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

Attested

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Centre for Academic Courses
Anna University, Chennai-600 025

ANNA UNIVERSITY: CHENNAI: 600 025

UNIVERSITY DEPARTMENTS

B.TECH. TEXTILE TECHNOLOGY

REGULATIONS – 2019

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

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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

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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		✓	✓					✓				✓

Course Title	PO												PSO		
HUMANITIES AND SOCIAL SCIENCES INCLUDING MANAGEMENT COURSES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO 2**	**PSO3**
Technical English															
Professional Communication															
Elective - Humanities I															
Elective - Humanities I															
Fundamentals of Economics and Management	-	-	2	-	1.2	1.8	-	1.2	0.8	-	2	2	1.8	2	-
Basic Science Courses [BSC]	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO 2**	**PSO3**
Engineering Mathematics I															
Engineering Physics															
Engineering Chemistry															
Basic Sciences Laboratory															
Engineering Mathematics II															
Chemistry (Chemistry for technologists)															
Probability and statistics	2	2	1	2.8	1	-	-	-	-	-	1.4	1.4	1	-	-
Environmental Science	0.8	0.8	0.8	-	-	2.4	2.8	2.8	0.6	-	-	-	2	-	-
ENGINEERING SCIENCECOURSE [ESC]	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO 2**	**PSO3**
Engineering Graphics															
Workshop Practices Lab															
Problem solving and Python programming															
Basics of Electrical and Electronics Engineering															
Engineering Mechanics															

Electrical and Electronics Engineering Laboratory															
Problem solving and Python Programming laboratory															
PROFESSIONALCOURSES [PCC]	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO 2**	**PSO3**
Basics of Textile Technology	-	-	-	-	-	-	-	2	1	-	1	1	-	1	-
Technology of Pre-Spinning Process	2.8	2.8	3	2	2	1	1	2	2	1.8	1.8	1.8	3	1	-
Technology of Pre-Weaving Process	2.2	2	1.4	2	2.2	1.4	1.4	1.6	1.4	1.8	1.8	2	2.6	2.6	2.6
Characteristics of Textile Fibres	2.8	3	2	1	-	1	1	1	1.8	1.8	1.4	1	3	1.8	2
Spinning Process Laboratory	1.25	2.5	1.5	1.75	1.25	-	-	-	2.5	2.25	2.5	-	2.5	2	-
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
Technology of Woven Fabric Manufacture	1.4	2.2	2.4	2.2	1.8	1.8	1.4	2	2	1.8	2	2	3	3	3
Technology of Yarn Spinning	2.28	2.28	2.14	2.28	1.57	1.28	1.28	2.14	2.28	2.14	2.14	2.14	3	2	3
Knitting Technology	3	2.4	2	2.4	1.8	2	2	2	1	2	2	2.4	2	3	3
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
Fabric Manufacture Laboratory	3	3	2	2	1.8	2	2	2	3	2	2	1.4	3	3	3
Woven Fabric Structure	1	1	1.8	-	2.8	1	1	1	2	1	1	1	2	2	2
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
Textile Quality Evaluation	2.4	2.4	2.2	2.8	1.8	1.6	-	1.6	-	2.6	2.6	-	2.6	3	3
Technology of Nonwovens	1	1.8	1.8	1.8	1.8	1	1	2	1	2	2	2	2	2	2.8
Textile Quality Evaluation Laboratory	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
Fabric Analysis Laboratory	3	1	2	1	1	1	1	-	1	1	1	-	2	2	3
Chemical Processing of Textile Material II	2.8	1.8	1.8	2	1.2	1.8	1.8	1.8	1.8	2	2	1	3	3	3
Garment Manufacturing Technology	1.6	1.4	1	0.8	1.4	0.8	1.4	1	0.2	1.8	2.4	1	1.8	2.6	2.6
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
Textile Chemical Processing Laboratory	2	1.8	2.6	1.6	0.4	1.6	1.2	2	1.6	2	2	-	3	2	2
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
Financial Management for Textile Industry	-	-	2.4	-	2.6	1	-	2	2	2	2.4	1	-	2	-
PROFESSIONAL ELECTIVES [PEC]	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO 2**	**PSO3**
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
Quality Control in Spinning	2.4	2.4	1.2	3	2.4	1.2	1.2	2.2	2.2	2.2	2	1.4	3	1.4	-
Theory of Drafting and Twisting	2.6	3	2.4	2.2	2	1	1.2	-	1.4	1.4	1.4	1.2	2.2	1.2	2

