMAL AND MODERN PHYSICS 9

Thermal expansion - thermal stress - expansion joints - bimetallic strips - thermal conductivity- heat conductions in solids – flow of heat through compound media - Forbe's and Lee's disc method: theory and experiment- Black body radiation – Planck's theory (derivation) – Compton effect – wave model of radiation and matter – Schrödinger's wave equation – time dependent and independent equations – Physical significance of wave function – particle in a one dimensional box.

UNIT IV APPLIED OPTICS 9

Interference - Michelson interferometer: construction, working, determination of wave length and thickness - anti-reflection coating - air wedge and its applications - Lasers – principle and applications – Einstein's coefficients – CO_2 and Nd:YAG laser - semiconductor lasers: homo junction and hetro junction - construction and working – applications. Optical fibres - classification (index & mode based) - principle and propagation of light in optical fibres - acceptance angle and numerical aperture - fibre optic communication system - active and passive sensors.

UNIT V CRYSTAL PHYSICS 9

Single crystalline, polycrystalline and amorphous materials – Single crystals: unit cell, crystal systems, Bravais lattices, ditections and planes in a crystal, Miller indices - interplanar distance for a cubic crystal - coordination number and packing factor for SC, BCC, FCC, HCP and diamond structures - structure and significance of NaCl, CsCl, ZnS and graphite - crystal imperfections: point defects, line defects – Burger vectors, dislocations and stacking faults – Growth of single crystals: Bridgman and Czochralski methods.

TOTAL: 45 PERIODS

OUTCOME:

CO1: The students will understand different moduli of elasticity, their determination and applications.

CO2: The students will gain knowledge on the properties of sound, noise cancellation, and production, detection and applications of ultrasonics

CO3: The students will acquire sound knowledge on thermal expansion and thermal conductivity of materials. Further they will gain an idea of quantum physics.

CO4: The students will gain knowledge on interferometers, lasers and fiber optics

CO5: The students will secure knowledge on the basics of crystal structures and their significance. Further they gain basic ideas of growing single crystals.

TEXTBOOKS:

1. Gaur R.K. and Gupta S.L., “Engineering Physics”, Dhanpat Rai Publications (2013)
2. Palanisamy P.K., “Engineering Physics”, Scitech Publications (P) Ltd. (2006).
2. Arumugam M., “Engineering Physics”, Anuradha Publications (2000)

REFERENCES:

1. Serway R.A. and Jewett, J.W. “Physics for Scientists and Engineers with Modern Physics”. Brooks/cole Publishing Co. (2010).
2. Tipler P.A. and Mosca, G.P., “Physics for Scientists and Engineers with Modern Physics”. W.H.Freeman, (2007).
3. Markert J.T.,Ohanian, H. and Ohanian, M. “Physics for Engineers and Scientists”. W.W.Norton & Co. (2007).

CY7151 ENGINEERING CHEMISTRY

L	T	P	C
3	0	0	3

COURSE OBJECTIVES

- To develop an understanding about fundamentals of polymer chemistry.
- Brief elucidation on surface chemistry and catalysis.
- To develop sound knowledge photochemistry and spectroscopy.
- To impart basic knowledge on chemical thermodynamics.
- To understand the basic concepts of nano chemistry.

UNIT I POLYMER CHEMISTRY 9

Introduction: Functionality-degree of polymerization. Classification of polymers- natural and synthetic, thermoplastic and thermosetting. Types and mechanism of polymerization: addition (free radical, cationic, anionic and living); condensation and copolymerization. Properties of polymers: Tg, tacticity, molecular weight-weight average, number average and polydispersity index. Techniques of polymerization: Bulk, emulsion, solution and suspension.

UNIT II SURFACE CHEMISTRYAND CATALYSIS 9

Adsorption-Types of adsorption-adsorption of gases on solids- adsorption from solutions-Types of isotherms–Frendlich adsorption isotherm,Langmuir adsorption isotherm.Industrial applications of adsorption. Catalysis: Characteristics and types of catalysts-homogeneous and heterogeneous, auto catalysis. Enzyme catalysis -factors affecting enzyme catalysis, Michaelis-Menton equation.Industrial applications of catalysts.

UNIT III PHOTOCHEMISTRY AND SPECTROSCOPY 9

Photochemistry: Laws of photochemistry-Grotthuss-Draper law, Stark-Einstein law and Lambert-Beer Law. Photo processes-internal conversion, inter-system crossing, fluorescence, phosphorescence, chemiluminescence and photo-sensitization. Spectroscopy: Electromagnetic spectrum-absorption of radiation-electronic, vibrational and rotational transitions. Width and intensities of spectral lines.Spectrophotometric estimation of iron.UV-Vis and IR spectroscopy- principles, instrumentation (Block diagram) and applications.

UNIT IV CHEMICAL THERMODYNAMICS 9

Second law: Entropy-entropy change for an ideal gas, reversible and irreversible processes; entropy of phase transitions; Free energy and work function: Helmholtzand Gibbs free energy functions; Criteria of spontaneity; Gibbs-Helmholtz equation; Clausius Clapeyron equation; Maxwell relations-Van't Hoff isotherm and isochore. Chemical potential; Gibbs-Duhem equation- variation of chemical potential with temperature and pressure.

UNIT V NANOCHEMISTRY 9

Basics-distinction between molecules, nanoparticles and bulk materials; size-dependent properties.Preparation of nanoparticles – sol-gel and solvothermal.Preparation of carbon nanotube by chemical vapour deposition and laser ablation.Preparation of nanowires by VLS growth, electrochemical deposition and electro spinning.Properties and uses of nanoparticles, nanoclusters, nanorods, nanotubes and nanowires.

TOTAL : 45 PERIODS

COURSE OUTCOMES

CO1: Will be familiar with polymer chemistry, surface chemistry and catalysis.
CO2: Will know the photochemistry, spectroscopy and chemical thermodynamics.
CO3: Will know the fundamentals of nano chemistry.

TEXT BOOKS

1. Jain P. C. & Monica Jain., "Engineering Chemistry", DhanpatRai Publishing Company (P) Ltd, New Delhi, 2014.

2. Kannan P., Ravikrishnan A., “Engineering Chemistry”, Sri Krishna Hitech Publishing Company Pvt. Ltd. Chennai, 2014

REFERENCE BOOKS

1. Pahari A., Chauhan B., “Engineering Chemistry”, Firewall Media, New Delhi, 2012.
2. Sivasankar B., “Engineering Chemistry”, Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2012.
3. AshimaSrivastava. Janhavi N N, Concepts of Engineering Chemistry”, ACME Learning Private Limited., New Delhi., 2010.
4. Vairam S., Kalyani P., Suba Ramesh., “Engineering Chemistry”, Wiley India Pvt Ltd., New Delhi., 2011.

GE7152	ENGINEERING GRAPHICS	L	T	P	C
		3	2	0	4

OBJECTIVES

• To develop in students, graphic skills for communication of concepts, ideas and design of engineering products and expose them to existing national standards related to technical drawings.

CONCEPTS AND CONVENTIONS (NOT FOR EXAMINATION) 1

Importance of graphics in engineering applications – Use of drafting instruments – BIS conventions and specifications – Size, layout and folding of drawing sheets – Lettering and dimensioning.

14

UNIT I PLANE CURVES ANDFREE HANDSKETCHING

Basic Geometrical constructions, Curves used in engineering practices-Conics – Construction of ellipse, parabola and hyperbola by eccentricity method – Construction of cycloid – construction of involutes of square and circle – Drawing of tangents and normal to the above curves. Visualization concepts and Free Hand sketching: Visualization principles – Representation of Three Dimensional objects – Layout of views- Free hand sketching of multiple views from pictorial views of objects

14

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES

Orthographic projection- principles-Principal planes-First angle projection-Projection of points. Projection of straight lines (only First angle projections) inclined to both the principal planes-Determination of true lengths and true inclinations by rotating line method and trapezoidal method and traces Projection of planes (polygonal and circular surfaces) inclined to both the principal planes by rotating object method.

UNIT III PROJECTION OF SOLIDS 14

Projection of simple solids like prisms, pyramids, cylinder, cone and truncated solids when the axis is inclined to both the principal planes by rotating object method and auxiliary plane method.

UNIT IV PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES 14

Sectioning of solids in simple vertical position when the cutting plane is inclined to the one of the principal planes and perpendicular to the other – obtaining true shape of section.

Development of lateral surfaces of simple and sectioned solids – Prisms, pyramids cylinders and cones. Development of lateral surfaces of solids with cut-outs and holes.

15

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS

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

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

COMPUTER AIDED DRAFTING (DEMONSTRATION ONLY) 3

Introduction to drafting packages and demonstration of their use.

L=45+T=30, TOTAL: 75 PERIODS

OUTCOMES:

On Completion of the course the student will be able to

CO1: Perform free hand sketching of basic geometrical shapes and multiple views of objects.

CO2: Draw orthographic projections of lines, Planes and Solids

CO3: Obtain development of surfaces.

CO4: Prepare isometric and perspective views of simple solids.

TEXT BOOK:

1. N.D.Bhatt and V.M.Panchal, “Engineering Drawing”, Charotar Publishing House, 50th Edition, 2010.

REFERENCES:

1. K.R.Gopalakrishna., “Engineering Drawing” (Vol I&II combined) SubhasStores, Bangalore, 2007
2. Luzzader, Warren.J., and Duff,John M.,,’’ Fundamentals of Engineering Drawingwith an introduction to Interactive Computer Graphics for Design and Production”,Eastern Economy Edition, Prentice Hall of India Pvt Ltd, New Delhi, 2005
3. M.B.Shah and B.C.Rana, “Engineering Drawing”, Pearson, 2nd Edition, 2009
4. K.Venugopal and V.Prabhu Raja, “Engineering Graphics”, New Age International (P)Limited ,2008.
5. K. V.Natarajan, “A text book of Engineering Graphics”, 28th Edition, Dhanalakshmi Publishers, Chennai, 2015.
6. BasantAgarwal and Agarwal C.M., “Engineering Drawing”, Tata McGraw Hill Publishing Company Limited, New Delhi, 2008.
7. N.S Parthasarathy and Vela Murali, “ Engineering Drawing”, Oxford University Press, 2015

Publication of Bureau of Indian Standards:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out ofdrawing sheets
2. IS 9609 (Parts 0 & 1) – 2001: Technical products Documentation – Lettering.
3. IS 10714 (Part 20) – 2001 & SP 46 – 2003: Lines for technical drawings.
4. IS 11669 – 1986 & SP 46 – 2003: Dimensioning of Technical Drawings.
5. IS 15021 (Parts 1 to 4) – 2001: Technical drawings – Projection Methods.

Special points applicable to University Examinations on Engineering Graphics:

1. There will be five questions, each of either or type covering all units of the syllabus.
2. All questions will carry equal marks of 20 each making a total of 100.
3. The answer paper shall consist of drawing sheets of A3 size only. The students will be permitted to use appropriate scale to fit solution within A3 size.
4. The examination will be conducted in appropriate sessions on the same day.

BS7161	BASIC SCIENCES LABORATORY	L T P C
	(Common to all branches of B.E. / B.Tech Programmes)	0 0 4 2

PHYSICS LABORATORY: (Any Seven Experiments)

OBJECTIVE:

- To inculcate experimental skills to test basic understanding of physics of materials including properties of matter, thermal and optical properties.
- To induce the students to familiarize with experimental determination of velocity of ultrasonic waves, band gap determination and viscosity of liquids.

1. Torsional pendulum - Determination of rigidity modulus of wire and moment of inertia of disc
2. Non-uniform bending - Determination of young's modulus
3. Uniform bending – Determination of young's modulus
4. Lee's disc Determination of thermal conductivity of a bad conductor
5. Potentiometer-Determination of thermo e.m.f of a thermocouple
6. Laser- Determination of the wave length of the laser using grating
7. Air wedge - Determination of thickness of a thin sheet/wire
8. a) Optical fibre -Determination of Numerical Aperture and acceptance angle
   b) Compact disc- Determination of width of the groove using laser.
9. Acoustic grating- Determination of velocity of ultrasonic waves in liquids.
10. Ultrasonic interferometer – determination of the velocity of sound and compressibility of Liquids
11. Post office box -Determination of Band gap of a semiconductor.
12. Spectrometer- Determination of wavelength using gating.
13. Viscosity of liquids - Determination of co-efficient of viscosity of a liquid by Poiseuille's flow

TOTAL: 30 PERIODS

OUTCOME:

Upon completion of the course, the students will be able

CO1: To determine various moduli of elasticity and also various thermal and optical properties of materials.

CO2: To determine the velocity of ultrasonic waves, band gap determination and viscosity of liquid

CHEMISTRY LABORATORY:

(Minimum of 8 experiments to be conducted)

1. Estimation of HCl using Na_2CO_3 as primary standard and Determination of alkalinity in water sample.
2. Determination of total, temporary & permanent hardness of water by EDTA method.
3. Determination of DO content of water sample by Winkler's method.
4. Determination of chloride content of water sample by argentometric method.
5. Estimation of copper content of the given solution by Iodometry.
6. Determination of strength of given hydrochloric acid using pH meter.
7. Determination of strength of acids in a mixture of acids using conductivity meter.
8. Estimation of iron content of the given solution using potentiometer.
9. Estimation of iron content of the water sample using spectrophotometer (1, 10-Phenanthroline/thiocyanate method).

10. Estimation of sodium and potassium present in water using flame photometer.
11. Determination of molecular weight of poly vinyl alcohol using Ostwald viscometer.
12. Pseudo first order kinetics-ester hydrolysis.
13. Corrosion experiment-weight loss method.
14. Determination of CMC.
15. Phase change in a solid.

TOTAL: 60 PERIODS

TEXTBOOKS

1. Vogel's Textbook of Quantitative Chemical Analysis (8^{TH} edition, 2014)
2. Laboratory Manual- Department of Chemistry, CEGC, Anna University (2014).

GE7162 ENGINEERING PRACTICES LABORATORY L T P C
(Common to all Branches of B.E. / B.Tech. Programmes) 0 0 4 2

COURSE OBJECTIVES

• To provide exposure to the students with hands-on experience on various Basic Engineering Practices in Civil, Mechanical, Electrical and Electronics Engineering.

GROUP – A (CIVIL & ELECTRICAL)

1. CIVIL ENGINEERING PRACTICES 15

PLUMBING

- Basic pipe connections involving the fittings like valves, taps, coupling, unions, reducers, elbows and other components used in household fittings. Preparation of plumbing line sketches.
- Laying pipe connection to the suction side of a pump.
- Laying pipe connection to the delivery side of a pump.
- Practice in connecting pipes of different materials: Metal, plastic and flexible pipes used in householdappliances.

WOOD WORK

- Sawing, planing and making joints like T-Joint, Mortise and Tenon joint and Dovetail joint.

STUDY

- Study of joints in door panels and wooden furniture
- Study of common industrial trusses using models.

2. **ELECTRICAL ENGINEERING PRACTICES** 15

- Basic household wiring using Switches, Fuse, Indicator and Lamp etc.,
- Stair case light wiring
- Tube – light wiring
- Preparation of wiring diagrams for a given situation.
- Study of Iron-Box, Fan Regulator andEmergency Lamp

GROUP – B (MECHANICAL AND ELECTRONICS)

3. **MECHANICAL ENGINEERING PRACTICES** 15

WELDING

- Arc welding of Butt Joints, Lap Joints, and Tee Joints
- Gas welding Practice.
- Basic Machining - Simple turning, drilling and tapping operations..
- Study and assembling of the following:
  a. Centrifugal pump
  b. Mixie
  c. Air Conditioner.

DEMONSTRATION ON FOUNDRY OPERATIONS.

4. **ELECTRONIC ENGINEERING PRACTICES** 15

- Soldering simple electronic circuits and checking continuity.
- Assembling electronic components on a small PCB and Testing.
- Study of Telephone, FM radio andLow Voltage Power supplies.

TOTAL : 30 PERIODS

COURSE OUTCOMES

CO1: Ability to fabricate carpentry components and to lay pipe connections including plumbing works.

CO2: Ability to use welding equipments to join the structures

CO3: Ability to do wiring for electrical connections and to fabricate electronics circuits.

MATHEMATICS – II **L T P C**

MA7251 **4 0 0 4**

(Common to all branches of B.E. /B.Tech. Programmes in II Semester)

COURSE OBJECTIVES

- To develop the use of matrix algebra techniques this is needed by engineers for practical applications.
- To acquaint the student with the concepts of vector calculus, needed for problems in all engineering disciplines.
- To develop an understanding of the standard techniques of complex variable theory so as to enable the student to apply them with confidence, in application areas such as heat conduction, elasticity, fluid dynamics and flow the of electric current.
- To make the student appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I MATRICES 12

Eigenvalues and Eigenvectors of a real matrix – Characteristic equation – Properties of eigenvalues and eigenvectors – Cayley-Hamilton theorem – Diagonalization of matrices – Reduction of a quadratic form to canonical form by orthogonal transformation – Nature of quadratic forms.

UNIT II VECTOR CALCULUS 12

Gradient and directional derivative – Divergence and Curl – Irrotational and Solenoidal vector fields – Line integral over a plane curve – Surface integral - Area of a curved surface - Volume integral - Green's, Gauss divergence and Stoke's theorems – Verification and application in evaluating line, surface and volume integrals.

UNIT III ANALYTIC FUNCTION 12

Analytic functions – Necessary and sufficient conditions for analyticity - Properties – Harmonic conjugates – Construction of analytic function - Conformal mapping – Mapping by functions $w = z + c$, az, $\frac{1}{z}$, z^2 - Bilinear transformation.

UNIT IV COMPLEX INTEGRATION 12

Line integral - Cauchy's integral theorem – Cauchy's integral formula – Taylor's and Laurent's series – Singularities – Residues – Residue theorem – Application of residue theorem for evaluation of real integrals – Use of circular contour and semicircular contour with no pole on real axis.

UNIT V LAPLACE TRANSFORMS 12

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

TOTAL : 60 PERIODS

COURSE OUTCOMES

Upon successful completion of the course, students should be able to:

CO1: Evaluate real and complex integrals using the Cauchy integral formula and the residue theorem

CO2: Appreciate how complex methods can be used to prove some important theoretical results.

CO3: Evaluate line, surface and volume integrals in simple coordinate systems

CO4: Calculate grad, div and curl in Cartesian and other simple coordinate systems, and establish identities connecting these quantities
CO5: Use Gauss, Stokes and Greens theorems to simplify calculations of integrals and prove simple results.

TEXT BOOKS

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 9th Edition, New Delhi, 2014.
2. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, New Delhi, 43rd Edition, 2014.

REFERENCE BOOKS

1. Ramana, B.V. “Higher Engineering Mathematics”, Tata McGraw Hill, New Delhi, 2010.
2. Glyn James, “Advanced Modern Engineering Mathematics”, Pearson Education, New Delhi, 2007.
3. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, New Delhi, 3rd Edition, 2007.
4. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), New Delhi, 7th Edition, 2009.
5. Peter V. O’Neil , “Advanced Engineering Mathematics”, Cengage Learning India Pvt., Ltd, New Delhi, 2007.

HS7251 TECHNICAL ENGLISH L T P C
4 0 0 4

OBJECTIVES

- To enable students acquire proficiency in technical communication.
- To enhance their reading and writing skills in a technical context.
- To teach various language learning strategies needed in aprofessional environment.

CONTENTS

UNIT I ANALYTICAL READING 12

Listening- Listening to informal and formal conversations; **Speaking** – Conversation Skills(opening, turn taking, closing)-explaining how something works-describing technical functions and applications;**Reading** –Analytical reading, Deductive and inductive reasoning; **Writing**- vision statement–structuring paragraphs.

UNIT II SUMMARISING 12

Listening- Listening to lectures/ talks on Science & Technology;**Speaking** –Summarizing/ Oral Reporting, **Reading** – Reading Scientific and Technical articles; **Writing**- Extended definition –Lab Reports – Summary writing.

UNIT III DESCRIBING VISUAL MATERIAL 12

Listening- Listening to a panel discussion; **Speaking** – Speaking at formal situations; **Reading** – Reading journal articles - Speed reading;**Writing**-data commentary-describing visual material-writing problem-process- solution-the structure of problem-solution texts- writing critiques

UNIT IV WRITING/ E-MAILING THE JOB APPLICATION 12

Listening- Listening to/ Viewing model interviews; **Speaking** –Speaking at different types of interviews – Role play practice (mock interview); **Reading** – Reading job advertisements and profile of the company concerned;**Writing**- job application – cover letter –Résumé preparation.

UNIT V REPORT WRITING 12

Listening- Viewing a model group discussion;**Speaking** –Participating in a discussion - Presentation;**Reading** – Case study - analyse -evaluate – arrive at a solution;**Writing**– Recommendations- Types of reports (feasibility report)- designing and reporting surveys- – Report format.- writing discursive essays.

TEACHING METHODS:

Practice writing
Conduct model and mock interview and group discussion.
Use of audio – visual aids to facilitate understanding of various forms of technical communication.
Interactive sessions.

EVALUATION PATTERN:

Internals – 50%
End Semester – 50%

TOTAL:60 PERIODS

LEARNING OUTCOMES

CO1: Students will learn the structure and organization of various forms of technical communication.
CO2: Students will be able to listen and respond to technical content.
CO3: Students will be able to use different forms of communication in their respective fields.

TEXTBOOK:

1. Craig,Thaine**. Cambridge Academic English: An integrated skills course for EAP(Student's Book)Level: Intermediate** Cambridge University Press, New Delhi: 2012

REFERENCES:

1. Laws, Anne. Presentations. Hyderabad: Orient Blackswan, 2011.
2. Ibbotson, Mark. Cambridge English for Engieering. Cambridge University Press, Cambridge,New Delhi: 2008
3. Naterop, Jean B. and Rod Revell. Telephoning in English. Cambridge: Cambridge University Press, 2004.
4. Rutherford, Andrea J. Basic Communication Skills for Technology. New Delhi: Pearson Education, 2001.
5. Bailey, Stephen. Academic Writing A practical Guide for Students. Routledge, London: 2004.
6. Hewings, Martin. Cambridge Academic English: An integrated skills course for EAP(Student's Book)Level: Intermediate Cambridge University Press, New Delhi: 2012

PH7257 **PHYSICS OF MATERIALS** **L T P C**

(Common to Chemical, Ceramic, Food, Leather, Textile, Apparel, Industrial Biotechnology, Pharmaceutical and PET) **3 0 0 3**

OBJECTIVE:

- To make the students to understand the basics of phase diagrams and various materials preparation techniques
- To equip the students to have a knowledge on different types of electron theory, basics of quantum mechanics and about superconductors
- To introduce the physics of semiconducting materials and applications of semiconductors in device fabrication
- To familiarize the students with the theory and applications of magnetic and dielectric materials
- To provide the students a sound platform towards learning about advanced materials and their applications.

UNIT I PREPARATION OF MATERIALS 9

Phases - phase rule – binary systems – tie line rule – lever rule – phase diagram – invariant reactions - nucleation – homogeneous and heterogeneous nucleation – free energy of formation of a critical nucleus – Thin films – preparation: PVD, CVD method – Nanomaterials Preparation: wet chemical, solvothermal, sol-gel method.

UNIT II ELECTRICAL AND SUPERCONDUCTING MATERIALS 9

Classical free electron theory - expression for electrical conductivity – thermal conductivity, - Wiedemann-Franz law - Quantum free electron theory – applications of Schrodinger wave equation: particle in a finite potential well – particle in a three-dimensional box- degenerate states – Fermi-Dirac statistics – density of energy states – electron in periodic potential – electron effective mass – concept of hole. Superconducting phenomena, properties of superconductors – Meissner effect and isotope effect. Type I and Type II superconductors, High T_c superconductors – Magnetic levitation and SQUIDS.

UNIT III SEMICONDUCTING MATERIALS 9

Elemental Semiconductors - Compound semiconductors - Origin of band gap in solids (qualitative) - carrier concentration in metals - carrier concentration in an intrinsic semiconductor (derivation) – Fermi level – variation of Fermi level with temperature – electrical conductivity – band gap determination – carrier concentration in n-type and p-type semiconductors (derivation) – variation of Fermi level with temperature and impurity concentration – Hall effect – determination of Hall coefficient – LED - Solar cells.

UNIT IV DIELECTRIC AND MAGNETIC MATERIALS 9

Dielectric, Paraelectric and ferroelectric materials - Electronic, Ionic, Orientational and space charge polarization – Internal field and deduction of Clausius Mosotti equation – dielectric loss – different types of dielectric breakdown – classification of insulating materials and their applications - Ferroelectric materials - Introduction to magnetic materials - Domain theory of ferromagnetism, Hysteresis, Soft and Hard magnetic materials – Anti-ferromagnetic materials – Ferrites, Giant Magneto Resistance materials.

UNIT V NEW MATERIALS AND APPLICATIONS 9

Ceramics – types and applications – Composites: classification, role of matrix and reinforcement – processing of fibre reinforced plastics and fibre reinforced metals – Metallic glasses – Shape memory alloys – Copper, Nickel and Titanium based alloys – grapheme and its properties – Relaxor ferroelectrics - Bio materials – hydroxyapatite – PMMA – Silicone - Sensors: Chemical Sensors - Bio-sensors – Polymer semiconductors – Photoconducting polymers.

TOTAL: 45 PERIODS

OUTCOME:

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

CO1: Acquire knowledge of phase diagram, and thin film and nanomaterial preparation techniques

CO2: Familiarize with conducting materials, basic quantum mechanics, and properties and applications of superconductors.

CO3: Gain knowledge on semiconducting materials based on energy level diagrams, its types, temperature effect. Also, fabrication methods for semiconductor devices will be understood.

CO4: Realize with theories and applications of dielectric and ferromagnetic materials

CO5: Familiarize with ceramics, composites, metallic glasses, shape memory alloys, biomaterials and their important applications.

.

REFERENCES:

1. Callister W. D. and Rethwisch, D. G., "Materials Science and Engineering", 9th Edition, Wiley (2014).
2. Raghavan V., "Materials Science and Engineering", Prentice Hall of India (2004).
3. Askeland D.R. and Wright, W.J., "Essentials of Materials Science and Engineering", 3rd Edition, Cengage Learning (2014).
4. Pillai, S.O., "Solid State Physics", New Age International, 7th Edition (2015).
5. Viswanathan, B., "Nanomaterials", Narosa Book Distributors Pvt Ltd. (2011).

CY7255	CHEMISTRY FOR TECHNOLOGISTS	L	T	P	C
		3	0	0	3

OBJECTIVE

- The students should be conversant with
- boiler feed water requirements, water treatment techniques,
- Applications of oil and its properties, principles of different chemical analysis.
- Different kinds of preparations of important chemicals.

UNIT I WATER TECHNOLOGY 9

Water quality parameters- hardness -definition - units of hardness - determination of hardness (EDTA method).Alkalinity - definition - determination of alkalinity.TDS, BOD, COD and iron and their significance. Softening – zeolite and demineralization processes. Boiler troubles (scale, sludge, boiler corrosion, caustic embrittlement and carry over) and remedies – removal of oils and silica, internal conditioning.Desalination by electro-dialysis and reverse osmosis.

UNIT II OILS, FATS, SOAPS & LUBRICANTS 9

Chemical constitution, chemical analysis of oils and fats – free acid, saponification and iodine values, definitions, determinations and significance.Soaps and detergents - cleaning action of soap. Lubricants - definition, characteristics, types and properties – viscosity, viscosity index, carbon residue, oxidation stability, flash and fire points, cloud and pour points, aniline point. Solid lubricants – graphite and molybdenum disulphide.

UNIT III CHEMICAL ANALYSIS – AN ANALYTICAL INSIGHT 9

Gravimetric analysis – principles – method – applications.redox titrations – principle – method – applications. Thin layer chromatography – principles – techniques – applications. Principles underlying the estimations of nitrogen in nitrogeneous fertilizers, phenol and aniline.

UNIT IV DYE CHEMISTRY 9

Witt's theory and modern theory of colors – synthesis of methyl red, methyl orange, congo red, malachite green, p-rosaniline, phenolphthalein, fluorescence, eosin dyes.

UNIT V CHEMICALS AND AUXILIARIES 9

Preparations of bleaching powder, sodium hypochlorite, hydrogen peroxide, chlorine dioxide – estimation of available chlorine in hypochlorite – determination of strength of hydrogen peroxide.

TOTAL: 45 PERIODS

OUTCOME

CO1: Will be familiar with boiler feed water requirements, water treatment techniques.
CO2: Will know the oil and its properties, principles of different chemical analysis.
CO3: Will know the preparations of important chemicals.

TEXT BOOKS

1. Jain & Jain, "Engineering Chemistry", 16th Edition, 2014,DhanpatRai Publishing Company, New Delhi.
2. Sharma B.K, "Industrial Chemistry", 16th Edition, 2014, GOEL Publishing House, n Meerut.

REFERENCE BOOKS

1. Dara SS, Umare SS, "A Textbook of Engineering Chemistry", S. Chand & Company Ltd., New Delhi, 2010.
2. Puri BR, Sharma LR, Pathania S, "Principles of Physical Chemistry", 42nd Edition, 2008, Vishal Publishing Co., Jalandhar.
3. Morrison RT, Boyd RN, Bhattacharjee SK, "Organic Chemistry", 7th Edition, Pearson India, 2011

GE7153 ENGINEERING MECHANICS L T P C
4 0 0 4

OBJECTIVE :

The objective of this course is to inculcate in the student the ability to analyze any problem in a simple and logical manner and to predict the physical phenomena and thus lay the foundation for engineering applications.

UNIT I STATICS OF PARTICLES 12

Fundamental Concepts and Principles, Systems of Units, Method of Problem Solutions, Statics of Particles -Forces in a Plane, Resultant of Forces, Resolution of a Force into Components, Rectangular Components of a Force, Unit Vectors.

Equilibrium of a Particle- Newton's First Law of Motion, Space and Free-Body Diagrams, Forces in Space, Equilibrium of a Particle in Space.

UNIT II EQUILIBRIUM OF RIGID BODIES 12

Principle of Transmissibility, Equivalent Forces, Vector Product of Two Vectors, Moment of a Force about a Point ,Varignon's Theorem, Rectangular Components of the Moment of a Force, Scalar Product of Two Vectors, Mixed Triple Product of Three Vectors, Moment of a Force about an Axis, Couple - Moment of a Couple, Equivalent Couples, Addition of Couples, Resolution of a Given Force into a Force -Couple system, Further Reduction of a System of Forces, Equilibrium in Two and Three Dimensions - Reactions at Supports and Connections.

UNIT III DISTRIBUTED FORCES 16

Centroids of lines and areas – symmetrical and unsymmetrical shapes, Determination of Centroids by Integration , Theorems of Pappus-Guldinus, Distributed Loads on Beams, Center of Gravity of a Three-Dimensional Body, Centroid of a Volume, Composite Bodies , Determination of Centroids of Volumes by Integration.

Moments of Inertia of Areas and Mass - Determination of the Moment of Inertia of an Area by Integration , Polar Moment of Inertia , Radius of Gyration of an Area , Parallel-Axis Theorem , Moments of Inertia of Composite Areas, Moments of Inertia of a Mass - Moments of Inertia of Thin Plates , Determination of the Moment of Inertia of a Three-Dimensional Body by Integration.

UNIT IV FRICTION 8

The Laws of Dry Friction. Coefficients of Friction, Angles of Friction, Wedges, Wheel Friction. Rolling Resistance , Ladder friction.

UNIT V DYNAMICS OF PARTICLES 12

Kinematics - Rectilinear Motion and Curvilinear Motion of Particles.

Kinetics- Newton's Second Law of Motion -Equations of Motions , Dynamic Equilibrium, Energy and Momentum Methods - Work of a Force , Kinetic Energy of a Particle, Principle of Work and Energy, Principle of Impulse and Momentum, Impact, Method of Virtual Work - Work of a Force, Potential Energy, Potential Energy and Equilibrium.

L – 45 + T – 15 TOTAL: 60 PERIODS

OUTCOMES:

- Upon completion of this course, students will be able to construct meaningful mathematical models of physical problems and solve them.

TEXT BOOK

1. Beer,F.P and Johnson Jr. E.R, "Vector Mechanics for Engineers", McGraw-Hill Education (India) Pvt. Ltd. 10th Edition, 2013.

REFERENCES

1. Hibbeller, R.C., Engineering Mechanics: Statics, and Engineering Mechanics:

Dynamics, 13th edition, Prentice Hall, 2013.
2. J.L. Meriam & L.G. Karige, Engineering Mechanics: Statics (Volume I) and Engineering Mechanics: Dynamics, 7th edition, Wiley student edition, 2013.
3. P. Boresi & J. Schmidt, Engineering Mechanics: Statics and Dynamics, 1/e, Cengage learning, 2008.
4. Irving H. Shames, G. Krishna Mohana Rao, Engineering Mechanics - Statics and Dynamics, Fourth Edition – PHI / Pearson Education Asia Pvt. Ltd., 2006.
5. Vela Murali, “Engineering Mechanics”, Oxford University Press (2010)

GE7151	COMPUTING TECHNIQUES	L	T	P	C
	(Common to all branches of Engineering and Technology)	3	0	0	3

OBJECTIVES:

- To learn programming using a structured programming language.
- To provide C programming exposure.
- To introduce foundational concepts of computer programming to students of different branches of Engineering and Technology.

UNIT I INTRODUCTION 9

Introduction to Computers – Computer Software – Computer Networks and Internet - Need for logical thinking – Problem formulation and development of simple programs - Pseudo code - Flow Chart and Algorithms.

UNIT II C PROGRAMMING BASICS 9

Introduction to C programming – Fundamentals – Structure of a C program – Compilation and linking processes - Constants, Variables – Data Types – Expressions - Operators –Decision Making and Branching – Looping statements – Solving Simple Scientific and Statistical Problems.

UNIT III ARRAYS AND STRINGS 9

Arrays – Initialization – Declaration – One dimensional and two dimensional arrays - Strings- String operations – String Arrays - simple programs- sorting- searching – matrix operations.

UNIT IV POINTERS 9

Macros - Storage classes –Basic concepts of Pointers– Pointer arithmetic - Example Problems - Basic file operations

UNIT V FUNCTIONS AND USER DEFINED DATA TYPES 9

Function – definition of function – Declaration of function – Pass by value – Pass by reference – Recursion –Enumerators – Structures - Unions

TOTAL : 45 PERIODS

OUTCOMES

At the end of the course, the student should be able to:

CO1:Write C program for simple applications
CO2: Formulate algorithm for simple problems
CO3: Analyze different data types and arrays
CO4: Perform simple search and sort.
CO5: Use programming language to solve problems.

TEXTBOOKS:

1. Pradip Dey, Manas Ghosh, “Computer Fundamentals and Programming in C”, Second Edition, Oxford University Press, 2013
2. Ashok N. Kamthane, “Computer programming”, Pearson Education, 2007.
3. Yashavant P. Kanetkar. “Let Us C”, BPB Publications, 2011.

REFERENCES:

1. Kernighan,B.W and Ritchie,D.M, “The C Programming language”, Second Edition, Pearson Education, 2006
2. Byron S Gottfried, “Programming with C”, Schaums Outlines, Second Edition, Tata McGraw-Hill, 2006.
3. R.G. Dromey, “How to Solve it by Computer”, Pearson Education, Fourth Reprint, 2007

CY7261	APPLIED CHEMISTRY LABORATORY	L	T	P	C
		0	0	4	2

OBJECTIVE

- To make the student acquire practical skills in the wet chemical and instrumental methods for quantitative estimation of nitrite in water, cement, oil, coal, Phenol

LIST OF EXPERIMENTS

1. Determination of Redwood / Saybolt numbers, kinematic viscosity and viscosity index of lubricating oils
2. Determination of flash point, fire point, cloud and pour point of oils
3. Determination of acid value, iodine value of oils and saponification value.
4. Determination of COD of water samples
5. Determination of total, temporary & permanent hardness of water by EDTA method. Estimation of HCl using Na_2CO_3 as primary standard and determination of alkalinity in water sample.
6. Determination of purity of washing soda and strength of a commercial acid
7. Estimation of available chlorine in hypochlorite solution
8. Estimation of strength of hydrogen peroxide
9. Estimation of Phenol.
10. Determination of Calorific value using Bomb calorimeter

TOTAL: 60 PERIODS

OUTCOME

CO1: Familiarization with equipment like viscometers, flash and fire point apparatus etc
CO2: Familiarization of methods for determining COD
CO3: Familiarization of a few simple synthetic techniques for soap

TEXT BOOKS

1. Daniel R. Palleros, “Experimental organic chemistry” John Wiley & Sons, Inc., New York (2001).
2. Furniss B.S. Hannaford A.J, Smith P.W.G and Tatchel A.R., Vogel’s Textbook of practical organic chemistry, LBS Singapore (2010).

GE7161 COMPUTER PRACTICES LABORATORY

L	T	P	C
0	0	4	2

OBJECTIVES

- To understand the basic programming constructs and articulate how they are used to develop a program with a desired runtime execution flow.
- To articulate where computer programs fit in the provision of computer-based solutions to real world problems.
- To learn to use user defined data structures.

LIST OF EXPERIMENTS

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

TOTAL: 60 PERIODS

OUTCOMES

At the end of the course, the student should be able to:

CO1: Write and compile programs using C programs.
CO2: Write program with the concept of Structured Programming
CO3: Identify suitable data structure for solving a problem
CO4: Demonstrate the use of conditional statement.

LABORATORY REQUIREMENTS FOR BATCH OF 30 STUDENTS

30 Systems with C compiler

MA7357	PROBABILITY AND STATISTICS (Branch specific course)	L T P C 4 0 0 4

OBJECTIVES:

- To make the students acquire a sound knowledge in statistical techniques that model engineering problems.
- The Students will have a fundamental knowledge of the concepts of probability.

UNIT I RANDOM VARIABLES 12

Discrete and continuous random variables – Moments – Moment generating functions – Binomial, Poisson, Geometric, Uniform, Exponential, Gamma, Weibull and Normal distributions - Functions of a random variable.

UNIT II TWO-DIMENSIONAL RANDOM VARIABLES 12

Joint distributions – Marginal and conditional distributions – Covariance – Correlation and Linear regression – Transformation of random variables – Central limit theorem (for independent and identically distributed random variables).

UNIT III TESTS OF SIGNIFICANCE 12

Sampling distributions - Tests for single mean, proportion, Difference of means (large and small samples) – Tests for single variance and equality of variances – $\chi 2$- test for goodness of fit – Independence of attributes – Non-parametric tests: Test for Randomness and Rank - sum test (Wilcoxon test).

UNIT IV DESIGN OF EXPERIMENTS 12

Completely randomized design – Randomized block design – Latin square design - 2^2 - factorial design - Taguchi's robust parameter design.

UNIT V STATISTICAL QUALITY CONTROL 12

Control charts for measurements ($\overline{X}$ and R charts) – Control charts for attributes (p, c and np charts) – Tolerance limits - Acceptance sampling.

TOTAL: 60 PERIODS

OUTCOMES

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

CO1 analyze the performance in terms of probabilities and distributions achieved by the determined solutions
CO2 To be familiar with some of the commonly encountered two dimensional random variables and be equipped for a possible extension to multivariate analysis
CO3 To apply the basic principles underlying statistical inference(estimation and hypothesis testing)
CO4 To demonstrate the knowledge of applicable large sample theory of estimators and tests
CO5 To obtain a better understanding of the importance of the methods in modern industrial processes.

TEXT BOOKS:

1. Milton, J. S. and Arnold, J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, New Delhi, 4th Edition, 3rd Reprint, 2008.
2. Johnson, R.A. and Gupta, C.B., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2011.

REFERENCES:

1. Devore, J.L., "Probability and Statistics for Engineering and the Sciences",Thomson Brooks/Cole, International Student Edition, New Delhi, 7th Edition, 2008.

2. Walpole, R.E., Myers, R.H., Myers, S.L. and Ye, K., “Probability and Statistics for Engineers and Scientists”, Pearson Education, Asia, 8th Edition, 2007.
3. Ross, S.M., “Introduction to Probability and Statistics for Engineers and Scientists”, Elsevier, New Delhi, 3rd Edition, 2004.
4. Spiegel, M.R., Schiller, J. and Srinivasan, R.A., “Schaum’s Outline of Theory and Problems of Probability and Statistics”, Tata McGraw Hill, New Delhi, 2004.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Analyze the performance in terms of probabilities and distributions achieved by the determined solutions	2	2	1	2	1	-	-	-	-	-	1	1	1	-	-
CO2	To be familiar with some of the commonly encountered two dimensional random variables To and be equipped for a possible extension to multivariate analysis	2	2	1	3	1	-	-	-	-	-	1	1	1	-	-
CO3	To apply the basic principles underlying statistical inference(estimation and hypothesis	2	2	1	3	1	-	-	-	-	-	2	2	1	-	-

	testing)															
CO4	To demonstrate the knowledge of applicable large sample theory of estimators and tests	2	2	1	3	1	-	-	-	-	-	1	1	1	-	-
CO5	To obtain a better understanding of the importance of the methods in modern industrial processes.	2	2	1	3	1	-	-	-	-	-	2	2	1	-	-
Overall CO		2	2	1	2.8	1	-	-	-	-	-	1.4	1.4	1	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

EE7254 PRINCIPLES OF ELECTRICAL AND ELECTRONICS ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

To impart knowledge on

- Electric circuit laws , single and three phase circuits and wiring
- Working principles of Electrical Machines
- Various electronic devices and measuring instruments

UNIT I ELECTRICAL CIRCUITS 9

Basic principles involved in power generation, transmission and distribution, Ohms Law, Kirchoff's Law , steady state solution of DC circuits , Thevinin's Theorem, Norton's Theorem, Superposition Theorem.

UNIT II AC CIRCUITS 9

Introduction to AC circuits – waveforms and RMS value – power and power factor, single phase and three-phase balanced circuits, housing wiring, industrial wiring, materials of wiring.

UNIT III ELECTRICAL MACHINES 9

Principles of operation and characteristics of DC machines. Transformers (single and three phase) ,Synchronous machines , three phase and single phase induction motors.

UNIT IV ELECTRONIC DEVICES & CIRCUITS 9

Types of Materials –Silicon & Germanium- N type and P type materials – PN Junction –Forward and Reverse Bias –Semiconductor Diodes –Bipolar Junction Transistor – Characteristics – transistor as an Amplifier –Introduction to operational Amplifier –Inverting Amplifier –Non Inverting Amplifier –DAC – ADC .

UNIT V MEASUREMENTS & INSTRUMENTATION 9

Introduction to transducers: pressure, temperature, position, electrical measurements ,Classification of instruments – moving coil and moving iron Ammeter and Voltmeter – multimeters – dynamometer type Wattmeter – three-phase power measurements – energy meter – megger – instrument transformers (CT and PT)

TOTAL : 45 PERIODS

OUTCOMES:

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

CO1: To be able to understand the concepts related with electrical circuits and wiring.
CO2: To be able to understand AC circuits and single and three phase balanced circuits
CO3: Capable of understanding the operating principle of DC machines, single and three phase induction motors
CO4: To be able to understand the working principle of electronic devices and circuits
CO5: To be able to understand the transducer and various instruments

REFERENCES

1. Del Toro, "Electrical Engineering Fundamentals", Pearson Education, New Delhi, 2007
2. John Bird, "Electrical Circuit Theory and Technology", Elsevier, First Indian Edition, 2006
3. Allan S Moris, "Measurement and Instrumentation Principles", Elseveir, First Indian Edition, 2006
4. Rajendra Prasad, "Fundamentals of Electrical Engineering", Prentice Hall of India, 2006
5. Thereja .B.L., "Fundamentals of Electrical Engineering and Electronics", S. Chand & Co. Ltd., 2008
6. V.K Mehta and Rohit Mehta, "Principle of Electrical Engineering", S. Chand & Company, 2008

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO 1	PO 2	PO3	PO 4	PO 5	PO 6	PO7	PO 8	PO 9	PO10	PO1 1	PO1 2	PSO1	PSO2	PSO3
CO1	To be able to understand the concepts related with electrical circuits and wiring.	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
CO2	To be able to understand AC circuits and single and three phase balanced circuits	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
CO3	Capable of understanding the operating principle of DC machines, single and three phase induction motors	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
CO4	To be able to understand the working principle of electronic devices and circuits	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
CO5	To be able to understand the transducer and various instruments	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
Overall CO		-	2	1	-	-	-	-	-	-	-	1	1	1	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT 7301 **FUNDAMENTALS OF POLYMER CHEMISTRY** **L T P C**
3 0 0 3

OBJECTIVES:

To enable the students to understand the

- Various polymerization techniques
- Fibre forming polymer characteristics and evaluation techniques
- Processing of regenerated fibres
- Need of various additives in polymer processing

UNIT I **9**

Introduction to natural and synthetic polymers; terms and fundamental concepts; step- growth polymerization, Carother's equation, functionality, crosslinking; PET manufacturing; chain growth polymerization, free radical polymerization, kinetics of free-radical initiation, termination, chain transfer, Mayo's equation, cage effect, auto acceleration inhibition and retardation

UNIT II **9**

Polypropylene manufacturing; acrylic manufacturing; atom transfer radical polymerization, ionic polymerization, ring opening polymerization; Nylon-6 manufacturing; co-polymerization and its importance; copolymer equation, reactivity ratio, tailor making of copolymer properties; techniques of chain polymerization; bulk, solution, emulsion, micro emulsion and suspension polymerization; chemical modification of fibres; polymer solution, Flory's theory; Interaction parameter

UNIT III **9**

Molecular weight and its distribution by: end group analysis, osmometry, light scattering, ultra centrifugation, gel permeation chromatography, intrinsic viscosity; spectroscopic methods of polymer characterization using FT-IR, UV-VIS and NMR spectroscopy, DTA, TGA and DSC

UNIT IV **9**

Compounding of polymers - fillers, plasticizers, antioxidants, UV stabilizers, colouring agents and flame retardants; polymer processing - compression, moulding, injection, extrusion, calendaring and film casting; preparation and properties of polyesters, polyamides, epoxy and silicone polymers; conductive polymers, super absorbent polymers.

UNIT V **9**

Recycling, remoulding, depolymerisation, incineration, biodegradable polymers

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Techniques of polymerisation
CO2: Methods of polymerisation
CO3: Characterisation of polymers
CO4: Production and properties of polymers
CO5: Recycling and reuse of polymers

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2. Fred W Billmeyer, "Textbook of Polymer Science", John Wiley & Sons, 984-03.
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5. Anil Kumar; Rakesh K Gupta, "Fundamentals of Polymers", McGraw-Hill, New York, 1998.
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8. Gowariker V. R., Viswanathan N. V., and Jayadev Sreedhar, “Polymer Science”, 2nd edition, New Age International (P) Limited publishers, Bangalore, 2015.
9. William D. Callister, Jr, “Materials Science and Engineering – An Introduction”, 7th edition, Sixth Edition, John Wiley & Sons, Inc., 2007.
10. Hobert H. Willard, Lynne L. Merrit, John A Dean and Frank A. Settle, “Instrumental Methods of Analysis”, CBS Publishers, 2004

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Techniques of polymerisation	2	2	2	1	-	2	2	2	-	1	-	-	3	-	-
CO2	Methods of polymerisation	2	2	2	1	-	2	2	2	-	1	-	-	3	-	-
CO3	Characterisation of polymers	2	1	1	1	-	1	1	2	-	1	-	-	3	-	-
CO4	Production and properties of polymers	2	2	2	2	-	1	1	2	-	1	-	-	3	-	-
CO5	Recycling and reuse of polymers	2	2	3	2	-	2	2	2	-	2	-	-	3	-	-
Overall CO		2	1.8	2	1.4	-	1.6	1.6	2	-	1.2	-	-	3	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7302 TECHNOLOGY OF PRE SPINNING PROCESS L T P C
3 0 0 3

OBJECTIVES:

- To enable the students to understand the theory of various operations carried out at different stages of pre-spinning processes and the construction of machinery used for preparatory

UNIT I INTRODUCTION 5

Sequence of spinning machinery for producing carded, combed and blended yarns in short staple and long staple spinning system; linear density systems for textile materials conversions; influence of characteristics of raw material – fibre fineness, length, strength, elongation, stiffness, fibre friction, cleanliness on yarn quality and machine performance; spinnability

UNIT II GINNING AND BLOWROOM MACHINERY 9

Description and working of different types of gins; ginning performance on yarn quality; objectives, principle and description of opening, cleaning and blending machines used in blowroom; chute feed; cleaning efficiency, production calculations.

UNIT III CARDING MACHINE 9

Objectives and principle of carding; detailed study of flat card; autolevelling; card clothing and its maintenance; production calculation

UNIT IV COMBER 9

Objectives and detailed study of comber preparatory machines; objectives and principles of combing; sequence of combing operation; combing efficiency and production calculation

UNIT V DRAWFRAME AND ROVING MACHINE 13

Tasks of drawing machine; drafting systems used in modern drawing machines; autolevelling; draft and production calculation; objectives of roving machine; working of roving machine; bobbin builder mechanism ; draft, twist and production calculations; safety measures at pre-spinning processes – equipments used, safety practices

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Processes involved in the conversion of fibre to yarn
CO2: Functioning of ginning and blowroom machinery
CO3: Functioning of carding machines
CO4: Functioning of comber preparatory and comber
CO5: Functioning of drawframe and roving frame

REFERENCES

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3. Klein W., “The Rieter Manual of Spinning, Vol.1-3”, Rieter Machine Works Ltd., Winterthur, 2014, ISBN 10 3-9523173-3-0 / ISBN 13 978-3-9523173-3-4.
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7. Iredale John A., “Yarn Preparation: A Handbook”, Intermediate Technology, London, 1992, ISBN:1853390429.
8. Doraiswamy I., Chellamani P., and Pavendhan A., “Cotton Ginning, Textile Progress”, The Textile Institute, Manchester, 1993

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Processes involved in the conversion of fibre to yarn	2	2	3	2	2	1	1	2	2	1	1	1	3	1	-
CO2	Functioning of ginning and blowroom machinery	3	3	3	2	2	1	1	2	2	2	2	2	3	1	-
CO3	Functioning of carding machines	3	3	3	2	2	1	1	2	2	2	2	2	3	1	-
CO4	Functioning of comber preparatory and comber	3	3	3	2	2	1	1	2	2	2	2	2	3	1	-
CO5	Functioning of drawframe and roving frame	3	3	3	2	2	1	1	2	2	2	2	2	3	1	-
Overall CO		2.8	2.8	3	2	2	1	1	2	2	1.8	1.8	1.8	3	1	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7303 TECHNOLOGY OF PRE WEAVING PROCESS L T P C
3 0 0 3

OBJECTIVES:

- To enable the students to understand the theory of preparation of yarn for fabric formation and functioning of various preparatory machines

UNIT I BASICS OF WINDING 9

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

UNIT II PROCESS CONTROL IN WINDING 9

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

UNIT III WARPING AND SIZING 9

Objectives of warping, material flow in beam warping and creels used in warping machines; sectional warping machines; objectives of sizing; sizing materials and recipe used for different types of fibres; size preparation equipment; sizing machines; sizing filament yarns; concept of single end sizing, combined dyeing and sizing. Control concepts in modern sizing; energy conservation in sizing; Sizing defects and production calculations

UNIT IV PROCESS CONTROL IN WARPING AND SIZING 13

Process control in warping (production calculation, machine and labour productivity, control of end breaks, quality and hard waste in warping); Control systems used in sizing machine

UNIT V DRAWING-IN 5

Need for drawing-in operation; manual and automatic drawing- in, leasing, knotting and pinning machines; selection and care of reeds, healds and drop pins, control of cross ends and extra ends and calculations; safety measures at pre-weaving processes – equipments used, safety practices

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall know about

CO1: Objectives of working principle of winding machines
CO2: The machine and process parameters in winding
CO3: Objectives and working of warping and sizing machines
CO4: The process control in warping and sizing
CO5: Drawing – in and denting process

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1. Baneerjee.P.K., “Principles of Fabric Formation”, CRC Press, London, 2014, ISBN Number:13:978-1-4665-5445-0.
2. Abhijit Majumdar, Apurba Das, R.Alagirusamy and V.K.Kothari., “Process Control in Textile Manufacturing”, Wood Head Publishing Limited, Oxford, 2013, ISBN: 978-0-85709-027-0.
3. B.C.Goswami, R.D.Anadjiwala and D.M.Hall., “Textile Sizing”., Marcel Dekker, NewYork, 2004, ISBN: 0-8247-5053-5.
4. John A. Iredale “Yarn Preparation: A Hand Book”, Textile Institute, Manchester, 1992, ISBN: 1853390429.

5. Ormerod A. and Sondhelm W. S., “Weaving: Technology and Operations”, Textile Institute, 1995, ISBN: 187081276X.
6. MilindVasudeoKoranne, “Fundamentals of Yarn Winding”,Woodhead Publishing, India, 2013, ISBN: 978-1-78242-068-2.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	**PO2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO3**
CO1	Objectives and working principle of winding machines	2	1	1	1	2	1	1	1	1	1	1	2	2	2	2
CO2	The machine and process parameters in winding	3	3	1	3	2	1	1	2	2	1	2	2	3	3	3
CO3	The objectives and working of warping and sizing machines	1	2	2	2	2	2	2	2	1	1	2	2	3	3	3
CO4	The process control in warping and sizing	3	2	2	3	3	2	2	2	2	2	2	2	3	3	3
CO5	Drawing – in and denting process	2	2	1	1	2	1	1	1	1	1	2	2	2	2	2
Overall CO		2.2	2	1.4	2	2.2	1.4	1.4	1.6	1.4	1.2	1.8	2	2.6	2.6	2.6

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7351 CHARACTERISTICS OF TEXTILE FIBRES L T P C
4 0 0 4

OBJECTIVES:

To enable the students to understand the

- Structure and morphology of textile fibres
- Physical characteristics textile fibres

UNIT I STRUCTURE OF FIBRES 12

Classification of fibres; study of morphological structures of fibers; physical properties of fibres. order and disorder in fibre structure; molecular conformations – planar zig-zag, helical, lamellar, and sphrulite conformations.

UNIT II STRUCTURE INVESTIGATION TECHNIQUES 6

Transmission and Scanning electron microscopes-principle; construction and working; X-ray diffraction techniques – estimation of crystallinity; Infrared radiation and dichroism techniques; chemical element and group identification by transmittance and optical density methods, molecular orientation estimation

UNIT III MOISTURE ABSORPTION CHARACTERISTICS 12

Theories of moisture sorption; Moisture absorption behavior of natural and man-made fibres; influence of fibre structure, humidity and temperature on the moisture absorption; conditioning of fibres –mechanism of conditioning and factors influencing conditioning. Moisture diffusion in fibres. Heat of sorption – integral and differential, their relation; factors influencing heat of sorption - measurement of heat of sorption

UNIT IV TENSILE AND ELONGATION CHARACTERISTICS OF FIBRES 18

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

UNIT V OPTICAL, FRICTIONAL, AND THERMAL CHARACTERISTICS 12

Reflexion and Lustre-objective and subjective methods of measurement - refractive index and its measurement - birefringence, factors influencing birefringence - Absorption and dichroism

Friction – static, limiting and kinetic friction, its measurement, comparison of fibres, directional friction in wool – friction. Thermal transitions of fibres - thermal conductivity, thermal expansion and contraction, Tg, melting; static electricity in textile fibres

TOTAL: 60 PERIODS

OUTCOME:

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

CO1: Structure and properties of fibres
CO2: Method of investigation of structure of fibres
CO3: Moisture properties of fibres
CO4: Tensile and elongation properties of fibres
CO5: Optical, thermal and frictional characteristics of fibres

REFERENCES

1. Morton W. E., and Hearle J. W. S., “Physical Properties of Textile Fibres”, The Textile Institute, Washington D.C., 2008, ISBN 978-1-84569-220-95
2. Meredith R., and Hearle J. W. S., “Physical Methods of Investigation of Textiles”, Wiley Publication, New York, 1989, ISBN: B00JCV6ZWU | ISBN-13:

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8. Hearle J.W.S., “Polymers and Their Properties : Fundamentals of Structures and Mechanics Vol 1”, Ellis Horwood, England, 1982, ISBN: 047027302X | ISBN-13: 9780470273029
9. Greaves. P. H., and Saville B.P., “Microscopy of Textile Fibres”, Bios Scientific, U.K., 1995, ISBN: 1872748244 | ISBN-13: 9781872748245
10. Seville. B. P., “Physical Testing of Textiles”, Woodhead Publishing, 1999,ISBN: 1855733676 | ISBN-13: 9781855733671
11. Hearle J. W. S., and Peters. R. H., “Fibre structure”, Elsevier Ltd, 1963, ISBN: 1483212211 | ISBN-13: 9781483212210

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO3**
CO1	Structure and properties of fibres	3	3	2	1	-	1	1	1	2	1	1	1	3	1	2
CO2	Method of investigation of structure of fibres	2	3	2	1	-	1	1	1	2	2	2	1	3	2	2
CO3	Moisture properties of fibres	3	3	2	1	-	1	1	1	2	2	1	1	3	2	2
CO4	Tensile and elongation properties of fibres	3	3	2	1	-	1	1	1	1	2	2	1	3	2	2
CO5	Optical, thermal and frictional characteristics of fibres	3	3	2	1	-	1	1	1	2	2	1	1	3	2	2
Overall CO		2.8	3	2	1	-	1	1	1	1.8	1.8	1.4	1	3	1.8	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

EE7261	ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY	L T P C 0 0 4 2

OBJECTIVE:

- To train the students in performing various tests on electrical drives, sensors and circuits.

LIST OF EXPERIMENTS:

1. Load test on separately excited DC shunt generator
2. Load test on DC shunt moor
3. Load test on S Transformer
4. Load test on Induction motor
5. Regulation of 3 Alternator
6. Study of CRO
7. Logic gates
8. Operational amplifiers
9. Time constant of RC circuit
10. Characteristics of LVDT
11. Calibration of Rotometer
12. RTD and Thermistor
13. Flapper Nozzle system

TOTAL: 60 PERIODS

OUTCOME:

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

CO1: Able to perform test on DC shunt generator and DC shunt moor
CO2: Able to load test on transformer and induction motor
CO3: Understand the CRO
CO4: Able to understand time constant of RC circuit and Characteristics of LVDT
CO5:Able to execute test on RTD and Thermistor

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Able to perform test on DC shunt generator and DC shunt moor	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
CO2	Able to load test on transformer and induction motor	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
CO3	Understand the CRO	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
CO4	Able to understand time constant of RC circuit and Characteristics of LVDT	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
CO5	Able to execute test on RTD and Thermistor	-	2	1	-	-	-	-	-	-	-	1	1	1	-	-
Overall CO		-	2	1	-	-	-	-	-	-	-	1	1	1	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT 7311 PRE SPINNING PROCESS LABORATORY L T P C
0 0 4 2

OBJECTIVES:

To enable the students to

- Get practical experience in the pre spinning machines
- Learn material passage in the machine and identify the parts of machine
- Do production, draft and twist calculations.

LIST OF EXPERIMENTS

1. Construction details of blow room machines and material passage
2. Cleaning efficiency and production calculations in blow room
3. Construction details of carding machine and the material passage
4. Draft and production calculations in carding machine
5. Wire point specifications and settings in carding machine
6. Construction details of drawing machine, material passage, draft and production calculations
7. Construction details of comber and material passage
8. Combing cycle, draft and production calculations
9. Construction details of roving machine, material passage
10. Draft, Twist and production calculations in roving machine
11. Study of builder mechanism of roving machine
12. Determination of degree of openness of fibre at blow room
13. Determination of neps present in the card and comber web

OUTCOMES:

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

CO1: Understand the material passage in the spinning preparatory machines and draw gearing diagram,

CO2: Identify the components of blow room, carding machine, draw frame, comber and speed frame

CO3: Calculate draft, twist and production rate

CO4: Calculate degree of cleaning in blowroom, card and comber

TOTAL: 60 PERIODS

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1.	Understand the material passage in the spinning preparatory machines and draw gearing diagram	1	2	1	1	1	-	-	-	2	2	3	-	2	2	-
CO2.	Identify the components of blow room, carding machine, draw frame, comber and speed frame	2	2	1	2	2	-	-	-	2	1	3	-	2	2	-
CO3.	Calculate draft, twist and production rate	1	3	2	2	1	-	-	-	3	3	2	-	3	2	-
CO4.	Calculate degree of cleaning in blowroom, card and comber	1	3	2	2	1	-	-	-	3	3	2	-	3	2	-
Overall CO		1.25	2.5	1.5	1.75	1.25	-	-	-	2.5	2.25	2.5	-	2.5	2	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

MA7354 **NUMERICAL METHODS** **L T P C**
4 0 0 4

OBJECTIVES:
To provide the mathematical foundations of numerical techniques for solving linear system, eigenvalue problems, interpolation, numerical differentiation and integration and the errors associated with them;

- To demonstrate the utility of numerical techniques of ordinary and partial differential equations in solving engineering problems where analytical solutions are not readily available.

UNIT I SOLUTION OF EQUATIONS AND EIGENVALUE PROBLEMS 12
Solution of algebraic and transcendental equations - Fixed point iteration method – Newton-Raphson method- Solution of linear system of equations - Gauss elimination method – Pivoting - Gauss-Jordan methods – Iterative methods of Gauss-Jacobi and Gauss-Seidel - Matrix Inversion by Gauss-Jordan method - Eigenvalues of a matrix by Power method and by Jacobi's method.

UNIT II INTERPOLATION AND APPROXIMATION 12
Interpolation with unequal intervals - Lagrange interpolation – Newton's divided difference interpolation – Cubic Splines - Interpolation with equal intervals - Newton's forward and backward difference formulae – Least square method - Linear curve fitting.

UNIT III NUMERICAL DIFFERENTATION AND INTEGRATION 12
Approximation of derivatives using interpolation polynomials - Numerical integration using Trapezoidal, Simpson's 1/3 and Simpson's 3/8 rules – Romberg's method - Two point and three point Gaussian quadrature formulae – Evaluation of double integrals by Trapezoidal and Simpson's rules.

UNIT IV INITIAL VALUE PROBLEMS FOR ORDINARY DIFFERENTIAL EQUATIONS 12
Single step-methods - Taylor's series method - Euler's method - Modified Euler's method - Fourth order Runge-Kutta method for solving first and second order equations - Multi-step methods - Milne's and Adams-Bashforth predictor-corrector methods for solving first order equations.

UNIT V BOUNDARY VALUE PROBLEMS IN ORDINARY AND PARTIAL DIFFERENTIAL EQUATIONS 12
Finite difference methods for solving two-point linear boundary value problems - Finite difference techniques for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain – One dimensional heat-flow equation by explicit and implicit (Crank-Nicholson) methods - One dimensional wave equation by explicit method.

TOTAL: 60 PERIODS

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

CO1 Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions.
CO2 Apply numerical methods to obtain approximate solutions to mathematical problems.
CO3 Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.
CO4 Analyse and evaluate the accuracy of common numerical methods.
CO5 Boundary value problems in ordinary and partial differential equations

TEXT BOOKS:

1. Grewal, B.S. and Grewal,J.S., “Numerical methods in Engineering and Science”, Khanna Publishers, New Delhi, 9th Edition, 2007.
2. Sankara Rao . K, " Numerical Methods for Scientists and Engineers" PHI Learning Pvt Ltd. New Delhi, 2007.

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1. Brian Bradie, “A Friendly Introduction to Numerical Analysis”, Pearson Education Asia, New Delhi, 1st Edition, 2007.
2. Gerald, C.F. and Wheatley, P.O., “Applied Numerical Analysis”, Pearson Education Asia, New Delhi, 6th Edition, 2006.
3. Laurene V. Fausett, “Applied Numerical Analysis using MATLAB”, Pearson Education, New Delhi, 1st print, 2nd Edition, 2009.
4. S. R. K. Iyengar, R. K. Jain, Mahinder Kumar Jain, "Numerical Methods for Scientific and Engineering Computation", 6th Edition, New Age International Publishers, New Delhi, 2012.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Demonstrate understanding of common numerical methods and how they are used to obtain approximate solutions.	-	2	-	2	-	-	-	-	-	-	1	1	-	-	-
CO2	Apply numerical methods to obtain approximate solutions to mathematical problems.	-	2	-	2	-	-	-	-	-	-	1	1	-	-	-
CO3	Derive numerical methods for various mathematical operations and tasks, such as interpolation, differentiation, integration, the solution of linear and nonlinear equations, and the solution of differential equations.	-	2	-	2	-	-	-	-	-	-	1	1	-	-	-

CO4	Analyse and evaluate the accuracy of common numerical methods.	-	2	-	2	-	-	-	-	-	-	1	1	-	-	-
CO5	Boundary value problems in ordinary and partial differential equations	-	2	-	2	-	-	-	-	-	-	1	1	-	-	-
Overall CO		-	2	-	2	-	-	-	-	-	-	1	1	-	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

CH7351 SOLID MECHANICS FOR TECHNOLOGISTS LT P C
3 0 0 3

AIM

To give them knowledge on structural, Mechanical properties of Beams, columns

OBJECTIVES

- The students will be able to design the support column, beams, pipelines, storage tanks and reaction columns and tanks after undergoing this course. This is precursor for the study on process equipment design and drawing.

UNIT I STRESS, STRAIN AND DEFORMATION OF SOLIDS 9

Rigid bodies and deformable solids – forces on solids and supports – equilibrium and stability – strength and stiffness – tension, compression and shear stresses – Hooke's law and simple problems – compound bars – thermal stresses – elastic constants and poission's ratio.

UNIT II TRANSVERSE LOADING ON BEAMS 9

Beams – support conditions – types of Beams – transverse loading on beams – shear force and bending moment in beams – analysis of cantilevers, simply – supported beams and over hanging beams – relationships between loading, S.F. and B.M. In beams and their applications – S.F.& B.M. diagrams.

UNIT III DEFLECTIONS OF BEAMS 9

Double integration method – Macaulay's method – Area – moment theorems for computation of slopes and deflections in beams.

UNIT IV STRESSES IN BEAMS 9

Theory of simple bending – assumptions and derivation of bending equation ($M/I = F/Y = E/R$) – analysis of stresses in beams – loads carrying capacity of beams – proportioning beam sections – leaf springs – flitched beams – shear stress distribution in beams – determination of shear stress in flanged beams.

UNIT V TORSION AND COLUMNS 9

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

TOTAL : 45 PERIODS

OUTCOMES:

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

CO1: Stress, Strain and Deformation of Solids
CO2: Transverse Loading on Beams
CO3: Deflections of Beams
CO4: Stresses in Beams
CO5: Torsion and Columns

TEXT BOOKS

1. Junarkar S.B., "Mechanics of Structure Vol. 1, 21st Edition", Character Publishing House, Anand, India, 1995
2. William A. Nash, "Theory and Problems of Strength of Materials", Schaum's Outline Series, McGraw Hill International Editions, Third Edition, 1994
3. Bansal, R.K, "Strength of Materials", Laxmi Publications (P) Ltd., Fourth Edition, 2010

REFERENCES

1. Elangovan A., "Thinma Visai Iyal (Mechanics of Solids in Tamil)", Anna University, Chennai, 1995.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Stress, Strain and Deformation of Solids	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO2	Transverse Loading on Beams	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO3	Deflections of Beams	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO4	Stresses in Beams	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
CO5	Torsion and Columns	1	2	2	-	-	-	-	-	-	-	-	-	-	-	-
Overall CO		1	2	2	-	-	-	-	-	-	-	-	-	-	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT 7402 TECHNOLOGY OF WOVEN FABRIC MANUFACTURE L T P C
4 0 0 4

OBJECTIVES:

To enable the students to learn the

- Basics of weaving machine and important motions of looms
- Selection and control of process variables during fabric formation

UNIT I INTRODUCTION TO WEAVING 5

Yarns quality requirements for high speed automatic shuttle looms and shuttle less loom; warp and weft preparation for high speed looms; principle of weaving with hand and power looms, passage of material, motions in loom – primary, secondary and auxiliary motions, plain power loom driving, timing of motions.

UNIT II SHEDDING MOTIONS 13

Shed geometry and shedding requirement; types of shed; shedding mechanisms - positive and negative; principles of tappet, dobby and jacquard shedding mechanisms; reversing mechanisms; limitations of various shedding mechanisms; conventional and modern dobby and jacquard mechanism.

UNIT III WEFT INSERTION AND BEAT UP 18

Shuttle picking and checking mechanisms, shuttle flight and timing; weft feeder – types, principles of weft insertions in shuttle less looms; mechanism of weft insertion by projectile, rapier loom and jet looms – air and water; multi-phase weaving systems; kinematics of sley, sley eccentricity; beat up mechanism in modern looms

UNIT IV SECONDARY AND AUXILARY MOTIONS LOOMS 12

Take up and let - off motions used in plain power looms; cloth formation, weaving condition-factors and control; warp protector and warp and weft stop motion; plain power loom accessories; automatic weft replenishment in shuttle looms – pirn changing and shuttle changing looms; mechanisms involved in automatic pirn changing – feelers, cutters, design of shuttle, three try motions; multi shuttle looms- box changing principle, automatic pirn changing in multi shuttle loom; weft arrival control and automation in shuttle less looms; selvedges in shuttle less looms; quick style change.

UNIT V PROCESS CONTROL & SPECIAL WEAVING PROCESS 12

Techno economics of shuttle less loom weft insertion systems; loom monitoring and control,loom stoppages and efficiency; fabric defects and value loss; fabric shrinkage in the loom - causes and control; fabric engineering;filament weaving – silk & texturised yarns; principles and mechanisms in weaving - pile fabrics, tapes and tri-axial fabrics; safety measures to be taken at weaving industry.

TOTAL: 60 PERIODS

OUTCOMES:

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

CO1: Basics of weaving operation

CO2: Working of tappet, dobby and Jacquard shedding mechanism

CO3: Principle of weft insertion in shuttle and shuttleless weaving and working of beat up mechanism

CO4: Secondary and auxiliary motions

CO5: Control of process variables at loom and understand the principle of producing special fabrics

REFERENCES

1. Talukdar. M.K., Sriramulu. P.K., and Ajgaonkar. D.B., “Weaving: Machines, Mechanisms, Management”, Mahajan Publishers, Ahmedabad, 1998, ISBN: 81-85401-16-0.

2. Booth. J.E., “Textile Mathematics Volume 3”, The Textile Institute, Manchester, 1977, ISBN: 090073924X.
3. Marks R., and Robinson. T.C., “Principles of Weaving”, The Textile Institute, Manchester, 1989, ISBN: 0 900739 258.
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5. Vangheluwe L., “Air- Jet Weft Insertion”, Textile progress, Vol. 29, No. 4, Textile Institute Publication, 1999, ISBN; 1870372255.
6. Valeriy V. Choogin., PalithaBandara., and Elena V. Chepelyuk., “Mechanisms of Flat Weaving Technology”, Wood Head Publishing, 2013, ISBN: 0857097806 | ISBN-13: 9780857097804
7. Prabir Kumar Banerjee., “Principles of Fabric Formation” CRC Press, 2014, ISBN: 1466554444 | ISBN-13: 9781466554443
8. Majumdar A., Das A., Alagirusamy R.,and Kothari V.K., “ Process Control in Textile Manufacturing”, wood Head publishing, 2012, ISBN: 0857090275 | ISBN-13: 9780857090270
9. “Weaving: The knowledge in Technology”, Papers Presented at the Textile Institute Weaving Conference 1998, Textile Institute, ISBN: 1870372182 ISBN-13: 9781870372183.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO3**
CO1	Basics of weaving operation	2	2	2	2	2	2	1	2	2	2	2	2	3	3	3
CO2	Working of tappet, dobby and Jacquard shedding mechanism	3	2	3	2	1	2	1	2	2	2	2	3	3	3	3
CO3	Principle of weft insertion in shuttle and shuttleless weaving and working of beat up mechanism	2	2	2	2	2	2	2	2	2	2	3	3	3	3	3
CO4	Secondary and auxiliary motions	2	2	2	2	2	2	2	2	2	2	2	2	3	3	3
CO5	Control of process variables at loom and understand the principle of producing special fabrics	3	3	2	3	2	3	1	2	2	2	3	2	3	3	3
Overall CO		2.4	2.2	2.2	2.2	1.8	2.2	1.4	2	2	2	2.4	2.4	3	3	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7403 TECHNOLOGY OF YARN SPINNING L T P C
3 0 0 3

OBJECTIVES:

To enable the students to understand the

- Theory of yarn formation by different spinning systems
- Construction of yarn spinning machines

UNIT I RING SPINNING 13

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

UNIT II CONDENSED YARN SPINNING 5

Condensed yarn spinning – principle, different methods, properties; comparison with ring spun yarn

UNIT III YARN PLYING 9

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

UNIT IV ROTOR SPINNING 9

Principle of open end spinning; principle of yarn production by rotor spinning system; design features of important elements used in rotor spinning; comparative study on properties of rotor yarn

UNIT V OTHER SPINNING SYSTEMS 9

Friction and air-jet spinning methods – principle of yarn production, raw material used, structure, properties and applications; principle of yarn production by self-twist, air vortex, core, wrap and other spinning systems; safety measures at spinning machines – equipments used, safety practices

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Understand the theory of formation of yarn by ring spinning system and construction of machine

CO2: Understand the principle and method of production of condensed spun yarn

CO3: Understand the concept and production of ply yarns and fancy yarns

CO4: Understand the working of rotor spinning and design features of important elements

CO5: Understand the working principle of friction, air vortex, air jet and other spinning system

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1. Klein W., and Stalder H., “The Rieter Manual of Spinning, Vol.4”, Rieter Machine Works Ltd., Winterthur, 2014, ISBN: 10 3-9523173-4-9 / ISBN: 13 978-3-9523173-4-1.
2. Stalder H., “The Rieter Manual of Spinning, Vol.5”, Rieter Machine Works Ltd., Winterthur, 2014, ISBN: 10 3-9523173-5-7 / ISBN: 13 978-3-9523173-5-8.
3. Stalder H., “The Rieter Manual of Spinning, Vol.6”, Rieter Machine Works Ltd., Winterthur, 2014, ISBN: 10 3-9523173-6-5 / ISBN: 13 978-3-9523173-6-5.
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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Understand the theory of formation of yarn by ring spinning system and construction of machine	3	3	3	3	2	2	2	3	3	3	3	3	3	2	3
CO2	Understand the principle and method of production of condensed spun yarn	2	2	2	3	1	1	1	2	2	2	2	2	3	2	3
CO3	understand the concept and production of ply yarns and fancy yarns	2	2	2	2	1	1	1	2	2	2	2	2	3	2	3
CO4	Understand the working of rotor spinning and design features of important elements	2	2	2	2	1	1	1	2	2	2	2	2	3	2	3
CO5	Understand the working principle of friction, air vortex, air jet and other spinning system	2	2	2	2	1	2	2	2	3	2	2	2	3	2	3
Overall CO		2.2	2.2	2.2	2.4	1.2	1.4	1.4	2.2	2.4	2.2	2.2	2.2	3	2	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7401 TECHNOLOGY OF MANUFACTURED FIBRE PRODUCTION L T P C
3 0 0 3

OBJECTIVES:

- To make the students understand different methods of production of manmade fibres and post spinning operations

UNIT I POLYMER RHEOLOGY 9

Transport phenomena in fibre manufacturing- heat and mass; polymer rheology-Newtonian and non-Newtonian fluids; necessary conditions of fibre forming polymer; melt instabilities.

UNIT II MELT SPINNING 9

Melt Spinning- polymer selection and preparation, equipments, testing of filament, properties and applications of polyester, polyamide and polypropylene fibres; process control

UNIT III SOLUTION SPINNING 9

Solution spinning- polymer selection and preparation, equipments, testing of filament, properties and applications of acrylic, polyurethane and regenerated cellulose fibres; process control

UNIT IV POST SPINNING OPERATIONS 9

Neck drawing, drawing systems, influence of drawing on structure and properties of fibres; types of heat setting, influencing parameters on heat setting, influence of heat setting on fibre behaviour; spin finish application; texturizing; process control

UNIT V ADVANCES IN FIBRE SPINNING 9

Liquid crystal spinning; gel spinning; profile fibres, hollow & porous fibres; speciality fibres- polyglycolic acid, polylactic acid, chitosan fibres preparation properties and applications; safety rules to be followed in fibre production industry

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the student shall know about the

CO1: Polymer Rheology
CO2: Melt spinning of polymers
CO3: Solution spinning of polymers
CO4: Post spinning operations carried out for the fibres/filaments produced
CO5: Advances in fibre spinning operation

REFERENCS

1. Kothari V. K., “Textile Fibres: Development and Innovations”, Vol. 2, Progress in Textiles, IAFL Publications, New Delhi, 2000, ISBN: 81-s901033-0-X.
2. Gupta V. B., and Kothari V. K., (Editors), “Manufactured Fibre Technology”, Kluwer Academic Publishers, 1997, ISBN 0412-54030-4.
3. Vaidya A. A., “Production of Synthetic Fibres”, Prentice Hall of India Pvt. Ltd., New Delhi, 1988.ISBN: 0876925786 / ISBN: 9780876925782.
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6. Nakasjima (English edition, edited by Kajiwara K. and McIntyre J. E.), “Advanced Fibre Spinning Technology”, Wood head Publication Ltd., England, 1994, ISBN: 1855731827

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO3**
CO1	Polymer Rheology	3	3	2	2	2	2	2	2	2	2	2	2	3	2	3
CO2	Melt spinning of polymers	3	3	2	2	1	1	1	1	2	2	2	2	3	3	3
CO3	Solution spinning of polymers	3	3	2	2	1	1	2	1	2	2	2	2	3	3	3
CO4	Post spinning operations carried out for the fibres/filaments produced	3	3	2	2	1	2	2	2	2	2	2	2	3	3	2
CO5	Advances in fibre spinning operation	3	3	2	2	2	1	2	1	2	2	2	2	3	2	3
Overall CO		3	3	2	2	1.4	1.4	1.8	1.4	2	2	2	2	3	2.6	2.8

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7451 **WOVEN FABRIC STRUCTURE** **L T P C**
3 0 0 3

OBJECTIVES:
To enable the students to learn about different structures of woven fabric and design the structure for different applications

UNIT I **9**
Basic weaves – plain, twill, satin, sateen and their derivatives – loom requirements

UNIT II **9**
Ordinary and Brighten Honey Comb; Huck-a-Back and its modifications; Mock Leno; crepe weaves; colour theory – light and pigment theory; modification of colour; application of colours; colour and weave effects – loom requirements

UNIT II **13**
Bedford cords - plain and twill faced, wadded; welts and piques, wadded piques; backed fabrics - warp and weft, reversible and non-reversible fabrics; extra warp and extra weft figuring - single and double colour – loom requirements

UNIT IV **9**
Pile fabrics; warp pile - wire pile, terry pile, loose backed; weft pile – plain back and twill back velveteen, lashed pile, corduroy, weft plush – loom requirements

UNIT V **5**
Double cloth, types of stitches; Damasks; Gauze and Leno principles – loom requirements; 3Dfabrics

TOTAL: 45 PERIODS

OUTCOMES:
Upon the completion of this course the student will be able to construct design, draft and peg plan and loom requirements for producing fabrics with

CO1: Plain, twill, satin and derivatives structures
CO2: Honey comb, crepe structures
CO3: Bedford cords, piques, backed fabrics, extra warp/weft figuring
CO4: Warp and weft pile structures
CO5: Double, damask, gauze and leno structures

REFERENCES

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2. Grosicki Z. J., “Watson’s Advanced Textile Design and Colour”, Vol. II, Butterworths, London, 1989, *ISBN*-9781855739963
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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Plain, twill, satin and derivatives structures	1	1	1	-	2	1	1	1	2	1	1	1	2	2	2
CO2	Honey comb, crepe structures	1	1	2	-	3	1	1	1	2	1	1	1	2	2	2
CO3	Bedford cords, piques, backed fabrics, extra warp/weft figuring	1	1	2	-	3	1	1	1	2	1	1	1	2	2	2
CO4	Warp and weft pile structures	1	1	2	-	3	1	1	1	2	1	1	1	2	2	2
CO5	Double, damask, gauze and leno structures	1	1	2	-	3	1	1	1	2	1	1	1	2	2	2
Overall CO		1	1	1.8	-	2.8	1	1	1	2	1	1	1	2	2	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7411 **FIBRE SCIENCE LABORATORY** **L T P C**
0 0 2 1

OBJECTIVES:

To enable the students to understand the

- Identification of fibres by different methods
- Method of characterization of fibres

LIST OF EXPERIMENTS

1. Identification of natural, regenerated and synthetic fibres
2. Determination of density of various fibres by density gradient column
3. Determination of denier of synthetic fibres by gravimetric method
4. Determination of Moisture Regain and Moisture content of fibres
5. Determination of wax content and spin finish of natural and synthetic fibres
6. Identification of fibres and Determination of the blend proportion of
    a. Natural/ regenerated cellulose
    b. Cellulose/ protein fibres
    c. Cellulose/polyester fibres
    d. Natural cellulose/ regenerated cellulose/polyester
7. Analysis of thermal transitions of various fibres by Thermo gravimetric method. Comparison of low melting point and high melting point fibres and also its glass transition temperature
8. Analysis of end groups of polymers and fibres by using FTIR spectrometer
9. Sample preparation by wet spinning and determination of its properties
    a. Viscose
    b. Acrylic
10. Analysis of XRD patterns of various fibres and determination of crystallinity index

TOTAL: 30 PERIODS

OUTCOMES:

Upon the completion of this course the student will be able to

CO1: Identify the fibres using solubility test
CO2: Identify the fibres using burning test
CO3: Identify the fibres using microscopic characterization
CO4: Determination of linear density, density and moisture properties of fibres
CO5: Analyze the results of TGA, FTIR spectrometer and X-ray diffractometer

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Identify the fibres using solubility test	3	2	3	1	1	1	2	2	1	2	1	1	3	3	2
CO2	Identify the fibres using burning test	2	2	2	1	1	1	2	2	1	2	1	1	3	3	2
CO3	Identify the fibres using microscopic characterization	2	2	1	1	1	1	2	1	1	2	1	1	2	2	1
CO4	Determination of linear density, density and moisture properties of fibres	3	2	2	2	1	1	2	1	1	2	1	1	3	2	2
CO5	Analyze the results of TGA, FTIR spectrometer and X-ray diffractometer	3	3	2	2	2	1	2	1	1	2	1	1	3	1	3
Overall CO		2.6	2.2	2	1.4	1.2	1	2	1.4	1	2	1	1	2.8	2.2	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7412 **SPINNING PROCESS LABORATORY** **L T P C**
0 0 2 1

OBJECTIVES:

- To enable the students to understand the material passage in the spinning machines, important parts of machines, draft, twist and production calculations
- To train the students to handle machine and operate them practically

LIST OF EXPERIMENTS

1. Construction details of ring spinning machine and material passage
2. Draft, Twist and production calculations in ring spinning machine
3. Study of builder mechanism of ring spinning machine
4. Selection of ring travellers
5. Construction details of rotor spinning machine and material passage
6. Draft, Twist and production calculations in rotor spinning machine
7. Production of carded web using miniature card
8. Production of sliver using miniature drawing machine
9. Production of different yarn samples using ring spinning machine
10. Production of different yarn samples using rotor spinning machine

TOTAL:30 PERIODS

OUTCOMES:

Upon completion of this course, the student shall be able to
CO1: Calculate draft, twist and production rate of ring and rotor spinning machine
CO2: Understand the formation of yarn by ring and rotor spinning system
CO3: Produce yarn using ring and rotor spinning system

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO3**
CO1.	Calculate draft, twist and production rate of ring and rotor spinning machine	1	2	1	1	1	-	-	-	2	2	3	-	2	2	-
CO2.	Understand the formation of yarn by ring and rotor spinning system	2	2	1	2	2	-	-	-	2	1	3	-	2	2	-
CO3.	Produce yarn using ring and rotor spinning system	1	3	2	2	1	-	-	-	3	3	2	-	3	2	-
Overall CO		1.33	2.33	1.33	1,66	1.33	-	-	-	2.33	2	2.66	-	2.33	2	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7461 FABRIC ANALYSIS LABORATORY L T P C
0 0 4 2

OBJECTIVES:

To enable the students to analyse different fabrics for structure and constructional details

LIST OF EXPERIMENTS

1. Visualization of commercially available woven, knitted and nonwoven fabrics
2. Analysis of construction details of the following fabric structure
    i. Plain and its derivatives
    ii. Twill and its derivatives
    iii. Satin (Regular and irregular)
    iv. Sateen (Regular and irregular)
    v. Honeycomb (ordinary and Brighton)
    vi. Huck-a-back
    vii. Extra warp and extra weft figuring
    viii. Pile fabrics (warp and weft)
    ix. Backed fabrics
    x. Gauze and Leno
    xi. Double cloth
    xii. Crepe
    xiii. Tapestry
    xiv. Mock-leno
    xv. Bedford cord.
    xvi. Single jersey
    xvii. Double jersey structures
3. Analysis of blend composition in the yarn of the fabric
4. Analysis of finish on the fabric

TOTAL:60 PERIODS

OUTCOMES:

Upon completion of this practical course, the student will be able to

CO1: Analyze the woven and knit fabrics and determine the constructional details

CO2: Draw design of the woven fabric structure,

CO3: Draw draft plan of the woven fabric structure

CO4: Draw peg plan of the woven fabric structure

CO5: Analyze of blend composition and finish on the fabric

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Analyze the woven and knit fabrics and determine the constructional details	3	1	2	1	1	1	1	-	1	1	1	-	2	2	3
CO2	Draw design of the woven fabric structure,	3	1	2	1	1	1	1	-	1	1	1	-	2	2	3
CO3	Draw draft plan of the woven fabric structure	3	1	2	1	1	1	1	-	1	1	1	-	2	2	3
CO4	Draw peg plan of the woven fabric structure	3	1	2	1	1	1	1	-	1	1	1	-	2	2	3
CO5	Analyze of blend composition and finish on the fabric	3	1	2	1	1	1	1	-	1	1	1	-	2	2	3
Overall CO		3	1	2	1	1	1	1	-	1	1	1	-	2	2	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7502 **KNITTING TECHNOLOGY** **L T P C**
4 0 0 4

OBJECTIVES:

To make the students to understand the

- Fundamentals of knitting
- Types of knitting processes in detail
- Functioning of different components of knitting machine

UNIT I INTRODUCTION 6

Reasons for the growth of the knitting industry; comparison of fabric properties - woven, knits and bonded fabrics; classification of knitting processes – weft knit & warp knit; yarn quality requirements for knitting; preparation of staple yarns for weft and warp knitting

UNIT II FUNDAMENTALS OF KNITTING 12

General definitions and principles of knitting; types of knitting needles – Bearded, Latch & Compound needle; elements of knitted loop structure

UNIT III WEFT KNITTING 18

Basic weft knitted structures and their production - plain, rib, interlock and purl; fundamentals of formation of knit, tuck and float stitches; factors affecting the formation of loop; effect of loop length and shape on fabric properties; analysis of various types of weft knitted structure; weft knitted fabric geometry; basic principles and elements of flat knitting machines; different types of flat knitting machines- manual, mechanical and computer controlled; production of various weft knitted structures using flat knitting machines;

UNIT IV WEFT KNITTING MACHINES 12

Construction, characteristics and working of circular knitting machines used for the production of basic structures; production of derivatives of weft knitted structures; needle control in circular knitting machines; quality control in knitted fabric production; production calculation; safety measures to be taken at knitting industry; process control in weft knitting.

UNIT V WARP KNITTING 12

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

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of this course, the student shall know the

CO1: Type of knitting processes, yarn requirements for knitting
CO2: Principle of knitting in different types of knitting machines
CO3: Basic weft knitted structures, flat knitting process
CO4: Functioning of weft knitting machines
CO5: Functioning of warp knitting machines

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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Type of knitting processes, yarn requirements for knitting	3	2	2	2	1	2	2	2	1	2	2	2	2	3	3
CO2	Principle of knitting in different types of knitting machines	3	3	2	3	2	2	2	2	1	2	2	3	2	3	3
CO3	Basic weft knitted structures, flat knitting process	3	3	2	3	2	2	2	2	1	2	2	3	2	3	3
CO4	Functioning of weft knitting machines	3	2	2	2	2	2	2	2	1	2	2	2	2	3	3
CO5	Functioning of warp knitting machines	3	2	2	2	2	2	2	2	1	2	2	2	2	3	3
Overall CO		3	2.4	2	2.4	1.8	2	2	2	1	2	2	2.4	2	3	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively.

TT7501 CHEMICAL PROCESSING OF TEXTILE MATERIALS I L T P C
3 0 0 3

OBJECTIVES:
To enable the students to learn about chemical structure of fibres, pre-treatments involved in the wet processing of textiles and finishing treatment of textile fabrics

UNIT I **9**
Chemical structure of fibres; action of chemicals on fibres; natural and added impurities intextiles; singeing and desizing of natural and synthetic fibres and its blends; heat setting.

UNIT II **9**
Scouring, bleaching and mercerization of cotton, bio-scouring of cotton; carbonization, scouring and bleaching of wool; degumming of silk

UNIT III **9**
Loose stock machine; hank and package processing machines; yarn singeing machine; woven and knitted fabric singeing machines; stretching devices; shearing and raising machines; kiers; mangles; jigger; winch; jet and soft flow machines; yarn mercerizer, chain and chainless mercerizers; continuous scouring and bleaching machines; washing ranges, hydro extractors; detwisters; dryers; stenters

UNIT IV **9**
Calendaring, crease proofing, shrink proofing and softening; wool finishing.

UNIT V **9**
Water and oil repellent finishes; fire retardant finish; antibacterial finish; Application of Nanotechnology in finishing; assessment of finishes; safety measures to be taken at the textile chemical processing industry.

TOTAL: 45 PERIODS

UTCOMES:
Upon completion of this course, the student shall have the knowledge of
CO1: Chemical structure and action of chemicals
CO2: Necessity and requirements of pretreatments in wet processing of textiles
CO3: Machines for dyeing
CO4: Finishing machines after dyeing
CO5: Various finishing treatments on fabric

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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Chemical structure and action of chemicals	3	2	1	2	-	1	1	2	2	2	2	1	3	2	2
CO2	Necessity and requirements of pretreatments in wet processing of textiles	3	2	1	2	-	1	2	2	2	2	2	1	3	2	2
CO3	Machines for dyeing	2	3	2	1	-	2	2	2	2	2	2	2	3	2	2
CO4	Finishing machines after dyeing	2	3	2	2	-	2	2	2	2	2	2	2	3	2	2
CO5	Various finishing treatments on fabric	2	2	2	2	-	2	2	2	2	2	2	2	3	2	2
Overall CO		2.4	2.4	1.6	1.8	-	1.6	1.8	2	2	2	2	1.6	3	2	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7503 PROCESS CONTROL IN SPINNING L T P C
3 0 0 3

OBJECTIVES:
To enable the students to understand and apply process and quality control measures during spinning of yarn

UNIT I LEVELLING 9
Different levelling methods adopted in the pre spinning machines; assessment and control of autoleveling; influence of the uniformity of the intermediate products on the yarn quality; effect of machines and processing parameters on product uniformity; importance of fibre- mix homogeneity on yarn quality; types and levels of mixing in the preparatory processes; assessment of fibre-blend variations.

UNIT II NEP AND HOOK REMOVAL 9
Causes of nep and hook formation in the fibre-opening processes; improving the removal of neps in the carding and combing machines; fibre hook straightening during the preparatory operations; measurement of nep and hooklevel

UNIT III WASTE CONTROL 9
Control of waste in blowroom, card and combers; influence of machine and processing parameters on waste removal; controlling the lint content in waste; control of pneumafil waste, hard waste in ring frame; cleaning efficiency

UNIT IV PRODUCTION CONTROL 9
Factors affecting the production limits of the spinning machinery; achieving maximum production in the given machinery; new concepts in achieving higher production in the spinning machinery; role of machinery maintenance and humidity control on production efficiency; computation of the productivity indices.

UNIT V YARN QUALITY ANALYSIS & MAN-MADE FIBRE PROCESSING 9
Analysis and control of within length and between length variations and spectrogram; yarn faults classifications; causes and remedies for yarn faults and defects; optimum processing conditions required for man-made-fibres like polyester, viscose in the spinning machinery.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the student shall be able to understand the
CO1: Quality control measures in terms of levelling of material,
CO2: Neps and hooks removal during the preparatory processes
CO3: Control of waste during spinning
CO4: Importance of humidity control and machinery maintenance
CO5: Analysis of yarn quality and special measures to be taken while processing manmade fibres

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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	Quality control measures in terms of levelling of material	3	3	3	3	2	1	1	1	2	2	3	2	3	2	2
CO2	Neps and hooks removal during the preparatory processes	3	3	3	3	2	1	1	1	2	2	2	2	2	3	1
CO3	Control of waste during spinning	3	3	3	3	1	1	1	1	2	2	2	2	2	3	1
CO4	Importance of humidity control and machinery maintenance	3	2	2	3	1	1	1	1	2	2	2	2	3	2	1
CO5	Analysis of yarn quality and special measures to be taken while processing manmade fibres	3	2	2	3	1	2	2	2	3	3	2	2	3	2	1
Overall CO		3	2.6	2.6	3	1.4	1.2	1.2	1.2	2.2	2.2	2.2	2	2.6	2.4	1.2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7504 QUALITY EVALUATION OF FIBRES AND YARNS L T P C
3 0 0 3

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

UNIT I INTRODUCTION 5
Definition of quality; importance of quality assessment; method of developing quality and productivity norms; selection of samples for quality assessment – random and biased samples, squaring technique and zoning technique for fibre selection; yarn sampling - use of random numbers; sampling for various types of yarn tests.

UNIT II FIBRE LENGTH AND STRENGTH ANALYSIS 9
Fibre testing, the fibre quality index and spinnability; fibre length and length uniformity- measuring techniques; tensile strength testing modes – CRT, CRE, CRL and ARL; fibre strength, importance, relation to yarn strength; measurement techniques

UNIT III FIBRE FINENESS, MATURITY AND TRASH ANALYSIS 9
Fibre fineness – definition, comparison of various fibres, its importance in yarn manufacture, measurement techniques; cotton fibre maturity, estimation by microscopic method, maturity ratio and index, estimation by other methods – optical, air flow differential dyeing, its importance in spinning; fibre trash – influence on quality, measurement, principle and estimation microdust for rotor spinning; high volume instrument for total fibre quality measurement

UNIT IV YARN COUNT, TWIST AND STRENGTH 9
Yarn numbering systems-Indirect and direct systems, count conversions; count measuring systems; twist in single and ply yarns, twist directions, twist factor, twist and yarn strength; twist measurement and breaking twist angle measurement; single yarn strength; lea count- strength product (CSP) and Corrected Count Strength Product (CCSP)

UNIT V YARN MASS EVENNESS AND SURFACE QUALITY 9
Yarn mass evenness parameters, measurement; Yarn fault classification; Yarn Appearance; yarn abrasion resistance – importance and measuring technique; yarn hairiness – importance and assessment techniques; yarn friction– static and dynamic friction, methods of measurement

TOTAL: 45 PERIODS

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

CO1: Importance of quality and methods of sampling for fibre and yarn testing
CO2: Fibre length and strength testing analysis
CO3: Testing procedure and principle for fibre fineness, maturity and trash
CO4: Yarn numbering systems, principle and test procedures for determining the yarn strength and twist
CO5: Importance and measuring techniques for yarn evenness and surface quality

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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Importance of quality and methods of sampling for fibre and yarn testing	2	2	2	2	2	-	-	2	-	1	1	-	2	3	2
CO2	Fibre length and strength testing analysis	3	2	1	3	2	-	-	1	-	1	2	-	3	3	2
CO3	Testing procedure and principle for fibre fineness, maturity and trash	2	3	1	2	2	-	-	1	-	1	2	-	3	3	2
CO4	Yarn numbering systems, principle and test procedures for determining the yarn strength and twist	2	3	1	2	1	-	-	1	-	1	2	-	3	3	2
CO5	Importance and measuring techniques for yarn evenness and surface quality	2	3	1	2	2	-	-	1	-	1	2	-	3	3	2
Overall CO		2.2	2.6	1.2	2.2	1.8	-	-	1.2	-	1	1.8	-	2.8	3	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7551 TECHNOLOGY OF BONDED FABRICS L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about the

- Fundamentals of bonded fabrics
- Different method of web formation and bonding

UNIT I FUNDAMENTALS OF BONDED FABRICS 5

Definitions and classification of bonded fabrics; fibres, fibre preparations and their characteristics for the production of bonded fabrics, uses; methods of bonded fabric production

UNIT II WEB FORMATION WITH STAPLE FIBRES 9

Production of staple-fibre web by dry and wet methods; influence of web laying methods on fabric properties; quality control of web

UNIT III MECHANICAL, CHEMICAL AND THERMAL BONDING 13

Bonded fabric production by mechanical bonding - needling, stitching, water jet consolidation; thermal Bonding technologies; chemical bonding – binder polymers and bonding technologies

UNIT IV POLYMER – LAID WEB AND FABRIC FORMATION 9

Manufacture of Spun bonded fabrics, fibre orientation in spun bonded fabrics and characterization of filament arrangement; manufacture of melt blown fabrics – fibre formation and its attenuation; effect of processing parameters on fabric characteristics

UNIT V FINISHING AND APPLICATION OF BONDED FABRICS 9

Dry and Wet finishing; characterisation, structure - property relationship in bonded fabrics; End uses of bonded fabrics; safety measures to be taken at the nonwoven industry; process control in the manufacture of bonded fabrics.

TOTAL: 45 PERIODS

OUTCOMES:

- Upon completion of the course the student will be able to understand the
  CO1: Fundamentals of bonded fabric production
  CO2: Basics of nonwoven web formation techniques
  CO3: Mechanical, Chemical and thermal bonding methods to produce nonwovens and their end uses
  CO4: Production of spun bonded and melt blown nonwoven fabrics.
  CO5: Understand the finishing and characterization of bonded fabrics
  .

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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Fundamentals of bonded fabric production	2	2	2	2	2	1	1	2	2	2	2	2	2	2	3
CO2	Basics of nonwoven web formation techniques	1	2	2	2	2	1	1	2	1	2	2	2	2	2	3
CO3	Mechanical, Chemical and thermal bonding methods to produce nonwovens and their end uses	2	3	3	3	2	1	2	2	2	2	2	3	2	2	3
CO4	Production of spun bonded and melt blown nonwoven fabrics.	1	2	2	2	2	2	1	2	1	2	2	2	2	2	3
CO5	Understand the finishing and characterization of bonded fabrics	2	3	3	2	2	3	2	3	1	2	2	3	2	2	3
Overall CO		1.6	2.4	2.4	2.2	2	1.6	1.4	2.2	1.4	2	2	2.4	2	2	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT 7511 FABRIC MANUFACTURE LABORATORY L T P C
0 0 4 2

OBJECTIVES:

To enable the students to practically understand the mechanisms of loom and knitting machines

LIST OF EXPERIMENTS

1. Analysis of Yarn faults
2. Control of production, package density, yarn faults in cone / cheese winding machine
3. Determination of depth of shed and heald shaft movements in tappet shedding mechanism
4. Preparation of pattern card for dobby shedding mechanism and way in which adjust the depth of shed
5. Study of jacquard shedding mechanism
6. Power required to insert the weft through shuttle in over and under picking mechanism
7. Study of picking mechanism in shuttleless loom
8. Control of sley eccentricity and Beat-up force in weaving
9. Study of let-off mechanisms
10. Determination of pick space through 5 and 7 wheel take-up mechanisms
11. Study of weft replenishment mechanism in shuttle looms
12. Method of achieving the required colour patterns in 4 X 1 drop box motion
13. Study of warp protector mechanism
14. Study of plain, rib and interlock circular knitting machines
15. Study of flat knitting machines

TOTAL:60 PERIODS

OUTCOMES:

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

CO1: Test and analyze the yarn faults

CO2: Understand the primary mechanism and its control

CO3: Understand the secondary mechanism and its control

CO4: Understand the auxiliary motion

CO5: Understand the mechanism of knitting machines

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Test and analyze the yarn faults	3	3	2	2	2	2	2	2	3	2	2	1	3	3	3
CO2	Understand the primary mechanism and its control	3	3	2	2	2	2	2	2	3	2	1	2	3	3	3
CO3	Understand the secondary mechanism and its control	3	3	2	2	2	2	2	2	3	2	1	2	3	3	3
CO4	Understand the auxiliary motion	3	3	2	2	2	2	2	2	3	2	2	1	3	3	3
CO5	Understand the mechanism of knitting machines	3	3	2	2	2	2	2	2	3	2	2	2	3	3	3
Overall CO		3	3	2	2	2	2	2	2	3	2	1.6	1.6	3	3	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7512 FIBRE AND YARN QUALITY EVALUATION LABORATORY **L T P C**
0 0 4 2

OBJECTIVES:

To enable the students to practically determine the properties of fibres and yarns

LIST OF EXPERIMENTS

Determination of

1. Fibre fineness
2. Fibre length
3. Fibre maturity
4. Fibre trash content
5. Bundle fibre strength
6. Roving, sliver and yarn linear density
8. Single yarn strength
9. Yarn lea strength
10. Yarn single and ply yarn twist
11. Yarn impact strength
12. Yarn to yarn abrasion
13. Unevenness of yarn
14. Assessment of yarn appearance
15. Testing of synthetic filaments
16. Classification of yarn faults

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Measure fiber characteristic
CO2: Measure the linear density of the strands
CO3: Measure the strength characteristic of yarn
CO4: Measure twist and surface characteristic
CO5: Classification of yarn faults

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Measure fiber characteristic	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO2	Measure the linear density of the strands	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO3	Measure the strength characteristic of yarn	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO4	Measure twist and surface characteristic	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO5	Classification of yarn faults	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
Overall CO		3	1	2	2	2	1	-	1	1	2	2	1	3	2	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7601 CHEMICAL PROCESSING OF TEXTILE MATERIALS II L T P C
3 0 0 3

OBJECTIVE:
To enable the students to understand the theory of dyeing and printing of woven fabrics, knitted fabrics and garments

UNIT I COLOUR SCIENCE 9
Theories of colour measurement, Beer–Lambert's law and Kubelka-Munk theory and their application in colour assessment and colour matching; whiteness and yellowness indices.

UNIT II THEORY OF DYEING 9
Dyeing equilibrium; dye-fibre interaction; adsorption isotherm; dye affinity; heat of dyeing; half r dyeing time.

UNIT III DYEING 13
Basic characteristics of dyes and pigments; classification of dyes and principle of application of dyes; Chemistry and technology of application of direct, reactive, disperse, acid and basic dyes; processing of denims; determination of fastness properties.

UNIT IV PRINTING 9
Methods and styles of printing; printing machines; constituents of printing paste; printing with direct, reactive, acid and disperse dyes; printing with pigments

UNIT V KNITS AND GARMENTS 5
Dimensional stabilization of tubular and open width knits; garment dyeing and printing; garment washing

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students will know about
CO1: Theory of colour
CO2: Theory of dyeing
CO3: Different classes of dyes and method of dyeing
CO4: Methods and styles of printing
CO5: Chemical processing of knits and garments

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1. Shah H.S., and Gandhi R.S., "Instrumental Colour Measurement and Computer Aided Colour Matching for Textiles", Mahajan Book Publication, 1990, ISBN: 8185401004 / ISBN: 9788185401003
2. Choudhury A.K.R., "Modern concepts of colour and Appearance", Oxford and IBH publishing Ltd., 2000, ISBN: 1578080789 | ISBN-13: 9781578080786
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13. Miles W. C., “Textile Printing”, Wood head Publication, 2003, ISBN 0 901956 76 1.
14. Jones B. W., “Garment Dyeing: Ready to Wear Fashion from the Dyehouse”, Textile Progress, Vol. 19, No. 2, 1988, ISBN 1870812131.
15. Roshan Paul (Ed.)., “Denim – Manufacture Finishing and Applications”, Wood head Publishing, 2015, ISBN: 0857098438 | ISBN-13: 9780857098436

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Theory of colour	3	2	2	2	2	1	1	2	2	2	2	1	3	3	3
CO2	Theory of dyeing	3	2	2	2	1	2	2	2	2	2	2	1	3	3	3
CO3	Different classes of dyes and method of dyeing	3	2	2	2	1	2	2	2	2	2	2	1	3	3	3
CO4	Methods and styles of printing	3	2	2	2	2	2	2	2	2	2	2	1	3	3	3
CO5	Chemical processing of knits and garments	3	2	2	2	1	2	2	2	2	2	2	1	3	3	3
Overall CO		3	2	2	2	1.4	1.8	1.8	2	2	2	2	1	3	3	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively.

TT7602 GARMENT MANUFACTURING TECHNOLOGY L T P C
4 0 0 4

OBJECTIVES:

- To enable the students to understand the basics of pattern making, cutting and sewing
- To expose the students to various problems & remedies during garment manufacturing

UNIT I **15**

Anthropometry, mass-production, mass-customization; pattern making, grading

UNIT II **15**

Marker planning, spreading & cutting; Different types of seams and stitches; single needle lock stitch machine - mechanism and accessories; needle – functions, special needles, needle size, numbering, needlepoint; sewing thread-construction, material, thread size, packages

UNIT III **15**

Raw material, in process and final inspection, labels, linings, interlinings, wadding, lace, braid, elastic, hook and loop fastening, shoulder pads, eyelets and laces, zip fasteners, buttons

UNIT IV **15**

Garment pressing - categories and equipment, packing; care labeling of apparels

TOTAL: 60 PERIODS

OUTCOME:

Upon completion of the course, the students will know about

CO1: Anthropometry, pattern making and grading
CO2: Marker planning, spreading, cutting, types of seams and stitches, function of needles
CO3: Components and trims used in garments
CO4: Garment pressing, packing and care labelling

REFERENCES

1. Carr H., and Latham B., “The Technology of Clothing Manufacture”, Blackwell Science Ltd., Oxford, 1994, ISBN: 0632037482.
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3. Peggal H., “The Complete Dress Maker”, Marshall Caverdish, London, 1985.
4. Gerry Cooklin., Steven George Hayes., and John McLoughlin, “Introduction to Clothing Manufacture”, Blackwell Scientific Publications, London, 2006, ISBN: 0632058463 | ISBN-13: 9780632058464.
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6. Ruth E. Glock., and Grace I. Kunz., “Apparel Manufacturing – Sewn Product Analysis” 4th Edition, Upper Sadle River Publications, New York, 2004. ISBN: 0131119826 | ISBN-13: 9780131119826
7. PradipV.Mehta., “An Introduction to Quality Control for the Apparel Industry”, J.S.N. Internationals, 1992, ISBN: B015X4YGIE

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Anthropometry, pattern making and grading	1	1	1	-	2	-	1	1	-	2	3	1	2	3	3
CO2	Marker planning, spreading, cutting, types of seams and stitches, function of needles	2	1	1	1	1	-	1	1	-	2	2	1	2	2	2
CO3	Components and trims used in garments	1	1	1	1	1	1	1	1	1	1	2	1	1	3	3
CO4	Garment pressing, packing and care labelling	2	2	1	1	1	1	1	1	-	2	2	1	2	2	2
Overall CO		1.5	1.2 5	1	0.7 5	1.2 5	0.5	1	1	0.2 5	1.75	2.25	1	1.75	2.5	2.5

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7603 MECHANICS OF TEXTILE MACHINERY L T P C
3 0 0 3

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

UNIT I **5**
Equations of forces, motion and energy; energy stored in rotating masses.

UNIT II **9**
Clutches and brakes – types, application in textile machines; gears, gear trains; power transmission – different modes, advantages and limitations, applications

UNIT III **9**
Differential and variable speed drives – principles, application in textile machines; design of cone drums – piano feed regulation, roving machine builder mechanism; ;

UNIT IV **9**

Friction – calculations; bearings, design of drive transmitting shafts, balancing of rotating masses; principles of pneumatic controls used in textile machinery

UNIT V **13**
Design of winder drums; kinematics of shedding; design of tappets; beat up force, sley eccentricity; power for picking

TOTAL: 45 PERIODS

OUTCOMES
Upon completion of the course students will
CO1: Understand basics of linear and rotary motions
CO2: Have knowledge on clutches and brakes
CO3: Be able to design the cone drums, piano feed regulation and builder mechanisms
CO4: Be able to understand the design aspects of machine elements for specific requirements
CO5: Be able to design cams, tappets and understand kinematics of shedding and picking

REFERENCES

1. Booth J. E., “Textile Mathematics”, Vol. 2&3, The Textile Institute, Manchester, 1975, ISBN-10: 0900739193.
2. Slater K., “Textile Mechanics”, Vol. 1&2, The Textile Institute, Manchester, 1977, ISBN: 0900739274.
3. Rengasamy R. S., “Mechanics of Spinning Machines”, NCUTE, Ministry of Textiles, Govt. of India, 2000

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Understand basics of linear and rotary motions	3	3	3	2	2	1	1	2	1	1	1	2	2	2	1
CO2	Have knowledge on clutches and brakes	2	2	2	1	1	1	1	1	1	1	1	2	2	2	1
CO3	Be able to design the cone drums, piano feed regulation and builder mechanisms	3	3	3	2	2	1	1	2	1	1	1	2	2	2	1
CO4	Be able to understand the design aspects of machine elements for specific requirements	3	3	3	2	2	1	1	2	1	1	1	2	2	2	1
CO5	Be able to design cams, tappets and understand kinematics of shedding and picking	3	3	3	3	3	2	2	3	2	2	2	2	2	2	1
Overall CO		2.8	2.8	2.8	2	2	1.2	1.2	2	1.2	1.2	1.2	2	2	2	1

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7651 FABRIC QUALITY EVALUATION L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about the constructional details of fabrics, evaluation of fabric properties and their importance

UNIT I CONSTRUCTION CHARECTERISTICS 9

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

UNIT II STRENGTH CHARACTERISTICS 9

Tensile strength measurement – ravelled strip test and grab test, mechanical and electronic measuring systems; tear strength – importance, measuring systems; bursting strength and its measurement; ballistic impact strength; Universal tensile tester - principle and operation

UNIT III SURFACE CHARACTERISTICS 9

Fabric stiffness – principle of measurement of flexural rigidity; drapeability – measurement of drape coefficient; crease recovery - measurement techniques; wrinkle recovery assessment using standard grades; principle and functioning of air permeability testers; water repellency, contact angle and fabric shrinkage testing; fabric abrasion resistance – measuring technique; fabric pilling resistance – methods of determination

UNIT IV LOW STRESS AND FUNCTIONAL CHARACTERISTICS 5

Fabric bending hysteresis testing; shear hysteresis measurements; fabric compression and decompression behaviour; fabric surface roughness and friction measurements; fabric tensile hysteresis measurements; fabric flame resistance testing methods; moisture and thermal characteristics

UNIT V FABRIC INSPECTION AND GARMENT QUALITY 13

Fabric inspection – manual, semi-automatic and automatic inspection systems; classification of fabric defects; independent product quality certification, acceptable quality level, MIL standards and final inspection; quality assessment of garments - cutting, sewing, pressing, finishing and packaging defects.

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, students would be able to understand

CO1: Construction characteristics of fabric
CO2: Different measuring principles of strength characteristics of fabric
CO3: Principles, test procedure for surface characteristics of fabrics
CO4: low stress and functional characteristics of fabric
CO5: Fabric inspection and quality assessment of garments

REFERENCES

1. Booth J.E., “Principle of Textile Testing”, Butterworth Publications, London, 1996, ISBN: 8123905157 | ISBN-13: 9788123905150.
2. Seville B.P., “Physical Testing of Textiles”, Textile Institute, Manchester, 1999, ISBN: 1855733676 | ISBN-13: 9781855733671.
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4. Ruth E. Glock., and Grace I. Kunz., “Apparel Manufacturing – Sewn Product Analysis” 4th Edition, Upper Sadle River Publications, New York, 2004.ISBN: 0131119826 | ISBN-13: 9780131119826
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7. Slater K., “Physical Testing and Quality Control”, The Textile Institute, Vol.23, No.1/2/3Manchester, 1993, ISBN: 187081245X | ISBN-13: 9781870812450

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Construction characteristics of fabric	3	2	1	2	2	1	-	2	-	2	2	-	2	3	3
CO2	Different measuring principles of strength characteristics of fabric	3	2	1	3	2	2	-	2	-	2	2	-	2	3	3
CO3	Principles, test procedure for surface characteristics of fabrics	3	3	2	3	2	2	-	1	-	3	3	-	3	3	3
CO4	low stress and functional characteristics of fabric	3	2	1	2	2	2	-	1	-	3	3	-	3	3	3
CO5	Fabric inspection and quality assessment of garments	2	3	2	2	1	1	-	2	-	3	3	-	3	3	3
Overall CO		2.8	2.4	1.4	2.4	1.8	1.6	-	1.6	-	2.6	2.6	-	2.6	3	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

HS7551 **EMPLOYABILITY SKILLS** **L T P C**
3 0 0 3

COURSE DESCRIPTION

This course aims to help the students acquire the employability skills necessary for the workplace situations. It also attempts to meet the expectations of the employers by giving special attention to language skills, presentation skills, group discussion skills and soft skills. This will be achieved through expert guidance and teaching activities focusing on employability skills.

COURSE OBJECTIVES

- To enhance the employability skills of students with a special focus on presentation skills, group discussion skills and interview skills
- To help them improve their reading skills, writing skills, and soft skills necessary for the workplace situations
- To make them employable graduates

CONTENTS

UNIT I READING AND WRITING SKILLS 9

Reading: skimming & scanning strategies – note making skills – interpreting visual material (charts & tables) – critical reading – fast reading necessary for reading letters & files - preparing job applications - writing covering letter and résumé - applying for jobs online - email etiquette – writing official letters (placing an order, letters to consumers, etc.) writing reports – collecting, analyzing and interpreting data

UNIT II SOFT SKILLS 9

Hard skills & soft skills – soft skills: self-management skills & people skills - training in soft skills - persuasive skills – sociability skills –interpersonal skills – team building skills – leadership skills – problem solving skills – adaptability - stress management – motivation techniques – life skills -

UNIT III PRESENTATION SKILLS 9

Preparing slides with animation related to the topic – organizing the material - Introducing oneself to the audience – introducing the topic – answering questions – individual presentation practice—presenting the visuals effectively – 5 minute presentation

UNIT IV GROUP DISCUSSION SKILLS 9

Participating in group discussions – understanding group dynamics - brainstorming the topic -–questioning and clarifying –GD strategies (expressing opinions, accepting or refusing others opinions, turn taking) – activities to improve GD skills – viewing recorded GD - mock GD

UNIT V INTERVIEW SKILLS 9

Interview etiquette – dress code – body language – mock interview -–attending job interviews – answering questions confidently – technical interview
– telephone/Skype interview - practice in different types of questions – one to one interview &panel interview – FAQs related to job interview- Emotional and cultural intelligence.

LEARNING OUTCOMES

At the ends of the course students have to acquire about,

CO1: Good reading and writing skills

CO2: Soft skills for workplace situation

CO3: Good presentation skill

CO4: Group discussion skill

CO5: Interview skill

TOTAL : 45 PERIODS

REFERENCES:

1. Corneilssen, Joep. How to Prepare for Group Discussion and Interview. New Delhi: Tata-McGraw-Hill, 2009.
2. Dabreo, Desmond A. Group Discussion and Team Building. Mumbai: Better Yourself Books, 2004.
3. Ramesh, Gopalswamy, and Mahadevan Ramesh. The ACE of Soft Skills. New Delhi: Pearson, 2010.
4. Gulati, Sarvesh. Corporate Soft Skills. New Delhi: Rupa and Co. 2006.
5. Van Emden, Joan, and Lucinda Becker. Presentation Skills for Students. New York: Palgrave Macmillan, 2004.

EXTENSIVE READING

1. Covey, Stephen R. The 7 Habits of Highly Effective People. New York: Free Press, 2013.
2. Bagchi, Subroto. The Professional. New Delhi: Penguin Books India, 2009.

WEB RESOURCES

1. www.humanresources.about.com
2. www.careerride.com
3. https://bemycareercoach.com/softskills

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Good reading and writing skills	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-
CO2	Soft skills for workplace situation	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-
CO3	Good presentation skill	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-
CO4	Group discussion skill	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-
CO5	Interview skill	-	-	-	-	-	-	-	-	2	2	2	-	-	-	-
Overall CO		-	-	-	-	-	-	-	-	2	2	2	-	-	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7561 TEXTILE CHEMICAL PROCESSING LABORATORY L T P C
0 0 4 2

OBJECTIVE:
To train the students in pre-treatment, dyeing, printing and testing of textile materials

LIST OF EXPERIMENTS
1. Desizing and scouring of fabric.
2. Peroxide Bleaching of Cotton Yarn/Fabric.
3. Degumming of silk.
4. Identification of dyes.
5. Dyeing of Cotton using Reactive dyes
6. Dyeing of Cotton using Vat dye
7. Dyeing of polyester using disperse dyes.
8. Dyeing of polyester and cotton blend.
9. Determination of wash, light, perspiration and rubbing fastness of dyed fabrics
10. Printing of cotton fabric by direct technique.
11. Determination of Whiteness and Yellowness index.
12. Determination of K/S of dyed fabrics using Spectrophotometer.
13. Water proof and Flame retardant finishing of cotton
14. Resin and softener finishes.
15. Antimicrobial Finish Evaluation

TOTAL:60 PERIODS

OUTCOME:
Upon completing this practical course, the student would be able to
CO1: Desize, scour, bleach, dye, print and finish the fabric with different types of chemicals and colourants
CO2: Evaluate the fabric for fastness and chemical process related properties

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO3**
CO1	Desize, scour, bleach, dye, print and finish the fabric with different types of chemicals and colourants	2	1	2	3	1	2	2	2	2	1	2	-	3	2	2
CO2	Evaluate the fabric for fastness and chemical process related properties	2	1	2	2	2	1	1	1	1	2	1	-	3	2	2
Overall CO		2	1	2	2.5	1.5	1.5	1.5	1.5	1.5	1.5	1.5	-	3	2	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7661 FABRIC QUALITY EVALUATION LABORATORY L T P C
0 0 2 1

OBJECTIVE: (merged)

To make the students practically learn the various fabric evaluation procedures to determine the characteristics of fabric

LIST OF EXPERIMENTS

Determination of

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

TOTAL:30 PERIODS

OUTCOMES:

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

CO1: Fabric mechanical property
CO2: Fabric aesthetic property
CO3: Fabric surface characteristics
CO4: Fabric low stress property
CO5: Seam strength and seam slippage

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Fabric mechanical property	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO2	Fabric aesthetic property	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO3	Fabric surface characteristics	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO4	Fabric low stress property	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO5	Seam strength and seam slippage	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
Overall CO		3	1	2	2	2	1	-	1	1	2	2	1	3	2	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7701 STRUCTURAL MECHANICS OF YARNS AND FABRICS L T P C
3 0 0 3

OBJECTIVE:
To enable the students to understand the

- Fundamentals of the yarn structure, measures of structural parameters and factors influencing them
- Geometry of woven, knitted and nonwoven fabrics and understand the deformation of fabric under stress

UNIT I GEOMETRY OF TWISTED YARNS 9
Idealized helical yarn structure; relationship between yarn parameters twist contraction; idealized packing; measurement of packing density and radial packing density of yarn; ; .

UNIT II FIBRE MIGRATION 5
Ideal migration, tracer fibre technique, characterization of migration behaviour, mechanisms of migration, effect of various parameters on migration behaviour.

UNIT III MECHANICS OF CONTINUOUS FILAMENT AND STAPLE YARNS 9
Analysis of tensile behaviour of yarn – fibre strain and modulus; prediction of breakage;;; Analysis of tensile behaviour of spun yarn- deduction based on fibre obliquity and slippage; influence of fibre length, fineness and friction on tensile behaviour; strength prediction model for blended yarns

UNIT IV GEOMETRY OF FABRIC STRUCTURE 13
Geometry of Plain weaves; Peirce and Olofsson models; Jamming of threads; Balance of crimp; geometry of knitted structures; structure of felts and stitch bonded fabrics

UNIT V FABRIC DEFORMATION 9
Fabric deformation under tensile stress; prediction of modulus; other fabric deformation – compression, shear, bending and buckling; ; load-extension of warp knit fabrics; mechanical behaviour of needle felts

TOTAL:45 PERIODS

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

CO1. Explain the Ideal helical model of yarn, different structural parameters and measurement of packing density of yarn
CO2. Understand migration behavior of fibers and method of measuring migration of fibres in yarn
CO3. Understand the tensile behaviour of filament and spun yarns
CO4. Understand the models proposed for geometry of fabrics
CO5. Behaviour of fabric under deformation

REFERENCES

1. Hearle J. W. S., “Structural Mechanics of Fibers, Yarns and Fabrics”, Wiley-Interscience, New York, 1969, ISBN: 0471366692.
2. Hearle J. W. S., John J., Thwaites and Jafargholi Amirbayat., “Mechanics of FlexibleFibre Assemblies”, Sijthoff and Noordhoff, 1980, ISBN : 902860720X.
3. Jinlian Hu., “Structure and Mechanics of Woven Fabrics”, Woodhead Publishing Ltd.,2004, ISBN: 1855739046.
4. Hassan M. Berery., “Effect of Mechanical and Physical Properties on Fabrics Hand”, Wood head publishing Ltd., 2005, ISBN : 13: 978 – 1- 85573 -9185
5. Goswami B.C., “Textile Yarns”, John Wiley & Sons, New York, 1987.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Explain the Ideal helical model of yarn, different structural parameters and measurement of packing density of yarn	3	3	2	2	1	1	-	2	2	3	1	1	1	2	1
CO2	Understand migration behavior of fibers and method of measuring migration of fibres in yarn	3	3	2	2	2	1	-	1	1	2	1	1	1	2	1
CO3	Understand the tensile behaviour of filament and spun yarns	2	3	2	2	1	1	-	2	1	2	1	1	1	2	1
CO4	Understand the models proposed for geometry of fabrics	2	3	2	2	1	1	-	1	2	2	1	1	1	2	1
CO5	Behaviour of fabric under deformation	2	3	2	2	1	1	-	1	2	2	1	1	1	2	1
Overall CO		2.4	3	2	2	1.2	1	-	1.4	1.6	2.2	1	1	1	2	1

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7652 FINANCIAL MANAGEMENT FOR TEXTILE AND APPAREL INDUSTRIES **L T P C**
3 0 0 3

OBJECTIVES:

To enable the students to understand

- Basics of financial management that are required for the textile industry
- Determination of cost of yarn, fabric and garment

UNIT I **18**

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

UNIT II **9**

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

UNIT III **5**

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

UNIT IV **13**

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

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Understand the concept of costing, preparation of cost sheet and determine the cost of yarn, fabrics and garments

CO2: Carryout investment appraisal and calculate depreciation

CO3: Understand different sources and cost of capital and management of working capital and management of working capital

CO4: Analyze and interpret the financial statements of textile company

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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Understand types and methods of costing, and preparation of cost sheet	-	-	3	-	2	1	-	2	2	2	2	1	-	2	-
CO2	Determine the cost of yarn, fabrics and garments	-	-	3	-	2	1	-	2	2	2	2	1	-	2	-
CO3	Carryout investment appraisal and calculate depreciation	-	-	2	-	3	1	-	2	2	2	3	1	-	2	-
CO4	Analyze and interpret the financial statements of textile company	-	-	2	-	3	1	-	2	2	2	3	1	-	2	-
Overall CO		-	-	2.5	-	2.5	1	-	2	2	2	2.5	1	-	2	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7711	INDUSTRIAL TRAINING	L T P C
		0 0 0 3

OBJECTIVE:

To train the students in the field work so as to have a firsthand knowledge of practical problems related to textile technology in carrying out engineering tasks.

SYLLABUS:

The students individually undertake training in reputed textile industries during the summer vacation for a specified duration of four weeks. At the end of training, a detailed report on the work done should be submitted within ten days from the commencement of the semester. The students will be evaluated through a viva-voce examination by a team of internal staff.

OUTCOME:

On completion of the course, the student is expected to be able to

CO1: Acquire Oral presentation skills in Textile field
CO2: Acquire Technical report writing abilities
CO3: Document various material, machine and process parameters
CO4: Analyze industry problems and their solutions
CO5: Understand organizational flow structure .

Course Articulation Matrix

Course Outcomes	Statement	Program Outcome														
		PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO 11	PO 12	PSO1	PSO 2	PSO3
CO1	Acquire Oral presentation skills in Textile field	3	2	2	3	3	2	2	2	3	3	2	3	3	2	1
CO2	Acquire Technical report writing abilities	3	2	3	3	3	1	2	2	3	3	2	2	3	2	2
CO3	Document various material, machine and process parameters	3	2	3	3	2	3	3	3	3	2	3	3	3	3	3
CO4	Analyze industry problems and their solutions	3	2	3	3	1	3	3	3	3	2	3	3	3	3	3
CO5	Understand organizational flow structure	3	2	2	2	1	1	2	2	3	2	3	2	2	2	1
Overall CO		3	2	2.6	2.8	2	2	2.4	2.4	3	2.4	2.6	2.6	2.8	2.4	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7712	TECHNICAL SEMINAR	LT P C 0 0 0 2

OBJECTIVE:

To work on a specific technical topic in textile technology to acquire the skills of oral presentation and to acquire technical writing abilities for seminars and conferences.

SYLLABUS:

The students will work for two hours per week guided by a group of staff members. They will be asked to talk on any topic of their choice related to textile technology and to engage in dialogue with the audience. A brief copy of their talk also should be submitted. Similarly, the students will have to present a seminar of not less than fifteen minutes and not more than thirty minutes on the technical topic. They will also answer the queries on the topic. The students as audience also should interact. Evaluation will be based on the technical presentation and the report and also on the interaction during the seminar.

OUTCOME:

On completion of the course, the student is expected to be able to acquire/understand

CO1: Oral presentation skills

CO2: Technical report writing abilities

CO3: Industry related problems and their potential solutions

CO4: Sustainable solutions for textile industry

CO5: Leadership qualities

Course Articulation Matrix

Course Outcomes	Statement	Program Outcome														
		PO1	**PO2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO 10**	**PO 11**	**PO 12**	**PS O1**	**PS O2**	**PSO 3**
CO1	Oral presentation skills	3	2	2	3	3	2	2	2	3	3	2	3	3	-	1
CO2	Technical report writing abilities	3	2	3	3	3	1	2	2	3	3	2	2	3	-	2
CO3	Industry related problems and their potential solutions	3	2	3	3	2	3	3	3	3	2	3	3	3	-	3
CO4	Sustainable solutions for textile industry	3	2	3	3	1	3	3	3	3	2	3	3	3	-	3
CO5	Leadership qualities	3	2	2	2	1	1	2	2	3	2	3	2	2	-	1
Overall CO		3	2	2.6	2.8	2	2	2.4	2.4	3	2.4	2.6	2.6	2.8	-	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7811 **PROJECT** **L T P C**
0 0 20 10

OBJECTIVES:

• To solve the identified problem based on the formulated methodology.

• To develop skills to analyze and discuss the test results, and make conclusions.

SYLLABUS:

The student should continue the phase I work on the selected topic as per the formulated methodology. At the end of the semester, after completing the work to the satisfaction of the supervisor and review committee, a detailed report should be prepared and submitted to the head of the department. The students will be evaluated through based on the report and the viva-voce examination by a panel of examiners including one external examiner.

TOTAL: 300 PERIODS

OUTCOME:

At the end of the course, the students will carryout project work in the area of

CO1: Spinning and weaving
CO2: Fibre science and processing
CO3: Knitting and Nonwovens
CO4: Nanotechnology application in textiles
CO5: Textile structural composites

Course Articulation Matrix

Course Outcomes	Statement	Program Outcome														
		PO1	PO2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PS O1	PS O2	PSO 3
CO1	Spinning and weaving	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3
CO2	Fibre science and processing	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3
CO3	Knitting and Nonwovens	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3
CO4	Nanotechnology application in textiles	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3
CO5	Textile structural composites	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3
Overall CO		3	3	3	3	1	1	1	2	2	2	2	1	3	2	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT 7008 **TECHNICAL TEXTILES** **L T P C**
3 0 0 3

OBJECTIVES:
To enable the students understand the characteristics of textile materials and their selection for different applications viz., transport, sports, medical, protective and geo applications.

UNIT I **9**
Design and characteristics required in textiles for transport applications; applications of textile reinforced composites in transport sector; quality requirement of yarns used in fishing industry like nets, ropes; conveyor belts, power transmission belts.

UNIT II **9**
Design and characteristics required in textiles for medical and hygiene applications; antimicrobial, disposable and reusable products; textiles in sports wear

UNIT III **13**
Garment design and choice of materials in protection from hazards due to mechanical, extreme climate, nuclear, biological, chemical and flame

UNIT IV **14**
Use of geo textiles in filtration, drainage, separation and reinforcement application in construction; type of fibre and fabric to be used in such applications; evaluation of geo textiles; use of textile materials in permanent and temporary civil construction - tents, awnings, sound and thermal insulation; textile abrasives; textiles for aerosol filtration

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students shall be able to understand the textile materials required for

CO1: Transport applications
CO2: Medical and hygiene applications
CO3: Protective clothing
CO4: Geotextiles and filtration

REFERENCES

1. Anand S.C., “Medical Textiles”, Textile Institute, Manchester, 2001, ISBN: 185573494X.
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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Transport applications	1	2	3	3	-	2	2	2	1	2	3	3	2	3	3
CO2	Medical and hygiene applications	2	1	3	3	-	2	2	2	1	2	3	3	2	3	3
CO3	Protective clothing	1	1	3	3	-	3	2	2	1	2	3	3	2	3	3
CO4	Geotextiles and filtration	2	1	3	3	-	3	2	2	1	2	3	3	2	3	3
Overall CO		1.5	1.25	3	3	-	2.5	2	2	1	2	3	3	2	3	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7071 **CLOTHING COMFORT** **L T P C**
3 0 0 3

OBJECTIVES:

To enable the students to learn about the

- Important characteristics of the fabric responsible for its comfort properties and
- Different phenomena which take place in the fabric related to the comfort properties of the fabric

UNIT I **9**

Comfort – types and definition; human clothing system, comfort perception and preferences

UNIT II **9**

Psychological comfort; neuro-physiological comfort-basis of sensory perceptions; measurement techniques - mechanical stimuli and thermal stimuli

UNIT III **9**

Thermo physiological comfort – thermoregulatory mechanisms of the human body, role of clothing on thermal regulations

UNIT IV **9**

Heat and moisture transfer – moisture exchange, wearer's temperature regulations, effect of physical properties of fibres, behaviour of different types of fabrics

UNIT V **9**

Fabric tactile and mechanical properties - fabric prickliness, itchiness, stiffness, softness, smoothness, roughness, and scratchiness; predictability of clothing comfort performance

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Criteria for comfort of fabrics
CO2: Psychological and physiological comfort with respect to clothing
CO3: Thermo physiological comfort requirements of human and the role of clothing
CO4: The behavior of different fabric in relation to heat and moisture transfer
CO5: The low stress mechanical properties of fabric with respect to comfort to the wearer

REFERENCES

1. Hassan M. Behery., "Effect of Mechanical and Physical Properties on Fabric Hand", Wood head Publishing Ltd.,2005, ISBN: 1855739186 | ISBN-13: 9781855739185
2. Li Y., "The Science of Clothing Comfort", Textile Progress 31:1-2, Taylor and Francis, UK, 2001, ISBN: 1870372247 | ISBN-13: 9781870372244
3. Laing R.M., and Sleivert G.G., "Clothing, Textile and Human Performance" Textile Progress 32:2, The Textile Institute, 2002, ISBN: 1870372514 | ISBN-13: 9781870372510.
4. Apurba Das.,and Alagirusamy R., "Science in clothing comfort", Wood head Publishing India Pvt. Ltd., India, 2010, ISBN: 1845697898 | ISBN-13: 9781845697891
5. Guowen Song., "Improving comfort in clothing", Wood head Publishing Ltd., UK, 2011, ISBN: 1845695399 | ISBN-13: 9781845695392
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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Criteria for comfort of fabrics	1	2	2	2	1	1	1	1	1	1	1	1	1	2	2
CO2	Psychological and physiological comfort with respect to clothing	2	2	2	3	1	2	2	1	1	2	1	1	3	3	3
CO3	Thermo physiological comfort requirements of human and the role of clothing	2	3	3	3	2	3	3	1	1	2	1	1	3	3	3
CO4	The behavior of different fabric in relation to heat and moisture transfer	2	2	3	3	2	2	3	1	1	2	1	1	2	3	3
CO5	The low stress mechanical properties of fabric with respect to comfort to the wearer	2	3	3	3	2	2	2	1	1	2	1	1	2	2	2
Overall CO		1.8	2.4	2.6	2.8	1.6	2	2.2	1	1	1.8	1	1	2.2	2.6	2.6

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT 7073 OPERATIONS RESEARCH FOR TEXTILE INDUSTRY L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Various operations research (OR) methods that can be applied in the textile industry
- Expressing of problems arising in the textile industry in appropriate Operations Research formats
- Methods of solving such Operations Research problems

UNIT I **9**

Introduction – History of Operations Research, Scope of Operation Research, applications and limitations; The linear programming problem – construction, solution by graphical method, the Simplex method and its extension by the Big M method; Sensitivity analysis; Application of the LP technique in the field of Textile technology.

UNIT II **9**

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

UNIT III **9**

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

UNIT IV **9**

Decisions theory - decisions under assumed certainty, decision under risk, decision under uncertainty, illustrations from textile industry; simulation-theory, models, queuing system; inventory control - EOQ models-deterministic models –probabilistic models;

UNIT V **9**

Project planning and control models: CPM, PERT – network representation, determining critical path, project duration; crashing of project duration; resource levelling

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Design Operations Research problems from the cases arising in the Textile Industry and determine solution for linear programming problems
CO2: Construct and solve transportation problems and carryout replacement analysis
CO3: Construct and solve assignment, sequencing and integer program problems
CO4: Understand decision making under different condition and inventory control
CO5: Construct and solve project scheduling by PERT and CPM techniques and resource levelling

REFERENCES

1. Frederick S. Hillier., Gerald J. Lieberman., Frederick Hillier., and Gerald Lieberman., "Introduction to Operations Research", McGraw-Hill International Edition, 8th Edition, 2004, ISBN: 0073017795 / ISBN: 978-0073017792
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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Design Operations Research problems from the cases arising in the Textile Industry and determine solution for linear programming problems	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
CO2	Construct and solve transportation problems and carryout replacement analysis	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
CO3	Construct and solve assignment, sequencing and integer program problems	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
CO4	Understand decision making under different condition and inventory control	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
CO5	Construct and solve project scheduling by PERT and CPM techniques and resource levelling	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
Overall CO		-	-	2	-	3	-	-	1	2	1	2	-	-	1	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7076 TOTAL QUALITY MANAGEMENT FOR TEXTILE INDUSTRY L T P C
3 0 0 3

OBJECTIVES:

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

UNIT I INTRODUCTION 9

Introduction - Need for quality - Evolution of quality - Definition of quality - Dimensions of product and service quality - Basic concepts of TQM – TQM Framework - Contributions of Quality Gurus – Barriers to TQM – Cost of Quality.

UNIT II TQM PRINCIPLES 9

Quality statements - Customer focus –Customer orientation, Customer satisfaction, Customer complaints, Customer retention - Continuous process improvement – PDCA cycle, 5S, Kaizen- Supplier partnership – Partnering, Supplier selection, Supplier Rating.

UNIT III TQM TOOLS & TECHNIQUES I 13

The seven traditional tools of quality – New management tools – Six-sigma: Concepts, methodology, applications to spinning, weaving, chemical processing and garment industries– Bench marking – Reason to bench mark, Bench marking process – FMEA – Stages, Types; Quality circles – Quality Function Deployment (QFD) – Taguchi quality loss function – TPM – Concepts, improvement needs – Performance measures – BPR; application of TQM tools in textile industry

UNIT IV LEAN MANUFACTURING, QUALITY SYSTEMS 14

Need for ISO 9000-ISO 9000-2000 Quality System – Elements, Documentation, Quality auditing; OHSAS 18000, ISO 14000 – Concepts, Requirements and Benefits - Quality Council – Leadership, Employee involvement – Motivation, Empowerment, Team and Teamwork, Recognition and Reward; Lean manufacturing – overview, principle, fundamental lean tools; Waste – definition, types; waste management in apparel industry- identification and control; inventory control; Kanban flow; flexible manufacturing concept

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Understand the concept of quality
CO2: Understand the principles of TQM and its application in textile industry
CO3: Apply innovative tools to implement TQM in textile industry
CO4: Understand lean manufacturing and quality system in textile industry

REFERENCE BOOKS

1. Dale H.Besterfiled., “Total Quality Management”, Pearson Education Asia, Third Edition, Indian Reprint, 2006, ISBN: 0130306517 | ISBN-13: 9780130306517
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7. Bruce A. Henderson and Jorge L. Larco, “Lean Transformation”, The Oaklea Press, 1999
8. Don Topping, Tom Luyster, and Tom Shuker, “Value Stream Management”, Productivity Press, 2002

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Understand the concept of quality	1	2	2	-	2	1	1	2	2	2	2	2	2	2	-
CO2	Understand the principles of TQM and its application in textile industry	1	2	2	-	2	1	1	2	2	2	2	2	2	2	-
CO3	Apply innovative tools to implement TQM in textile industry	1	3	2	-	2	1	1	2	2	3	2	2	2	2	-
CO4	Understand lean manufacturing and quality system in textile industry	2	2	2	-	2	1	2	2	3	3	3	2	2	2	-
Overall CO		1.25	2.25	2	-	2	1	1.25	2	1.8	2.5	2.25	2	2	2	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7002 CHARACTERISATION OF POLYMERS L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Molecular structure of the fibres and
- Characterization of fibres for physical and chemical properties.

UNIT I MOLECULAR WEIGHT 9

Polymer solution thermo dynamics; molecular weight and molecular dimensions by end group analysis, osmometry, light scattering, viscometry, gel permeation chromatography,

UNIT II MOLECULAR STRUCTURE 9

Infrared, NMR, UV–visible Raman and mass spectroscopy

UNIT III THERMAL PROPERTIES 9

Thermal properties by differential scanning calorimetry, differential thermal analysis, thermo gravimetry, thermo-mechanical analyzer, dynamic mechanical and di-electric analysis

UNIT IV CHROMATOGRAPHIC TECHNIQUES 9

Chromatographic techniques – adsorption chromatorgraphy – TLC, GC, LC – HPLC, GPC – hyphenated techniques

UNIT V OTHERMETHODS 9

Optical and electron microscopy; SEM, TEM, X-ray scattering from polymers, birefringence, crystallinity by density measurements,

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student will be able to understand

CO1. Molecular weight of the polymers and its measurement
CO2. Molecular structure of the polymers
CO3. Measurement and analysis of thermal properties of different polymers
CO4. Characterization of textile polymers using chromatographic techniques
CO5: Characterization of textile polymers for morphology, crystallinity

REFERENCES

1. Gupta V.B., and Kothari V.K., “Man Made Fibre Production”, Chapman and Hall, 1985.
2. Bill Mayer., “Textbooks of Polymer Science”, 3rd ed., Wiley India Private Limited, 2007, ISBN: 8126511109 | ISBN-13: 9788126511105
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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Molecular weight of the polymers and its measurement	2	-	-	2	-	1	1	2	1	2	1	1	3	1	1
CO2	Molecular structure of the polymers	1	-	-	2	-	1	1	2	1	2	1	1	3	1	1
CO3	Measurement and analysis of thermal properties of different polymers	1	-	-	2	-	1	1	2	1	2	1	1	3	1	1
CO4	Characterization of textile polymers using chromatographic techniques	2	-	-	2	-	1	1	2	1	3	1	2	3	1	1
CO5	Characterization of textile polymers for morphology, crystallinity	2	-	-	2	-	1	1	2	1	3	1	1	3	1	1
Overall CO		1.6	-	-	2	-	1	1	2	1	2.4	1	1.2	3	1	1

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7003 **COATED TEXTILES** **L T P C**
3 0 0 3

OBJECTIVES:
To enable the students to understand need for coating of textiles, different methods of coating of textile fabrics

UNIT I **9**
Rubber-Natural and Synthetic, polyvinyl Chloride, polyurethanes, acrylic polymers; adhesive treatment, radiation-cured coatings; materials and trends; textile fibres-spinning, woven fabrics, knitted fabrics, nonwoven fabrics

UNIT II **9**
Rheological behaviour of fluids; rheology of plastisols; hydrodynamic analysis of coating; clothing comfort, impermeable coating, breathable fabrics

UNIT III **9**
Coating features, methods of coating- knife coating, roll coating, dip coating, transfer coating, rotary screen printing, calendaring, hot-melt coating; general characteristics- tensile strength, elongation, adhesion, tear resistance, weathering behaviour, microbiological degradation, yellowing

UNIT IV **9**
Synthetic leather, architectural textiles, fluid containers, tarpaulins, automotive air bag fabrics, carpet backing; textile foam laminates for automotive interiors; flocking fabrics for chemical protection; thermochromic fabrics, temperature adaptable fabrics, camouflage nets metal and conducting polymer, coated fabrics

UNIT V **9**
Test methods for coated fabric evaluation; environmental norms for the chemicals used in coating industry.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students would be able to understand
CO1: Polymers used for coating
CO2: Rheology of coated polymers
CO3: Methods of coating of textiles
CO4: Application of coated fabrics
CO5: Testing of coated fabrics

REFERENCES

1. Fung. W., “Coated and Laminated Textiles”., Wood head Publishing Limited., Cambridge., 2002., ISBN: 1 85573 576 8
2. Ghosh. S. K., “Functional Coatings”., Wiley-VCH Verlag, GmbH & Co. KGaA, Weinheim, 2006, ISBN:3-527-31296-X
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4. Ashish Kumar Sen., “Coated Textiles: Principles and Application”, TechnomicPublication,U.S.A.,2007, ISBN: 1420053450 | ISBN-13: 9781420053456
5. Mary Jo Waters., “Laboratory Methods for Evaluating Protective Clothing System Against Chemical Agents”, Report no. CRDC-SP 84010, CRDC, Aberdeen Proving Ground, MD, U.S.A, 1984

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Polymers used for coating	2	1	2	2	-	2	2	2	1	2	2	2	2	2	3
CO2	Rheology of coated polymers	2	2	2	2	-	1	1	1	1	2	2	2	2	2	3
CO3	Methods of coating of textiles	2	2	2	2	-	2	2	2	1	2	2	2	2	2	3
CO4	Application of coated fabrics	1	1	1	1	-	1	1	1	1	1	1	1	2	2	3
CO5	Testing of coated fabrics	2	1	2	2	-	1	1	1	1	2	2	2	2	2	3
Overall CO		1.8	1.4	1.8	1.8	-	1.4	1.4	1.4	1	1.8	1.8	1.8	2	2	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7007 **MEDICAL TEXTILES** **L T P C**
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Different types of biomaterials and
- Biomedical application of different textile structures

UNIT I **13**

Metals, ceramics, polymers used for bio medical applications – manufacture, features and limitations; cell- biomaterial interaction

UNIT II **9**

Non-implantable materials: Wound dressing- requirements of wound dressing, types, properties and applications; bandages - types, evaluation and applications

UNIT III **9**

Implantable biomedical devices: vascular grafts, sutures - types, properties and applications; extra-corporeal materials; scaffolds for tissue engineering

UNIT IV **9**

Healthcare and hygiene products: surgical gowns, masks, respirators, wipes, antibacterial textiles, super absorbent polymers

UNIT V **5**

Safety, Legal and ethical issues involved in using medical textile materials

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall know about

CO1: Different types of materials used for biomedical applications

CO2: Functional requirements, types and evaluation of wound dressings and bandages

CO3: Functional requirements and characterization of vascular grafts, sutures and scaffolds for tissue engineering applications

CO4: Textile material used for hygiene and health care applications

CO5: Standards for testing, safety and ethical issues related to medical textiles

REFERENCES

1. Allison Mathews., and Martin Hardingham., “Medical and Hygiene Textile Production - A Hand Book”, Intermediate Technology Publications, 1994, ISBN: 1853392111 | ISBN-13: 9781853392115
2. Anand S.C., Kennedy J.F.,Miraftab M., and Rajendran S., “Medical Textiles and Biomaterials for Health Care”, Wood head Publishing Ltd., 2006, ISBN: 0849317800 | ISBN-13: 9780849317804
3. Joon B. Park., and Joseph D. Bronzino., “Biomaterials – Principles and Applications”, CRC Press, Boca Raton London, New York, Washington, D.C. 2002, ISBN: 0849314917 | ISBN-13: 9780849314919
4. Anand S., “ Medical Textiles”, Textile Institute, 1996, ISBN: 185573317X
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7. Michael Szycher., and Steven James Lee., “Modern Wound Dressing: A Systematic Approach to Wound Healing”, Journal of Biomaterials Application

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Different types of materials used for biomedical applications	-	-	3	3	-	2	2	3	1	2	2	3	-	2	3
CO2	Functional requirements, types and evaluation of wound dressings and bandages	2	-	3	3	-	2	3	2	1	1	1	3	2	2	3
CO3	Functional requirements and characterization of vascular grafts, sutures and scaffolds for tissue engineering applications	-	-	2	3	-	2	2	2	-	1	1	3	-	2	1
CO4	Textile material used for hygiene and health care applications	2	-	3	3	-	3	3	3	1	1	2	3	2	2	3
CO5	Standards for testing, safety and ethical issues related to medical textiles	-	-	3	1	-	3	2	3	1	2	2	1	-	2	2
Overall CO		0.8	-	2.8	2.6	-	2.4	2.4	2.6	0.8	1.4	1.6	2.6	0.8	2	2.4

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7009 **TEXTILE COSTING** **L T P C**
3 0 0 3

OBJECTIVES:
To enable the students to learn about preparation of cost sheet, costing of yarn, fabric and garments

UNIT I **9**
Cost accounting, elements of cost, classification of cost elements – examples from textile industry, methods of costing; cost sheet preparation

UNIT II **4**

Cost profit volume analysis, breakeven analysis; standard costing, analysis of variance

UNIT III **18**
Costing of yarn – material, labour, power and overhead expenses, allocation of overhead costs; costing of fabric; costing of garment

UNIT IV **9**
Foreign exchange mechanisms, exchange rates; foreign exchange exposure management –risks, strategies to reduce risk; working capital management

UNIT V **5**
Budget, types of budgets, budgeting and control in textile industry

TOTAL: 45 PERIODS

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

CO1 Understand fundamentals of costing and construct cost sheet
CO2 Understand the concepts of cost profit volume and even break analysis and method of standard costing
CO3 Determine cost of yarn, fabric and garment
CO4 Understand the foreign exchange mechanism and management of working capital
CO5 Understand the concepts of preparation of budget

REFERENCES

1. Bhave B.V., and Srinivasan v., “Cost accounting to textile mills”, ATIRA, Ahmadabad, 1974.
2. Kantwala D.N., “Costing and Cost Control – A Marginal Approach for Textile Industry”, Texcons, Bombay, 1977.
3. James C., and Van Home., “Financial Management and Policy”, Prentice Hall of India Pvt.Ltd, New Delhi, 2001, ISBN: 0130326577 | ISBN-13: 9780130326577.
4. Thukaram Rao M.E., “Cost and Management Accounting” New Age International, Bangalore, 2004, ISBN: 812241513X / ISBN: 978-8122415131.
5. Thukaram Rao M.E., “Cost Accounting and Financial Management” New Age International, Bangalore, 2004, ISBN: 8122415148/ ISBN: 978-8122415148.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Understand fundamentals of costing and construct cost sheet	-	-	1	-	2	1	-	2	2	-	2	-	-	2	-
CO2	Understand the concepts of cost profit volume and even break analysis and method of standard costing	-	-	1	-	2	1	-	2	2	-	2	-	-	2	-
CO3	Determine cost of yarn, fabric and garment	-	-	1	-	3	1	-	2	2	-	2	-	-	2	-
CO4	Understand the foreign exchange mechanism and management of working capital	-	-	1	-	2	2	-	2	2	-	2	2	-	2	-
CO5	Understand the concepts of preparation of budget	-	-	1	-	2	-	-	2	2	-	2	-	-	2	-
Overall CO		-	-	1	-	2.2	1	-	2	2	-	2	0.4	-	2	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT 7010 TEXTILE REINFORCED COMPOSITES L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Reinforcements, matrices used for the composites
- Technique for making composites
- Manufacture and testing of composites and
- Application of composites

UNIT I INTRODUCTION 9

Fibre reinforced polymers materials, properties; resins - thermoset and thermo plastics, additives release agents; composite material classification and its properties; reinforcement – matrix interface wettability

UNIT II PREPREGS AND PREFORMS 9

Introduction; manufacturing techniques, property requirements; textile preforms - weaving, knitting and braiding; geometrical aspects- fibre orientation, volume fraction, weight fraction and voids.

UNIT III TECHNIQUES FOR MANUFACTURE OF COMPOSITES 13

Introduction, manufacturing processes – open mould process, closed mould process and continuous process; metal matrix composites, ceramic matrix composites – types, importance and processing

UNIT IV MECHANICAL PROPERTIES OF TEXTILE COMPOSITES 9

Testing of reinforced plastics – tensile, flexural, impact, interlaminar shear and compression properties

UNIT V APPLICATION OF POLYMER COMPOSITES 5

Composites - application in aerospace, construction industry, and sports products; electrical, polymer composite for biomedical and vibration damping

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall

CO1. Understand the basics of composites
CO2. Know about preforms, pre-pegs and their geometrical aspects
CO3. Know different methods of composite making
CO4. Know evaluation of characteristics of composites
CO5. Select different types of composites for different applications

REFERENCES

1. Leonard Hollaway, “Handbook of Polymer Composites for Engineering”, Wood head Publishing limited, 2007.
2. Long A C, “Design and Manufacture of Textile Composites”, Wood head Publishing limited, 2005.
3. White J R, and De S K, “Short Fiber-Polymer Composites”, Wood head Publishing limited, 1996.
4. George Lubin, “Handbook of Fiberglass and Advanced Plastics Composites”, VanNostrand Reinhold Company, New York, 1969

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Understand the basics of composites	1	2	3	3	1	2	1	1	1	3	1	2	1	2	2
CO2	Know about preforms,pre-pegs and their geometrical aspects	1	3	3	3	1	2	1	1	1	3	1	2	1	2	2
CO3	Know different methods of composite making	1	2	3	3	1	2	1	1	1	3	1	2	1	2	2
CO4	Know evaluation of characteristics of composites	1	3	3	3	1	2	`1	1	1	3	1	2	1	2	2
CO5	Select different types of composites for different applications	1	2	3	3	1	2	1	1	1	3	1	2	1	2	2
Overall CO		1	2.4	3	3	1	2	1	1	1	3	1	2	1	2	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7072 **COLOUR SCIENCE** **L T P C**
3 0 0 3

OBJECTIVES:
To enable the students to understand the theory of colour and measurement of colour

UNIT I LIGHT-MATTER INTERACTION 9
Electromagnetic spectrum – the optical region, interaction of light with matter a) Transparent case – Beer's Law and Lambert's Law b) Opaque case – reflection absorption and scattering, the concept of "Radiative Transfer Theory" and its simplification into the Kubelka – Munk model

UNIT II HUMAN COLOUR VISION 9
Colour sensation – physiological and psychological mechanism of colour vision; colour vision theories; defects in colour vision; colour vision tests; additive and subtractive colour mixing, and confusion in colour perception

UNIT III COLOUR ORDER SYSTEMS 9
Description of colour, various colour order systems, CIE numerical system for colour definition and its components – illuminants, the versions of the standard observer, the colour scales, chromaticity diagram.

UNITIV NUMERICAL COLOUR MATCHING 9
Reflectance and K/S value, relationship between dye concentrations and a) reflectance values and b) K/S values, reflectance and K/S curves of dyed samples; CIE model for computer colour matching and the calculation of colour recipes; non CIE models for colour matching, limitations of computer colour matching

UNIT V METAMERISM AND COLOUR DIFFERENCE ASSESSMENT 9
Metamerism – types and its assessment, metamerism in textile materials; colour differences – visual assessment, standard conditions, methods and problems, assessment of colour difference, non-linearity of subjective perception of colour, need for specific colour difference systems, setting up of objective pass/fail standards.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students shall be able to understand
CO1: Interaction between light and matter
CO2: Human colour vision
CO3: Colour order systems
CO4: Numerical Colour matching
CO5: Metamerism and colour difference assessment

REFERENCES

1. Wright W.D., "The Measurement of Colour", Adam Hilger Ltd., 1969, ISBN: 0852741340 | ISBN-13: 9780852741344
2. Sule A.D., "Computer Colour Analysis", New Age International Publishers, 2005, ISBN: 8122410847 | ISBN-13: 9788122410846.
3. Shah H.S., and Gandhi R. S., "Instrumental Colour Measurement and Computer Aided Colour Matching for Textiles", Mahajan Book Publication, 1990.ISBN: 8185401004 / ISBN: 9788185401003.
4. Park J., "Instrumental Colour Formulation: A Practical Guide", Wood head Publishing, 1993, ISBN: 0901956546 | ISBN-13: 9780901956545
5. Kuehni R.G., "Computer Colorant Formulation", Lexington Books, 1976, ISBN: 0669033359 | ISBN-13: 9780669033359

6. ChoudhuryA. K. R., “Modern Concepts of Colour and Appearance”, Oxford and IBH Publishing Ltd., 2000,ISBN: 1578080797 | ISBN-13: 9781578080793
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8. Travis D., “Effective Colour Displays”, Academic Press, 1991,ISBN: 0126976902 | ISBN-13: 9780126976908.
9. Gulrajani M. L. (Ed.), “Colour Measurement - Principles, advances and industrial applications", Wood head publishing Ltd, 2010, ISBN: 1845695593 | ISBN-13: 9781845695590

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	**PO 2**	**PO 3**	**PO 4**	**PO 5**	**PO 6**	**PO 7**	**PO 8**	**PO 9**	**PO1 0**	**PO1 1**	**PO1 2**	**PSO 1**	**PSO 2**	**PSO3**
CO1	Interaction between light and matter	2	2	1	2	1	-	-	-	1	1	1	1	2	-	-
CO2	Human colour vision	2	2	1	1	1	1	-	-	-	-	-	1	2	-	-
CO3	Colour order systems	2	3	1	2	1	1	-	-	2	2	2	1	2	-	-
CO4	Numerical Colour matching	3	3	2	3	3	-	-	-	2	2	2	1	2	-	-
CO5	Metamerism and colour difference assessment	2	2	2	2	1	2	-	2	2	2	2	1	2	-	-
Overall CO		2.2	2.4	1.4	2	1.4	0.8	-	0.4	1.4	1.4	1.4	1	2	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7074 SUPPLY CHAIN MANAGEMENT FOR TEXTILE INDUSTRY L T P C
3 0 0 3

OBJECTIVES:

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

UNIT I **9**

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

UNIT II **9**

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

UNIT III **9**

Distribution network and design for global textile and apparel products, models of distribution – facility location and allocation of capacity, uncertainty on design and network optimisation; the role of transportation in supply chain, modes of transportation, characteristics of transportation, transport design options for global textile and apparel network, trade-off in transport design, risk management in transportation, transport decision in practice for textile and apparel industries.

UNIT IV **9**

Coordination in supply chain- the bullwhip effect, forecasting, obstacles to coordination in supply chain; supply chain management for apparel retail stores, high fashion fad; supply chain in e-business and b2b practices

UNIT V **9**

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

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course, the student shall have the

CO1	Knowledge on the basic frame work of supply chain management
CO2	Understanding the economics of demand cycle
CO3	Understanding on the different distribution networks and its relevance with present apparel business conditions
CO4	Understand on coordination of supply chain management
CO5	understand supply chain management with apparel export and import

REFERENCES

1. Janat Shah., "Supply Chain Management – Text and Cases", Pearson Education, 2009, ISBN: 8131715175 | ISBN-13: 9788131715178

2. Peter Meindl., Kalra D. V., Kalra D., and Sunil Chopra “Supply Chain Management-Strategy Planning and Operation”, Pearson Education, 2010, ISBN: 8131730719 | ISBN-13: 9788131730713.
3. David Simchi-Levi., Philip Kaminsky., and Edith Simchi-Levi., “Designing and Managing the Supply Chain: Concepts, Strategies, and Cases”, 3rd Edition, Tata McGraw-Hill, 2012, ISBN: 0073341525 / ISBN: 978-0073341521
4. Altekar Rahul V., “Supply Chain Management-Concept and Cases”, PHI, 2005, ASIN: B00K7YGX2S

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Knowledge on the basic frame work of supply chain management	-	-	2	1	2	-	-	2	2	2	3	1	2	1	-
CO2	Understanding the economics of supply and demand cycle	-	-	3	2	2	-	-	2	2	2	3	1	2	1	-
CO3	Knowledge on its functions in the industry	-	-	2	2	2	-	-	2	2	2	2	1	2	1	-
CO4	Understanding on coordination of supply chain management	-	-	2	1	3	-	-	2	3	2	2	1	2	1	-
CO5	Understanding supply chain management with apparel export and import	-	-	3	1	3	-	-	2	3	2	2	1	2	1	-
Overall CO		-	-	2.4	1.4	2.4	-	-	2	2.4	2	2.5	1	2	1	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7075 TEXTILE AND APPAREL EXIM MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:
To give the students an exposure on international market for textile products, regulations with respect to export and import of textiles

UNIT I **5**
International markets for yarns, woven fabrics; international market for cotton, silk, jute, wool and other fibres; export and import of textiles by India – current status, promotional activities

UNIT II **5**
International markets for carpets and home textiles – product types, market potential and statistics, India - current status and promotional activities, role of export promotional councils

UNIT III **9**
International markets for woven piece goods, knitted garments, leather garments; statistics of international apparel market and trade; export incentives, role of AEPC, CII, FIEO, Textile Committee

UNIT IV **13**
Marketing – strategies, global brand building; logistics & SCM; role of export finances & EXIM banking, ECGC, Indian council of arbitration, FEMA; impact of foreign trade on Indian economy

UNIT V **13**
Exim policy - customs act, acts relating to export/import of textile and apparel; Indian customs formalities - export documentation for excisable goods, import documentation, clearance of import goods; concepts - 100% export oriented units, export processing zones, special economic zones; duty drawback procedure; import/export incentives; licenses; case study

TOTAL: 45 PERIODS

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

CO1 International market for fibre, yarn and woven fabric
CO2 International market for carpets and home textiles
CO3 International market for woven, knitted and leather garments
CO4 Knowledge on marketing strategies and export finance
CO5 Indian EXIM policies and procedure

REFERENCES

1. Charles W.I. Hill., and Arun Kumar Jain., “International Business”, 10th Edition, Tata McGraw Hill, 2014, ISBN: 007811277X / ISBN: 978-0078112775.
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6. OdedShenkar., and YaongLuo., “International Business”,3rd Edition, Routledge, 2014, ISBN : 0415817137 / ISBN : 978-0415817134
7. Datey V.S., “Indirect Taxes”,34th Edition, Taxmann Publications, 2015, ISBN: 9350715570 / ISBN: 9789350715574.
8. Kapoor D.C., “Export Management”, Vikas Publishing House Pvt. Ltd., 2009, ISBN: 8125909397 / ISBN: 978-8125909392
9. Govindan N.S., “Indirect Taxes Made Easy”, C. Sitaraman & Co., 2014, ASIN: B00HYVS32K

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO 1	PO2	PO3	PO 4	PO 5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	International market for fibre, yarn and woven fabric	-	1	2	1	3	-	-	2	2	1	2	1	2	1	-
CO2	International market for carpets and home textiles	-	1	2	1	3	-	-	2	2	1	2	1	2	1	-
CO3	International market for woven, knitted and leather garments	-	2	2	1	3	-	-	2	2	1	2	1	2	1	-
CO4	Knowledge on marketing strategies and export finance	-	1	2	1	2	-	-	2	3	2	2	1	2	1	-
CO5	Indian EXIM policies and procedure	-	1	2	1	2	-	-	2	2	1	3	1	2	1	-
Overall CO		-	1.2	2	1	2.6	-	-	2	2.2	1.2	2.2	1	2	1	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

GE 7351 ENGINEERING ETHICS AND HUMAN VALUES L T P C
(Common to all branches) **3 0 0 3**

OBJECTIVES
- To emphasise into awareness on Engineering Ethics and Human Values.
- To understand social responsibility of an engineer.
- To appreciate ethical dilemma while discharging duties in professional life.

UNIT I HUMAN VALUES 3
Morals, Values and Ethics – Integrity – Work Ethic – Honesty – Courage –Empathy – Self-Confidence – Discrimination- Character.

UNIT II ENGINEERING ETHICS 9
Senses of 'Engineering Ethics' - variety of moral issued - types of inquiry - moral dilemmas - moral autonomy - Kohlberg's theory - Gilligan's theory - consensus and controversy – Models of Professional Roles - theories about right action - Self-interest –Professional Ideals and Virtues - uses of ethical theories. Valuing Time – Co-operation – Commitment –

UNIT III ENGINEERING AS SOCIAL EXPERIMENTATION 9
Engineering as experimentation - engineers as responsible experimenters - codes of ethics – Importance of Industrial Standards - a balanced outlook on law – anticorruption- occupational crime -the challenger case study.

UNIT IV ENGINEER'S RIGHTS AND RESPONSIBILITIES ON SAFETY 12

Collegiality and loyalty – Respect for authority – Collective Bargaining – Confidentiality- Conflict of interest – Occupational Crime – Professional Rights – IPR- Safety and risk - assessment of safety and risk - risk benefit analysis and reducing risk - the Three Mile Island, Bhopal Gas plant and chernobyl as case studies.

UNIT V GLOBAL ISSUES 12
Multinational corporations - Environmental ethics - computer ethics - weapons development - engineers as managers-consulting engineers-engineers as expert witnesses and advisors -moral leadership-Sample code of conduct.

TOTAL : 45 PERIODS

OUTCOMES
Upon completion of this course, the student shall

CO1: Understand the human values and have the ability to perform with professionalism
CO2: Understand the ethics and its related theory
CO3: Understand the industrial standards and occupational crime
CO4: Understand their rights and responsibilities on safety, legal, ethical issues as it pertains to engineering profession.
CO5: Understand the global ethical issues

TEXT BOOKS
1. Mike Martin and Roland Schinzinger, "Ethics in Engineering", McGraw-Hill, New York 2005.
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, "Engineering Ethics – Concepts and Cases", Wadsworth Thompson Leatning, United States, 2000 (Indian
3. Govindarajan M, Natarajan S, Senthil Kumar V. S, "Engineering Ethics", Prentice Hall of India, New Delhi, 2004.

REFERENCES
1. Charles D. Fleddermann, "Engineering Ethics", Pearson Education / Prentice Hall, New

Jersey, 2004
2. Charles E Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics – Concepts and Cases”, Wadsworth Thompson Leatning, United States, 2000
3. John R Boatright, “Ethics and the Conduct of Business”, Pearson Education, New Delhi, 2003.
4. Edmund G Seebauer and Robert L Barry, “Fundamentals of Ethics for Scientists and Engineers”, Oxford Press , 2000
5. R.Subramanian , “Professional Ethics “,Oxford University Press ,Reprint ,2015.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO 1	PO 2	PO3	PO4	PO5	PO 6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO 3
CO1	Understand the human values and have the ability to perform with professionalism	-	-	1	-	-	3	-	3	3	-	2	-	-	2	-
CO2	Understand the ethics and its related theory	-	-	1	-	-	3	-	3	3	-	2	-	-	2	-
CO3	Understand the industrial standards and occupational crime	-	-	1	-	-	3	-	3	3	-	2	-	-	2	-
CO4	Understand their rights and responsibilities on safety, legal, ethical issues as it pertains to engineering profession .	-	-	1	-	-	3	-	3	3	-	2	-	-	2	-
CO5	Understand the global ethical issues	-	-	1	-	-	3	-	3	3	-	2	-	-	2	-
Overall CO		-	-	1	-	-	3	-	3	3	-	2	-	-	2	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

AT7073 **SMART TEXTILES** **L T P C**
3 0 0 3

OBJECTIVES:
To enable the students understand the concept and construction of smart fabrics, intelligent textiles and interactive garments

UNIT I **13**
An overview on smart textiles, electrically active polymers materials- application of non-ionic polymer gel and elastomers for artificial muscles; heat storage and thermo regulated textiles and clothing, thermally sensitive materials, cross – linked polymers of fibre substrates as multifunctional and multi-use intelligent material; mechanical properties of fibre Bragg gratings, optical responses of FBG (Fibre Bragg grating) sensors under deformation ; smart textile composites integrated with optic sensors

UNIT II **9**
Adaptive and responsive textile structures, bio-processing for smart textiles and clothing, tailor made intelligent polymers for biomedical application

UNIT III **9**
Smart fabrics – passive, active, very smart; classification of smart materials, concept of wearable computing, basic structure of fabric used for integrating different electronic sensors

UNIT IV **14**
Smart interactive garments for combat training, hospital and patient care; smart garments in sports and fitness activities; smart garments for children; smart home textiles

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students shall have the knowledge on
CO1: Requirement of polymers and their properties used in smart textiles
CO2: Knowledge on polymers and textiles for biomedical applications
CO3: Construction of smart textiles
CO4: Application of smart textiles

REFERENCES

1. Sanjay Gupta., “Smart Textiles their Production and Marketing Strategies”, NIFT, New Delhi, 2000.
2. William C. Smith., “Smart Textile Coating and Laminates”, Wood Head Publishing Series in Textiles, UK, 2010, ISBN 978-1-84569-379-4.
3. Tao X. M., “Smart Fibers, Fabrics and Clothing Fundamentals and Application”, Wood Head Publishing Ltd., October 2001, ISBN 1 855735466.
4. Mc Cann J. and Bryson D., “Smart Clothes and Wearable Technology”, Wood Head Publishing Series in Textiles, UK, 2010, ISBN-10: 1845693574

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO3	PO 4	PO 5	PO6	PO7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Requirement of polymers and their properties used in smart textiles	-	-	2	-	-	2	2	2	1	1	3	2	-	2	2
CO2	Polymers and textiles for biomedical applications	-	-	2	-	-	2	2	2	1	1	2	2	-	2	2
CO3	Construction of smart textiles	-	-	3	-	-	2	2	2	1	1	2	2	-	2	2
CO4	Application of smart textiles	-	-	2	-	-	3	3	2	1	1	3	2	-	2	2
Overall CO		-	-	2.25	-	-	2.25	2.25	2	1	1	2.5	2	-	2	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

AT7552 GARMENT PRODUCTION MACHINERY L T P C
3 0 0 3

OBJECTIVE:
To acquaint students of the basic production machinery and equipments used in garment construction

UNIT I FABRIC INSPECTION, SPREADING AND CUTTING MACHINES 13
Fabric inspection machinery; spreading machines – manual, semi automatic and fully automatic machines; mechanism of straight knife, rotary, band knife, die, laser, plasma, water jet and ultra sonic cutting machines; notches, drills and thread markers; computer interfaced cutting machines; fusing and molding machines; safety measures

UNIT II SEWING MACHINES 14
Lock stitch and chain stitch sewing machine – types, driving arrangement, function of elements, stitch formation, timing, settings and feed mechanism; needles-geometry and types; selection of machine and process parameters for different applications; Button fixing and button holing machine; safety measures

UNIT III MULTI THREAD SEWING MACHINES 13
Overlock, flatlock, feed-off the arm, zig-zag and embroidery machines– driving arrangement, function of elements, stitch formation, timing, settings and feed mechanism; safety measures

UNIT IV FINISHING MACHINES 5
Pressing machineries – buck pressing, iron pressing, block or die pressing, form pressing, steamers; folding and packing machines; safety measures

OUTCOMES:
Upon completion of the course, the students would understand
CO1 - Fundamental principle and working of machines used for spreading and cutting
CO 2 - Stitch formation and other mechanisms of SNLS machine and chain stitch machine and principle of button fixing and button holing machines
CO 3 - Stitch formation and other mechanisms of overlock, flatlock and other special sewing machines
CO 4 - Different types of finishing machines used for garments

TOTAL: 45 PERIODS

REFERENCES

1. Harold Carr., and Barbara latham., "The Technology of Clothing Manufacture", 4th Edition, Whiley-Black well Sciences, 2008, ISBN: 1405161981 / ISBN: 978-1405161985
2. Jacob Solinger., "Apparel Manufacturing Handbook",2nd Edition Bobbin Blenheim Media Corp, 1988, ISBN : 1879570009 / ISBN: 978-1879570009
3. Ruth E. Glock., and Grace I. Kunz., "Apparel Manufacturing Sewn Product Analysis", 4th Edition, Pearson Prentice Hall, 2005, ISBN: 0131119826 | ISBN-13: 9780131119826
4. Villumsone-Nemes I., "Industrial Cutting of Textiles material", Wood head Publications Pvt. Ltd 2012, ISBN: 978-1-85709-134-5
5. Jelka Gersak., "Design of Clothing Manufacture Process - A Systematic Approach to Planning Scheduling and Control", Wood head Publications Pvt. Ltd, 2013, ISBN: 978-1-85709-778-1

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Fundamental principle and working of machines used for spreading and cutting	2	3	2	1	1	1	1	1	1	2	2	1	2	3	3
CO2	Stitch formation and other mechanisms of SNLS machine and chain stitch machine and Principle of button fixing and button holing machines	3	2	1	1	1	1	1	1	1	2	2	1	2	3	3
CO3	Stitch formation and other mechanisms of overlock, flatlock and other special sewing machines	2	3	1	1	1	1	1	1	1	2	2	1	2	3	3
CO4	Different types of finishing machines used for garments	3	2	1	1	1	1	1	1	1	2	2	1	2	3	3
Overall CO		2.5	2.5	1.25	1	1	1	1	1	1	2	2	1	2	3	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

AT7071 PRODUCTION AND APPLICATION OF SEWING THREADS L T P C
3 0 0 3

OBJECTIVES:
To enable the students to understand the requirements and production of sewing threads for different applications

UNIT I **13**
Sewing threads – property requirements for different applications; ticket numbering; characterization of sewing threads; sewability of the thread, seam efficiency index

UNIT II **14**
Types of sewing thread – spun threads, core spun threads, filament threads; production, properties and applications; fancy yarns – types and production; metallic yarns

UNIT III **13**
Characteristics and application of high performance sewing threads - aramid threads, ceramic threads, polypropylene threads, polyethylene threads, polytetrafluroethylene threads, fibreglass threads, other sewing threads – tencel, acrylic, linen, elastic, soluble; embroidery threads

UNIT IV **5**
Sewing defects related to sewing threads – Assessment and control

TOTAL: 45 PERIODS

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

CO1 Characteristics of sewing thread
CO2 Production of sewing thread and fancy yarns
CO3 Understand the characteristics of high performance sewing threads
CO4 Testing and quality assurance of sewing threads

REFERENCES

1. Ukponmwan J.O., Mukhopadhyay A., and Chatterjee K.N., “Sewing threads”, Textile Progress, 2000, ISBN: 1870372387 | ISBN-13: 9781870372381.
2. Carl A Lawrence., “Fundamentals of Spun Yarn Technology”, CRC Press, Florida, USA, 2003, ISBN: 1566768217 | ISBN-13: 9781566768214
3. Carr H., “The Technology of Clothing Manufacture”, Blackwell Publisher, UK, 2004, ISBN: 0632021934 | ISBN-13: 9780632021932
4. Ruth E. Glock., “Apparel Manufacturing Sewn Product Analysis”, Prentice Hall, New Jersey, 2005,ISBN: 0131119826 | ISBN-13: 9780131119826
5. Jacob Solinger., “Apparel Production Handbook”, Reinhold Publications, 1998, ISBN: 1879570009 / ISBN: 978-1879570009
6. Rao J.V., and Rajendra Kr.Gaur., “Sewing Threads: Technology, Stitches, Seams, Problems, Needles”, NITRA, 2006.
7. Gong R.H., and Wright R.M., “Fancy yarns –Their manufacture and application”, Woodhead Publishing Ltd, England, 2002, ISBN: 0849315506 | ISBN-13: 9780849315503.

Course Articulation Matrix

Course Outcomes	Statement	Program Outcome													
		PO1	**PO2**	**PO3**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**	**PSO3**
CO1	Characteristics of sewing thread	2	2	1	1	1	1	1	−	2	1	1	2	3	2	2
CO2	Production of sewing thread and fancy yarns	3	3	3	3	2	2	2	−	2	1	1	2	3	3	3
CO3	Understand the characteristics of high performance sewing threads	2	2	2	2	1	1	1	−	2	2	2	2	3	2	2
CO4	Testing and quality assurance of sewing threads	2	2	2	2	1	1	1	−	2	2	2	3	3	2	2
Overall CO		2.25	2.25	2	2	1.25	1.25	1.25	-	2	1.5	1.5	2.25	3	2.25	2.25

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

AT7651 INDUSTRIAL ENGINEERING IN APPAREL INDUSTRY L T P C
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Basics of industrial engineering
- Different tools of industrial engineering and its application in apparel industry

UNIT I **5**

Industrial Engineering - evolution, functions, role of industrial engineer; work study- introduction, procedure

UNIT II **13**

Methods study – introduction, approach to method study; techniques of recording; method analysis techniques; principles of motion economy; method study in garment manufacture

UNIT III **9**

Ergonomics - importance, division; ergonomic principles - designing of workplace, working processes, handling material, tools and environment; ergonomic conditions related to garment industry

UNIT IV **13**

Work measurement– introduction; time study – equipment and procedure; standard data; work sampling techniques; incentive wage system; work measurement applied to garment industry; calculation of standard allowance minutes (SAM)

UNIT V **5**

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

TOTAL: 45 PERIODS

OUTCOMES:

Upon the completion of the course the student shall be able to understand

CO1: Fundamentals concepts of industrial engineering
CO2: Method study
CO3: Motion analysis
CO4: Work measurement and SAM
CO5: Concepts of line balancing and layout

REFERENCES

1. George Kanwaty., “Introduction to Work Study “, ILO, Geneva, 1996, ISBN: 9221071081 | ISBN-13: 9789221071082
2. Enrick N. L., “Time study manual for Textile industry”, Wiley Eastern (P) Ltd., 1989, ISBN: 0898740444 | ISBN-13: 9780898740448
3. Khanna O. P., and Sarup A., “Industrial Engineering and Management”, Dhanpat Rai Publications, New Delhi, 2010, ISBN: 818992835X / ISBN: 978-8189928353
4. Norberd Lloyd Enrick., “Industrial Engineering Manual for Textile Industry”, Wiley Eastern (P) Ltd., New Delhi, 1988, ISBN: 0882756311 | ISBN-13: 9780882756318
5. Chuter A. J., “Introduction to Clothing Production Management”, Whiley-Black well Science, U.S. A., 1995, ISBN: 0632039396 | ISBN-13: 9780632039395
6. David M. Levine., Timothy C. Krehbiel., and Mark L. Berenson., “Business Statistics: A First Course”,7th Edition, Pearson Education Asia, New Delhi, 2015, ISBN: 032197901X | ISBN-13: 9780321979018
7. Chase., Aquilano., and Jacobs., “Production and Operations Management”, Tata McGraw-Hill, New Delhi, 8th Edition, 1999, ISBN: 0256225567 | ISBN-13: 9780256225563
8. Gavriel Salvendy., “Industrial Engineering – Technology and operations management”, Wiley-Interscience Publications, USA, 2001, ISBN: 0471330574 | ISBN-13: 9780471330578
9. Gordana Colovic, “Ergonomics in the garment industry”, Wood publishing India Pvt. Ltd., India, 2014, ISBN: 0857098225 | ISBN-13: 978085709822

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Fundamentals concepts of industrial engineering	2	3	3	3	2	1	1	2	2	1	2	2	1	1	-
CO2	Method study	1	2	3	3	2	2	1	2	2	1	2	2	1	1	-
CO3	Motion analysis	1	2	3	3	2	2	1	2	2	1	2	2	1	1	-
CO4	Work measurement and SAM	2	3	3	3	2	1	1	2	2	2	3	2	1	1	-
CO5	Concepts of line balancing and layout	2	3	3	3	3	1	1	2	3	2	3	2	1	1	-
Overall CO		1.6	2.6	3	3	2.2	1.4	1	2	2.2	1.4	2.4	2	1	1	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively.

AT7072 PROTECTIVE TEXTILES L T P C
3 0 0 3

OBJECTIVES:
To enable the students understand the selection of fibre, yarn, fabric and design of garments for different protective applications.

UNIT I FIBRES, YARNS AND FABRICS FOR PROTECTIVE GARMENTS 13
Characteristic requirements of fibre, yarn and fabric for flame proof, heat resistant, ballistic resistance, electrical conduction, bacterial protection, radiation protection and radiation contamination protection.

UNIT II CHEMICAL FINISHES FOR PROTECTIVE FABRICS 5
Mechanism, Chemistry, Materials and methods - Flame retardant, Liquid repellent, Antistatic, Antibacterial, UV protection and mite protection finishes.

UNIT III PROTECTIVE FABRICS IN DIFFERENT APPLICATIONS 9
Protective fabrics used in the medical field and in hygiene; military combat clothing; protective fabrics against biological and chemical warfare; textiles for high visibility; antigravity suit.

UNIT IV PROTECTIVE GARMENT CONSTRUCTION 9
Garment construction - method of construction of garments according to various protective end uses; use of accessories for protective garment; ergonomics of protective clothing.

UNIT V EVALUATION OF PROTECTIVE TEXTILES 9
Standards and test method for protective fabric performance - flame retardant finishes, liquid repellent finishes, antistatic, liquid repellent, antibacterial, UV protection, mite protection; manikins-thermal manikins, segmented thermal manikins; evaporative resistance measurement-moisture permeability index, skin model; concept of dynamic manikins; permeation resistance test-index of penetration and index of repellency; liquid tight integrity and gas tight integrity.

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of the course, the students shall know the

CO1: Functional requirement of fibres, yarns and fabrics for different protective applications
CO2: Mechanism, materials and method of application of chemical finishes for protective textiles
CO3: Protective fabrics used for different applications
CO4: Construction of protective garments
CO5: Evaluation of protective textiles

REFERENCES

1. Adanur S., “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., 1995, ISBN : 1 – 56676 – 340 – 1.
2. Pushpa Bajaj., and Sengupta A.K., “Protective Clothing”, The Textile Institute, 1992, ISBN:1-870812 – 44-1.
3. Chellamani K. P., and Chattopadhyay D., “Yarns and Technical Textiles”, SITRA, 1999.
4. Scott R.A., “Textiles for Protection”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-921-6, 2005.
5. Saville.B.P., “Physical Testing of Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-367-6, 1999.
6. Fan Q., “Chemical Testing of Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-917-8, 2005.
7. Long A.C., “Design and Manufacture of Textile Composites”, Wood head Publishing Limited, Cambridge, UK, ISBN : 1-85573-744-2, 2005.

8. Fung W., “Coated and Laminated Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-576-8, 2002.
9. Horrocks A.R. and Anand S.C., “Handbook of Technical Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-385-4, 2004.
10. Anand S.C., Kennedy J.F., Miraftab M., and Rajendran S., “Medical Textiles and Biomaterials for Health Care”, Wood head Publishing Limited, Cambridge, UK, ISBN:1-85573-683-7, 20

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Functional requirement of fibres, yarns and fabrics for different protective applications	-	2	3	2	-	1	1	1	-	1	1	1	-	2	2
CO2	Mechanism, materials and method of application of chemical finishes for protective textiles	-	-	3	1	-	2	1	2	1	1	1	2	-	2	3
CO3	Protective fabrics used for different applications	-	-	3	3	-	1	2	2	1	1	1	2	-	3	3
CO4	Construction of protective garments	-	2	3	3	-	2	2	2	1	1	1	2	-	3	3
CO5	Evaluation of protective textiles	-	-	3	2	-	2	2	2	1	2	1	1	-	2	2
Overall CO		-	0.8	3	2.2	-	1.6	1.6	1.8	0.8	1.2	1	1.6	-	2.4	2.6

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

AT 7751 APPAREL MARKETING AND MERCHANDISING L T P C
3 0 0 3

OBJECTIVES:

To acquaint the students of the concepts of business, design merchandising, sourcing and export documentation

UNIT I INTRODUCTION TO APPAREL BUSINESS 5

Apparel business practices; business operations in Asian countries. Business practices of Indian apparel export and retail houses.

UNIT II MARKETING FOR APPAREL AND TEXTILE PRODUCTS 13

Marketing for the 21st century, core concepts and orientation towards market place, strategies and planning, market research and forecast, customers, consumer markets and business markets, market segments and brand building, brand positioning and competition

UNIT III DESIGN MERCHANDISING 9

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

UNIT IV SOURCING 9

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

UNIT V EXPORT DOCUMENTATION AND POLICIES 9

Government policies, guide lines for apparel export and domestic trade, tax structures and government incentives in apparel trade. Export documents and its purposes, banking activities, Letter of credit, logistics and shipping, foreign exchange regulation, export risk management and insurance. Export finance, Special economic zones.

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Understanding the international apparel business and role of Asian countries in the apparel and fashion trade

CO2: Applying the concepts of marketing and merchandizing in the apparel industry

CO3: Understand the manufacturing practices in apparel industry

CO4: Apply the concepts of sourcing in the apparel industry

CO5: Understand the apparel export and import procedure for international operations.

REFERENCES

1. Elian stone, Jean A samples, “Fashion Merchandising”, McGraw Hill Book Company, New York, 1985, ISBN: 0-07-061742-2
2. Shivaramu S.,” Export Marketing” – A Practical Guide to Exporters”, Wheeler Publishing, Ohio, 1996, ISBN: 81-7544-166-6
3. Ruth E. Glock, Grace I. Kunz ” Apparel Manufacturing Sewn Product Analysis” Fourth Edition, Pearson Prentice Hall, NJ, 2005, ISBN: 81-7758-076-0

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Understanding the international apparel business and role of Asian countries in the apparel and fashion trade	-	1	3	2	2	1	1	2	2	1	1	-	2	2	2
CO2	Applying the concepts of marketing and merchandizing in the apparel industry	-	1	3	2	2	1	1	2	2	1	1	-	2	2	2
CO3	Understand the merchandising practices in apparel industry	-	1	2	2	2	1	1	2	2	1	1	-	2	2	2
CO4	Apply the concepts of sourcing in the apparel industry	-	1	3	2	2	1	1	3	2	1	1	-	2	2	2
CO5	Understand the apparel export and import procedure for international operations	-	1	2	2	2	1	1	3	2	2	1	-	2	2	2
Overall CO		-	1	2.6	2	2	1	1	2.4	2	1.2	1	-	2	2	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

GE7071 DISASTER MANAGEMENT L T P C
3 0 0 3

OBJECTIVES:

- To provide students an exposure to disasters, their significance and types.
- To ensure that students begin to understand the relationship between vulnerability, disasters, disaster prevention and risk reduction
- To gain a preliminary understanding of approaches of Disaster Risk Reduction (DRR)
- To enhance awareness of institutional processes in the country and
- To develop rudimentary ability to respond to their surroundings with potential disaster response in areas where they live, with due sensitivity

UNIT I INTRODUCTION TO DISASTERS 9

Definition: Disaster, Hazard, Vulnerability, Resilience, Risks – Disasters: Types of disasters – Earthquake, Landslide, Flood, Drought, Fire etc - Classification, Causes, Impacts including social, economic, political, GE, health, psychosocial, etc.- Differential impacts- in terms of caste, class, gender, age, location, disability - Global trends in disasters: urban disasters, pandemics, complex emergencies, Climate change- Dos and Don'ts during various types of Disasters.

UNIT II APPROACHES TO DISASTER RISK REDUCTION (DRR) 9

Disaster cycle - Phases, Culture of safety, prevention, mitigation and preparedness community based DRR, Structural- nonstructural measures, Roles and responsibilities of- community, Panchayati Raj Institutions/Urban Local Bodies (PRIs/ULBs), States, Centre, and other stake-holders- Institutional Processess and Framework at State and Central Level- State Disaster Management Authority(SDMA) – Early Warning System – Advisories from Appropriate Agencies.

UNIT III INTER-RELATIONSHIP BETWEEN DISASTERS AND DEVELOPMENT 9

Factors affecting Vulnerabilities, differential impacts, impact of Development projects such as dams, embankments, changes in Land-use etc.- Climate Change Adaptation- IPCC Scenario and Scenarios in the context of India - Relevance of indienvironmental
nous knowledge, appropriate technology and local resources.

UNIT IV DISASTER RISK MANAGEMENT IN INDIA 9

Hazard and Vulnerability profile of India, Components of Disaster Relief: Water, Food, Sanitation, Shelter, Health, Waste Management, Institutional arrangements (Mitigation, Response and Preparedness, Disaster Management Act and Policy - Other related policies, plans, programmes and legislation – Role of GIS and Information Technology Components in Preparedness, Risk Assessment, Response and Recovery Phases of Disaster – Disaster Damage Assessment.

UNIT V DISASTER MANAGEMENT: APPLICATIONS AND CASE STUDIES AND FIELD WORKS 9

Landslide Hazard Zonation: Case Studies, Earthquake Vulnerability Assessment of Buildings and Infrastructure: Case Studies, Drought Assessment: Case Studies, Coastal Flooding: Storm Surge Assessment, Floods: Fluvial and Pluvial Flooding: Case Studies; Forest Fire: Case Studies, Man Made disasters: Case Studies, Space Based Inputs for Disaster Mitigation and Management and field works related to disaster management.

TOTAL: 45 PERIODS

OUTCOMES:

The students will be able to

CO1 Differentiate the types of disasters, causes and their impact on environment and society

CO2 Assess vulnerability and various methods of risk reduction measures as well as mitigation.

CO3 Draw the hazard and vulnerability profile of India, Scenarious in the Indian context,

CO4 Disaster management in India

CO5 Disaster damage assessment and management.

TEXTBOOKS:

1. Singhal J.P. “Disaster Management”, Laxmi Publications, 2010. ISBN-10: 9380386427 ISBN-13: 978-9380386423
2. Tushar Bhattacharya, “Disaster Science and Management”, McGraw Hill India Education Pvt. Ltd., 2012. **ISBN-10:** 1259007367, **ISBN-13:** 978-1259007361]
3. Gupta Anil K, Sreeja S. Nair. Environmental Knowledge for Disaster Risk Management, NIDM, New Delhi, 2011
4. Kapur Anu Vulnerable India: A Geographical Study of Disasters, IIAS and Sage Publishers, New Delhi, 2010.

REFERENCES

1. Govt. of India: Disaster Management Act , Government of India, New Delhi, 2005
2. Government of India, National Disaster Management Policy,2009.

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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Differentiate the types of disasters, causes and their impact on environment and society	-	-	1	-	1	2	1	2	3	1	1	2	1	-	-
CO2	Assess vulnerability and various methods of risk reduction measures as well as mitigation.	-	-	1	-	1	2	1	2	3	1	1	2	1	-	-
CO3	Draw the hazard and vulnerability profile of India, Scenarious in the Indian context,	-	-	1	-	1	2	1	2	3	1	1	2	1	-	-
CO4	Disaster management in India	-	-	1	-	1	2	1	1	1	1	1	2	1	-	-
CO5	Disaster damage assessment and management	-	-	1	-	1	2	1	2	3	1	1	2	1	-	-
Overall CO		-	-	1	-	1	2	1	1.8	2.6	1	1	2	1	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

GE7074 **HUMAN RIGHTS** **L T P C**
3 0 0 3

OBJECTIVES :

- To sensitize the Engineering students to various aspects of Human Rights.

UNIT I **9**

Human Rights – Meaning, origin and Development. Notion and classification of Rights – Natural, Moral and Legal Rights. Civil and Political Rights, Economic, Social and Cultural Rights; collective / Solidarity Rights.

UNIT II **9**

Evolution of the concept of Human Rights Magana carta – Geneva convention of 1864. Universal Declaration of Human Rights, 1948. Theories of Human Rights.

UNIT III **9**

Theories and perspectives of UN Laws – UN Agencies to monitor and compliance.

UNIT IV **9**

Human Rights in India – Constitutional Provisions / Guarantees.

UNIT V **9**

Human Rights of Disadvantaged People – Women, Children, Displaced persons and Disabled persons, including Aged and HIV Infected People. Implementation of Human Rights – National and State Human Rights Commission – Judiciary – Role of NGO's, Media, Educational Institutions, Social Movements.

TOTAL : 45 PERIODS

OUTCOME :

The students will be able to understand the

CO1:Basics of human rights
CO2: Evolution concepts of Human rights and its theories
CO3: Theories and perspectives of UN laws
CO4: Human rights in India
CO5:Human rights of weaker section people

REFERENCES:

1. Kapoor S.K., "Human Rights under International law and Indian Laws", Central Law Agency, Allahabad, 2014.
2. Chandra U., "Human Rights", Allahabad Law Agency, Allahabad, 2014.
3. Upendra Baxi, The Future of Human Rights, Oxford University Press, New Delhi.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Basics of human rights	-	-	2	-	-	2	-	3	2	-	-	1	-	-	-
CO2	Evolution concepts of Human rights and its theories	-	-	2	-	-	2	-	3	2	-	-	1	-	-	-
CO3	Theories and perspectives of UN laws	-	-	2	-	-	2	-	3	2	-	-	1	-	-	-
CO4	Human rights in India	-	-	2	-	-	2	-	3	2	-	-	1	-	-	-
CO5	Human rights of weaker section people	-	-	2	-	-	2	-	3	2	-	-	1	-	-	-
Overall CO		-	-	2	-	-	2	-	3	2	-	-	1	-	-	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7004 **FUNCTIONAL FINISHES** **L T P C**
3 0 0 3

OBJECTIVES:
To enable the students understand different types of finishes, method of application and characteristics of finished fabrics

UNIT I **9**
Formaldehyde and non-formaldehyde based resin finishing, mechanism and types of resins deployed, methods of application, assessment of resins and finished goods.

UNIT II **9**
Wetting and wicking; surface energy – concept, measurement and relevance to repellency; repellents applied to textile substrates; application of repellents by different techniques, assessment of the repellency in fabrics; detergency and soil release concepts, soil release agents, mechanism of soil retention & soil release, application of soil release finishes and its assessment; antistatic finishes mechanism, agents applied and its assessment.

UNIT III **9**
Terminology related to flammability, flame retardant mechanisms, flame retarding chemicals for textile materials and testing of flame retardant finishes; mechanical finishes -calendaring, compacting, raising, sanforising, peach finishing, heat setting, foam finishing and various techniques for foam application, drawbacks of foam finishing.

UNIT IV **9**
UV radiation; factors affecting UV protection; UV protection finishes; measurement of UV protection; antimicrobial finishes- classification, chemistry and application of antimicrobial finishes, evaluation of antimicrobial finishes.

UNIT V **9**
Micro encapsulation techniques; softening finish; plasma finishing and application of nanotechnology in finishing

TOTAL : 45 PERIODS

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

CO1: Crease proofing finish
CO2: Water, antistatic and soil repellent finish
CO3: Mechanical finishes and flame retardant finish
CO4: UV protection and antimicrobial finish
CO5: Advances in finishing

REFERENCES

1. Gulrajani M. L., “Advances in the dyeing and finishing of technical textiles”, Wood head Publishing Limited, 2013, ISBN: 0857094335 | ISBN-13: 9780857094339
2. R., “Plasma Technologies for Textiles”, Wood head Publishing Ltd, Cambridge, UK, 2007, ISBN: 1845690737 | ISBN-13: 9781845690731
3. Nierstrasz V. and Cavaco-Paulo A., “Advances in textile biotechnology”, Woodhead Publishing Ltd, Cambridge, UK, 2010.
4. Schindler W. D. and P J Hauser P. J., “Chemical finishing of textiles” Woodhead Publishing Ltd, Cambridge, UK, 2004, ISBN: 1855739054 | ISBN-13: 9781855739055
5. Cavaco-Paulo A. and Gubitz G., “Textile processing with enzymes”, Woodhead Publishing Ltd, Cambridge, UK, 2003.
6. Heywood D., “Textile finishing”, Society of Dyers & Colourists, 2003, ISBN: 0901956813 | ISBN-13: 9780901956811.
7. Rouette H. K., “Encyclopedia of textile finishing: English Version, Vol. 3”, Woodhead Publishing Ltd, Cambridge, UK, 2001.

8. Lewin and Sello, “Functional finishes, Part A & Part B”; CRC Press, 1994, ISBN: 0824771184
9. Microencapsulation in finishing, Review of progress of Colouration, SDC, 2001.
10. Perkins, W.S., “Textile colouration and finishing”, Carolina Academic Press., U.K, ISBN: 0890898855.2004.
11. Fiscus, G. and Grunenwald D., “Textile finishing : A complete guide”, High Tex, Blackwells Bookshop, Leeds, U.K.1999.
12. Chakraborty J.N, “Fundamentals and Practices in colouration of Textiles”, Woodhead Publishing India, 2009, ISBN-13:978-81-908001-4-3
13. Mehltig B and Textor T., “Nanosols and Textiles”, World Scientific publishing company, Singapore, 2008, ISBN: 9812833501 | ISBN-13: 9789812833501

Course Articulation Matrix

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Crease proofing finish	2	1	1	2	1	2	2	2	-	1	-	2	2	1	2
CO2	Water, antistatic and soil repellent finish	2	1	1	2	1	2	2	2	-	1	-	2	2	1	2
CO3	Mechanical finishes and flame retardant finish	2	1	1	2	1	1	1	2	-	1	-	2	2	1	2
CO4	UV protection and antimicrobial finish	2	1	1	3	1	2	2	2	-	1	-	2	2	1	2
CO5	Advances in finishing	2	1	1	3	1	2	2	2	-	1	-	2	2	1	2
Overall CO		2	1	1	2.4	1	1.8	1.8	2	-	1	-	2	2	1	2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7005 **HIGH PERFORMANCE FIBRES** **L T P C**
3 0 0 3

OBJECTIVES:

To enable the students to learn about

- Various high performance fibres which are used as technical textiles
- Production of high performance fibres

UNIT I LINEAR POLYMER FIBRES **9**

Aramid fibres - polymer preparation, spinning, structure and properties and applications; polyethylene fibres–manufacture, fibre characteristics, properties, yarn and fabric processing and applications

UNIT II CARBON FIBRE **9**

Manufacture of PAN-based, pitch-based carbon fibres - physical properties and applications

UNIT III GLASS AND CERAMIC FIBRES **9**

Glass fibres - fibre manufacture, properties; glass-fibre composites and other applications; manufacture of ceramic fibres, siliconcarbide-based fibres, other non-oxide fibres, alumina-based fibres, other polycrystalline oxide fibres, single-crystal oxide fibres

UNIT IV CHEMICAL AND THERMAL RESISTANCE FIBRES **12**

Chlorinated fibres, fluorinated fibres, polyetherketones, polyphenylenesulphide, polyetherimide - properties and applications; thermo plastic and thermoset polymers, aromatic polyamides and polyaramids, semi carbonfibres, polybenzimidazole

UNIT V SPECIALITY FIBRES **6**

Specialty fibres - hollow and profile fibres; blended and bi-component fibres; super absorbent fibres

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course, the students will have knowledge on manufacture and characteristics of

CO1: Linear polymer fibres
CO2: Carbon fibres
CO3: Glass and ceramic fibres
CO4: Chemical and thermal resistance fibres
CO5: Speciality fibres

TEXTBOOKS

1. Kothari V.K., “Textile Fibres :Development and Innovations”, Progress in Textiles,Vol.2,IAFL Publications,2000
2. John W. S. Hearle., “High Performance Fibres”, Wood head Publishing Ltd., Cambridge, England, 2001, ISBN: 084931304X | ISBN-13:9780849313042

REFERENCES

1. Peebles L.H., “Carbon Fibres”, CRC Press, London,1995

Hongu T., and Phillips G.O., “New Fibres”, 2nd Edition, Wood head Publishing Ltd., England, 1997, ISBN: 185573334X / ISBN:978-1855733343

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Linear polymer fibres	2	2	2	3	1	1	1	1	1	2	2	1	2	2	3
CO2	Carbon fibres	1	3	2	3	1	1	1	1	1	2	2	1	1	2	3
CO3	Glass and ceramic fibres	1	3	2	3	1	1	1	1	1	2	2	1	1	2	3
CO4	Chemical and thermal resistance fibres	2	3	2	3	1	1	1	1	1	2	2	1	2	2	3
CO5	Speciality fibres	1	3	2	3	1	1	1	1	1	2	2	1	2	2	3
Overall CO		1.4	2.8	2	3	1	1	1	1	1	2	2	1	1.6	2	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7006 LONG STAPLE SPINNING TECHNOLOGY L T P C
3 0 0 3

OBJECTIVES:

To enable the students to understand the method of production of yarn using long staple spinning system

UNIT I FIBRE CLEANING AND BLENDING 5

Impurities in the long-staple fibre like wool and their removal; methods adopted to process raw flax and jute; blending methods followed for long staple fibres

UNIT I FIBRE INDIVIDUALISATION 9

Fibre individualization in the carding machine; working principle and details of different type of carding machine-worsted carding, semi –worsted carding, woolen carding, flax carding and jute carding; card clothing and its maintenance; carding performance

UNIT I COMBING 9

Objective of combing; basic principles of combing; details of wol combing preparation and combing operation; worsted top finishing

UNIT IV DRAWING 9

Principle of long-staple drafting; effect of doubling; drafting irregularites; working details of worsted, semi worsted, jute and flax drawing; operating principle of roving machine

UNIT V YARN SPINNING 13

Mule spinning –drafting, twisting, backing-of, winding on; description of centrifugal spinning; flyer spinning; ring spinning – twisting, rings and travellers; condenser yarn spinning; cap spinning; open end spinning –general features of rotor and friction spinning as applicable to long-staple fibres; double-rove spinning; self-twist spinning system

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Fibre individualization, cleaning and the machineries required
CO2: Combing operation
CO3: Drawing operation
CO4: Yarn spinning
CO5: Alternative spinning

REFERENCES

1. Oxtoby E., “Spun Yarn Technology”, Buterworths, London, 1987, ISBN: 040801464 | ISBN- 13: 9780408014649
2. Hapey F., “Contemporary Textile Enginering”, Academic Pres, London, 1983
3. Lord P.R., “Yarn Production: Science, Technology and Economics”, The Textile Instiute, Manchester, 199, ISBN: 0123237505 |ISBN-13: 9780123237507
4. Ros D.A., Carnaby G.A and Lapage J., “Wolen Yarn Manufacture (Textile Progres)”, Vol.15, North Carolina State University, 1986, ISBN: 09073986X |ISBN-13: 97809073986
5. Richards R.T.D., and Sykes A.B., “Wolen Yarn Manufacture”, The Textile Instiute, Manchester, 194, ISBN: 1870812182 |ISBN-13: 9781870812184
6. Henshaw D.E., “Worsted Spining”, Vol.1, Textile Progres, The Textile Instiute, Manchester, 1981, ISBN: 090739452 |ISBN-13: 978090739453

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Fibre individualization, cleaning and the machineries required	3	2	3	3	-	2	2	1	2	2	2	2	3	1	2
CO2	Combing operation	3	2	2	2	-	1	1	1	1	1	1	1	3	1	2
CO3	Drawing operations	2	2	2	2	-	1	1	1	1	1	1	1	3	1	2
CO4	Yarn spinning	2	2	2	2	-	1	1	1	1	1	1	1	3	1	2
CO5	Alternative spinning	3	2	2	3	-	1	2	1	2	1	1	2	3	2	3
Overall CO		2.6	2	2.2	2.4	-	1.2	1.4	1	1.4	1.2	1.2	1.4	3	1.2	2.2

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7001 3D WEAVING L T P C
3 0 0 3

OBJECTIVES
To enable the students understand the theory of 3D weaving and different methods of production

UNIT I INTRODUCTION 9
Introduction to composite; forms of textile reinforcements and composite properties; classification of 3D woven fabrics; 3D woven structural requirements for composite and non composite applications; stitched 3D fabric production machines; Angle-interlock structure.

UNIT II WOVEN MULTILAYER 3D FABRIC PRODUCTION 9
Multilayer 3D fabric – design concepts, production techniques, production issues, near net shape production techniques; woven 3D spacer fabrics - techniques in spacer fabric weaving, properties, application and limitations

UNIT III NON INTERLACED 3D FABRIC PRODUCTION 9
Non crimp fabrics - loom modifications required, various shedding techniques; weft insertion techniques; properties, application and limitations

UNIT IV ORTHOGONALLY INTERLACED 3D FABRICS PRODUCTION 9
3D shedding concept, shedding devices - dual direction shedding and other shedding devices; picking techniques; beat-up techniques; combined picking and beating up techniques – mechanisms; composite modular joint- types and weaving techniques; properties, application and limitations

UNIT V CIRCULAR AND MULTI AXIAL 3D WEAVING 9
Circular 3D weaving technique; Triaxial weaving; modification of Triaxial weaving- Quart-axial and extended weaving, loom arrangements; multilayer multi axial fabrics; other shedding devices; fabric properties, application and limitations

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students would be able to understand
CO1: Types of 3D reinforcements used for making composites
CO2: Production of multilayer 3D fabrics and 3D spacer fabrics
CO3: Production of non-interlaced 3D fabric
CO4: Production of orthogonally interlaced 3D fabric
CO5: Circular and multiaxial 3D weaving

REFERENCES:

1. Jinlian Hu., “3D Fibrous Assemblies: Properties, Applications and Modelling of Three-Dimensional Textile structures”, CRC Press, 2008, **ISBN: 1420079867 | ISBN-13: 9781420079869**
2. Antonio Miravete., “3D Textile Reinforcements in Composite Materials”, Wood head Publishing, 1999, ISBN: 1855733765 | ISBN-13: 9781855733763
3. Tong L., MouritzA.P., and Bannister M., “3D Fibre Reinforced Polymer Composites”, Elsevier, 2002, ISBN: 0080439381 | ISBN-13: 9780080439389
4. NandanKhokar, “3D-Weaving and Noobing: Characterization of Interlaced and Non-interlaced 3D Fabric Forming Principles”, Ph. D. Thesis, Chalmers University of Technology, 1997. ISBN: 91-7197-492

Course Articulation Matrix

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Types of 3D reinforcements used for making composites	2	2	1	2	1	2	1	2	2	2	2	2	3	3	3
CO2	Production of multilayer 3D fabrics and 3D spacer fabrics	2	3	2	3	1	1	2	1	3	3	3	3	3	3	3
CO3	Production of non-interlaced 3D fabric	2	3	2	2	2	1	2	2	2	3	3	2	3	3	3
CO4	Production of orthogonally interlaced 3D fabric	2	3	3	3	2	1	2	1	2	3	3	2	3	3	3
CO5	Circular and multiaxial 3D weaving	2	2	2	2	1	1	2	2	2	2	2	2	3	3	3
Overall CO		2	2.6	2	2.4	1.4	1.2	1.8	1.6	2.2	2.6	2.6	2.6	3	3	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

AT7451 INTRODUCTION TO PATTERN ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

- To introduce students the human anthropometrics from the scientific and technological viewpoint
- To equip students with comprehensive pattern making skills

UNIT I BASICS OF ANTHROPOMETRICS AND SIZING SYSTEM 9

Anthropometry measurements, human anatomy, landmark terms, perception of body appearance, its relation to clothing, clothing sizing systems, illusions created by clothing, body ideals-Eight head theory, body proportions, height and weight distribution.

UNITII BODY MEASUREMENTS AND PATTERN TERMINOLOGIES 9

Important body measurements across all age groups, methods of measuring body dimensions, standard measurement chart-designation and control dimensions. Functions of pattern making tools, preparation of dress form , pattern grain line, balance line terms, notches, seam allowance, jog seam, dart points, pleats, flares, gather and true bias, trueing, blending.

UNIT III DRAFTING 9

Types of pattern making - drafting and draping methods; principles of pattern making, pattern details; basic blocks for men and women

UNIT IV PATTERNS FOR COLLARS AND SLEEVES 9

Collar classification and terms, basic shirt collar, peter pan collar, sailor collar, mandarin collar, built-up neck lines, cowls, sleeve cap, sleeve cuffs, puff, petal, lantern and leg-of-mutton sleeves

UNIT V FLAT PATTERN TECHNIQUES 9

Dart manipulation- single dart series-slash-spread technique, pivotal transfer technique; two dart series-slash spread and pivotal transfer technique; graduated and radiating darts; parallel, asymmetric and intersecting darts; types of added fullness and contouring principle

TOTAL: 45 PERIODS

OUTCOMES:

On completion of the course students are expected to

CO1. Take cognizance of the significance of Anthropometric and the clothing sizing systems
CO2. Understand methods of taking body measurements
CO3. Be aware of drafting and draping methods of pattern preparation
CO4. Develop patterns for other garment components
CO5. Understand the principles of pattern making and dot manipulation

REFERENCES

1. Fan J., Yu W., and Hunter L., “Clothing Appearance and Fit: Science and Technology”, Wood head Publishing Limited, 2004, ISBN: 1855737450 | ISBN-13: 9781855737457
2. Ashdown S., “Sizing in Clothing”, Wood head Publishing Limited, 2007, ISBN: 1845690346 | ISBN-13: 9781845690342
3. Helen Joseph Armstrong., “Patternmaking for Fashion Design”, Pearson Education Pvt Ltd., 2005,ISBN: 067398026X | ISBN-13: 9780673980267
4. Winifred Aldrich., “Metric Pattern Cutting for Children’s Wear and Baby Wear”, Blackwell Publishing, 2009, ISBN: 140518292X | ISBN-13: 9781405182928

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Take cognizance of the significance of Anthropometric and the clothing sizing systems	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO2	Understand methods of taking body measurements	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO3	Be aware of drafting and draping methods of pattern preparation	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO4	Develop patterns for other garment components	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO5	Understand the principles of pattern making and dot manipulation	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
Overall CO		2	2	2	-	2	-	-	1	1	1	1	1	2	3	1

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

AT7551 ADVANCED PATTERN ENGINEERING L T P C
3 0 0 3

OBJECTIVES:
To enable the students to develop better understanding on pattern construction, grading and pattern alteration techniques to provide good fit

UNIT I FOUNDATIONS FOR TOPS 9
Basic shirt foundation-front bodice draft, back bodice draft, sleeve draft, adding seam allowance and pattern information; kimono, raglan foundation; pattern for princess line foundation, strapless princess bodice foundation

UNIT II FOUNDATIONS FOR BOTTOM WEAR 9
pant foundation - front and back, waist band; jean foundation, pant derivatives;

UNIT III PATTERNS FOR POCKET, PLACKET AND FACINGS 6
Pocket classification, plackets; facing patterns for cut-out necklines and armholes

UNIT IV PATTERNS FOR KNITS, ACTION WEAR AND SWIMWEAR 12
Knit top foundations, bodysuit foundations and variations; swimwear–maillot, bikini, little-boy, and full-figure swim foundations; pattern for bias-cut dresses;

UNIT V PATTERN ALTERATIONS AND GRADING 9
Pattern alteration - fit for bodice, trouser and skirt; grading process, grade rules and types of grading system

TOTAL: 45 PERIODS

OUTCOMES:
On completion of the course students are expected to

CO1	Construct of top foundation
CO2	Construct bottom wear foundation
CO3	Construct the components such as pocket , placket and facings
CO4	Construct action and swim wear foundation and knit pattern adaptation
CO5	Carry on pattern alteration and grading

REFERENCES

1. Helen Joseph Armstrong., “Patternmaking for Fashion Design”, Pearson Education Pte. Ltd., 2005, ISBN: 067398026X | ISBN-13: 9780673980267
2. Winifred Aldrich., “Metric Pattern Cutting for Children’s Wear and Baby Wear”, Blackwell Publishing, 2004, ISBN: 140518292X | ISBN-13: 9781405182928

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Construct of top foundation	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO2	Construct bottom wear foundation	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO3	Construct the components such as pocket , placket and facings	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO4	Construct action and swim wear foundation and knit pattern adaptation	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO5	Carry on pattern alteration and grading	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
Overall CO		2	2	2	-	2	-	-	1	1	1	1	1	2	3	1

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

GE7251 ENVIRONMENTAL SCIENCE AND ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

To the study of nature and the facts about environment.

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

UNIT I ENVIRONMENT, ECOSYSTEMS AND BIODIVERSITY 14

Definition, scope and importance of environment – need for public awareness - concept of an ecosystem – structure and function of an ecosystem – producers, consumers and decomposers – energy flow in the ecosystem – ecological succession – food chains, food webs and ecological pyramids – Introduction, types, characteristic features, structure and function of the (a) forest ecosystem (b) grassland ecosystem (c) desert ecosystem (d) aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries) – Introduction to biodiversity definition: genetic, species and ecosystem diversity – biogeographical classification of India – value of biodiversity: consumptive use, productive use, social, ethical, aesthetic and option values – Biodiversity at global, national and local levels – India as a mega-diversity nation – hot-spots of biodiversity – threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – endangered and endemic species of India – conservation of biodiversity: In-situ and ex-situ conservation of biodiversity.

Field study of common plants, insects, birds

Field study of simple ecosystems – pond, river, hill slopes, etc.

UNIT II ENVIRONMENTAL POLLUTION 8

Definition – causes, effects and control measures of: (a) Air pollution (b) Water pollution (c)Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards– soil waste management: causes, effects and control measures of municipal solid wastes – role of an individual in prevention of pollution – pollution case studies – disaster management: floods, earthquake, cyclone and landslides.

Field study of local polluted site – Urban / Rural / Industrial / Agricultural.

UNIT III NATURAL RESOURCES 10

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

Field study of local area to document environmental assets – river / forest / grassland / hill / mountain.

UNIT IV SOCIAL ISSUES AND THE ENVIRONMENT 7

From unsustainable to sustainable development – urban problems related to energy – water conservation, rain water harvesting, watershed management – resettlement and rehabilitation of people; its problems and concerns, case studies – role of non-governmental organization- environmental ethics: Issues and possible solutions – climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – wasteland reclamation – consumerism and waste products – environment production act– Air (Prevention and Control of Pollution) act – Water (Prevention and control of Pollution) act – Wildlife protection act – Forest conservation act – enforcement machinery involved in environmental legislation- central and state pollution control boards- Public awareness.

UNIT V HUMAN POPULATION AND THE ENVIRONMENT 6

Population growth, variation among nations – population explosion – family welfare programme – environment and human health – human rights – value education – HIV / AIDS – women and child welfare – role of information technology in environment and human health – Case studies.

TOTAL: 45 PERIODS

OUTCOMES:

CO1:To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.

CO2:To identify the causes, effects and environmental pollution and natural disasters and contribute to the preventive measures in the immediate society.

CO3:To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.

CO4:To recognize different forms of energy and apply them for suitable applications in for technological advancement and societal development.

CO5:To demonstrate the knowledge of societal activity on the long and short term environmental issues and abide by the legal provisions, National and International laws and conventions in professional and personal activities and to identify and analyse effect of population dynamics on human value education, consumerism and role of technology in environmental issues.

TEXT BOOKS:

1. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education 2004.
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, 2006.

REFERENCES:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media.
2. Cunningham, W.P. Cooper, T.H. Gorhani, 'Environmental Encyclopedia',Jaico Publ., House, Mumbai, 2001.
3. Dharmendra S. Sengar, 'Environmental law', Prentice hall of India PVT LTD,New Delhi, 2007.
4. Rajagopalan, R, 'Environmental Studies-From Crisis to Cure', Oxford University Press 2005.

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	To recognize and understand the functions of environment, ecosystems and biodiversity and their conservation.	-	1	1	-	-	2	3	3	2	-	-	-	2	0	0
CO2	To identify the causes, effects and environmental pollution and natural disasters and contribute to the preventive measures in the immediate society.	2	1	1	-	-	2	3	3	-	-	-	-	2	0	0
CO3	To identify and apply the understanding of renewable and non-renewable resources and contribute to the sustainable measures to preserve them for future generations.	1	1	1	-	-	2	3	3	-	-	-	-	2	0	0
CO4	To recognize different forms of energy and apply them for suitable	1	1	1	-	-	3	3	3	-	-	-	-	2	0	0

	applications in for technological advancement and societal development.															
CO5	To demonstrate the knowledge of societal activity on the long and short term environmental issues and abide by the legal provisions, National and International laws and conventions in professional and personal activities and to identify and analyse effect of population dynamics on human value education, consumerism and role of technology in environmental issues.	-	-	-	-	-	3	2	2	1	-	-	-	2	0	0
Overall CO		0.8	0.8	0.8	0	0	2.4	2.8	2.8	0.6	0	0	0	2	0	0

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

GE7072 FOUNDATION SKILLS IN INTEGRATED PRODUCT DEVELOPMENT **L T P C 3 0 0 3**

OBJECTIVES:

- To understand the global trends and development methodologies of various types of products and services
- To conceptualize, prototype and develop product management plan for a new product based on the type of the new product and development methodology integrating the hardware, software, controls, electronics and mechanical systems
- To understand requirement engineering and know how to collect, analyze and arrive at requirements for new product development and convert them in to design specification
- To understand system modeling for system, sub-system and their interfaces and arrive at the optimum system specification and characteristics
- To develop documentation, test specifications and coordinate with various teams to validate and sustain up to the EoL (End of Life) support activities for engineering customer

UNIT I FUNDAMENTALS OF PRODUCT DEVELOPMENT 9

Global Trends Analysis and Product decision - Social Trends - Technical Trends- Economical Trends - Environmental Trends - Political/Policy Trends **- Introduction to Product Development Methodologies and Management -** Overview of Products and Services - Types of Product Development - Overview of Product Development methodologies **-** Product Life Cycle – Product Development Planning and Management.

UNIT II REQUIREMENTS AND SYSTEM DESIGN 9

Requirement Engineering - Types of Requirements - Requirement Engineering - traceability Matrix and Analysis - Requirement Management - **System Design & Modeling -** Introduction to System Modeling - System Optimization - System Specification - Sub-System Design - Interface Design.

UNIT III DESIGN AND TESTING 9

Conceptualization - Industrial Design and User Interface Design - Introduction to Concept generation Techniques – **Challenges in Integration of Engineering Disciplines** - Concept Screening & Evaluation - **Detailed Design -** Component Design and Verification – **Mechanical, Electronics and Software Subsystems** - High Level Design/Low Level Design of S/W Program **-** Types of Prototypes, S/W Testing- Hardware Schematic, Component design, Layout and Hardware Testing – **Prototyping -** Introduction to Rapid Prototyping and Rapid Manufacturing - **System Integration, Testing, Certification and Documentation**

UNIT IV SUSTENANCE ENGINEERING AND END-OF-LIFE (EOL) SUPPORT 9

Introduction to Product verification processes and stages - Introduction to Product Validation processes and stages - Product Testing Standards and Certification - Product Documentation - **Sustenance -**Maintenance and Repair – Enhancements - **Product EoL -** Obsolescence Management – Configuration Management - EoL Disposal

UNIT V BUSINESS DYNAMICS – ENGINEERING SERVICES INDUSTRY 9

The Industry - Engineering Services Industry - Product Development in Industry versus Academia –**The IPD Essentials -** Introduction to Vertical Specific Product Development processes -Manufacturing/Purchase and Assembly of Systems - Integration of Mechanical, Embedded and Software Systems – Product Development Trade-offs - Intellectual Property Rights and Confidentiality – Security and Configuration Management.

TOTAL: 45 PERIODS

OUTCOMES:

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

- Define, formulate and analyze a problem
- Solve specific problems independently or as part of a team
- Gain knowledge of the Innovation & Product Development process in the Business Context
- Work independently as well as in teams
- Manage a project from start to finish

TEXTBOOKS:

1. Book specially prepared by NASSCOM as per the MoU.
2. Karl T Ulrich and Stephen D Eppinger, "Product Design and Development", Tata McGraw Hill, Fifth Edition, 2011.
3. John W Newstorm and Keith Davis, "Organizational Behavior", Tata McGraw Hill, Eleventh Edition, 2005.

REFERENCES:

1. Hiriyappa B, “Corporate Strategy – Managing the Business”, Author House, 2013.
2. Peter F Drucker, “People and Performance”, Butterworth – Heinemann [Elsevier], Oxford, 2004.
3. Vinod Kumar Garg and Venkita Krishnan N K, “Enterprise Resource Planning – Concepts”, Second Edition, Prentice Hall, 2003.
4. Mark S Sanders and Ernest J McCormick, "Human Factors in Engineering and Design", McGraw Hill Education, Seventh Edition, 2013

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Define, formulate and analyze a problem	2	3	3	1	0	0	1	0	1	1	2	2	2	0	3
CO2	Solve specific problems independently or as part of a team	2	3	3	1	0	0	1	0	1	1	2	2	2	0	3
CO3	Gain knowledge of the Innovation & Product Development process in the Business Context	2	3	3	1	0	0	1	0	1	1	2	2	2	0	3
CO4	Work independently as well as in teams	2	3	3	1	0	0	1	0	1	1	2	2	2	0	3
CO5	Manage a project from start to finish	2	3	3	1	0	0	1	0	1	1	2	2	2	0	3
Overall CO		2	3	3	1	0	0	1	0	1	1	2	2	2	0	3

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively

TT7014 **ERP FOR TEXTILE INDUSTRY** **L T P C**
1 0 4 3

UNIT I **9+36**

Enterprise Resource Planning – principle, frame work, scope; application of ERP in textile manufacturing industry - business concepts, costing, order booking, MRP, purchase, production planning, production orders, inventory control, packing, shipping, scheduling, sample preparation and approval, business reports

UNIT II **3+12**

ERP in textile processing – master creation, raw material receipt, batch creation, sample process and approvals, recipe creation, dyes and chemicals issue, production tracking, quality control, dispatch, invoice, machine repairs and maintenance, reports

UNIT III **3+12**

ERP in retail management – style template, finished goods barcoding, stock taking, stock inward, retail order booking, stock allocation, scan and pack, dispatch, invoice, point of sale, reports

Total number of periods (Theory + Lab): 15+60

OUTCOME

Upon the completion of this course the students shall be able to

CO1: Understand the structure and carryout data entry using textile ERP software

CO2: Apply ERP concepts in textile chemical processing industry

CO3: Apply ERP concepts in Textile retail industry

TEXT BOOKS:

1. VeenaBansal, “Enterprise resource planning”, Pearson Education India, 2013
2. Sadagopan. S., “ERP-A Managerial Perspective”, Tata McGraw-Hill Education Pvt. Ltd., New Delhi, 2001
3. Garg and Venkitakrishnan, Venkitakrishnan N.K. “ERPWARE, ERP Implementation Framework”, Prentice Hall of India Pvt. Ltd., New Delhi, 2004

REFERENCES:

1. Vinod Kumar Grag and Venkitakrishnan N.K., “Enterprise Resource Planning: Concepts and practice”, Prentice Hall of India Pvt. Ltd, New Delhi, 2011
2. Joseph.A.Brady, Ellen F. Monk, Bret J. Wagner, “Concepts in Enterprise Resource Planning”, Course Technology, 2001

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO8	PO 9	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Understand the structure and carryout data entry using textile ERP software	-	-	2	-	3	-	-	2	2	2	2	1	-	2	-
CO2	Apply ERP concepts in textile chemical processing industry	-	-	2	-	3	-	-	2	2	1	2	1	-	2	-
CO3	Apply ERP concepts in Textile retail industry	-	-	2	-	3	-	-	3	2	1	2	1	-	2	-
Overall CO		-	-	2	-	3	-	-	2.33	2	1.33	2	1	-	2	-

1, 2 and 3 are correlation levels with weightings as Slight (Low), Moderate (Medium) and Substantial (High) respectively