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
Special Textile Structures	-	-	3	1.8	1.6	1.6	2	-	-	1.2	2.2	2.2	2	3	3
Characterization of Textile Polymers	1.6	-	-	2	-	1	1	2	1	2.4	1	1.2	3	1	1
High Performance Fibres	1.4	2.8	2	3	1	1	1	1	1	2	2	1	1.6	2	3
Advances in Textile Printing and Finishes	2.2	1	1	2.6	1	2.4	2.4	2	1	1	-	1.6	2	2	3
Management of Textile Effluents	2.2	1.2	2.4	1	-	2.2	2.2	2.2	1	1.6	1	1	2	2	-
Application of Statistics in Textile Industry	3	3	2.71	2.71	2.28	-	-	1	-	2.14	2	-	2	1	-
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
Technical Textiles	1.5	1.25	3	3	-	2.5	2	2	1	2	3	3	2	3	3
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
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
Textile Reinforced Composites	1	2.4	3	3	1	2	1	1	1	3	1	2	1	2	2
Smart Textiles	-	-	2.25	-	-	2.25	2.25	2	1	1	2.5	2	-	2	2
Protective Textiles	-	0.8	3	2.2	-	1.6	1.6	1.8	0.8	1.2	1	1.6	-	2.4	2.6
Garment Production Machinery	2.57	2.28	1.14	1	1	1	1	1	1	2	2	1	2	3	3
Industrial Engineering in Apparel Industry	1.2	2	3	3	2	1	1.2	2	2	1	2.4	2	1	1	-
Apparel Marketing and Merchandising	-	1	2.6	2	2	1	1	2.4	2	1.2	1	-	2	2	2
Enterprise Resource Planning for Apparel Industry	-	-	2.25	-	3	-	-	2	2	1	2.5	1	-	2	-
Pattern Making I	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
Pattern Making II	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
Production and Application of Sewing Threads	2.2	2.2	2	2	1.2	1.2	1.2	-	2	1.4	1.4	2.2	3	2.2	2.2
Apparel Product Development Lab	1.33	-	1.33	-	-	-	-	1	1.33	1.33	1.33	1	3	2	1
Basic Sewing and Pattern Making Laboratory	-	-	-	-	1	-	-	-	-	1	1	-	1	2	1
Operations Research for Textile Industry	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
Total Quality Management for Textile Industry	1.25	2.25	2	-	2	1	1.25	2	2.25	2.5	2.25	2	2	2	-
Textile Costing	-	-	1	-	2.2	1	-	2	2	-	2	0.4	-	2	-
Supply Chain Management for Textile Industry	-	-	2.4	1.4	2.4	-	-	2	2.4	2	2.4	1	2	1	-
Textile and Apparel EXIM Management	-	1.2	2	1	2.6	-	-	2	2.2	1.2	2.2	1	2	1	-
EMPLOYABILITY ENHANCEMENT COURSES (EEC)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**PSO1**	**PSO 2**	**PSO3**
Project I	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3
Project II	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3
Comprehension	3	2	2.6	2.8	2	2	2.4	2.4	3	2.4	2.6	2.6	2.8	-	2
Internship / Training	3	2	2.6	2.8	2	2	2.1	2.1	3	2.4	2.6	2.6	2.8	2.4	2

ANNA UNIVERSITY: CHENNAI: 600 025
UNIVERSITY DEPARTMENTS
B.TECH. TEXTILE TECHNOLOGY
REGULATIONS – 2019
CHOICE BASED CREDIT SYSTEM
CURRICULAAND SYLLABI FOR I TO VIII SEMESTERS
(Applicable to Students admitted from the Academic Year 2020-2021 onwards)

SEMESTER I

SI. NO.	CODE NO.	COURSETITLE	CATE GORY	PERIODSPER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	HS5151	Technical English	HSMC	4	0	0	4	4
2.	MA5158	Engineering Mathematics I	BSC	3	1	0	4	4
3.	PH5151	Engineering Physics	BSC	3	0	0	3	3
4.	CY5151	Engineering Chemistry	BSC	3	0	0	3	3
5.	GE5151	Engineering Graphics	ESC	1	0	4	5	3
6.	GE5152	Engineering Mechanics	ESC	3	1	0	4	4
PRACTICALS								
7.	BS5161	Basic Sciences Laboratory	BSC	0	0	4	4	2
8.	GE5162	Workshop Practices Laboratory	ESC	0	0	4	4	2
			TOTAL	**17**	**2**	**12**	**31**	**25**

SEMESTER II

SI. NO.	CODE NO.	COURSETITLE	CATE GORY	PERIODSPER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	HS5251	Professional Communication	HSMC	4	0	0	4	4
2.	MA5252	Engineering Mathematics II	BSC	3	1	0	4	4
3.	GE5153	Problem solving and Python programming	ESC	3	0	0	3	3
4.	EE5251	Basics of Electrical and Electronics Engineering	ESC	3	0	0	3	3
5.	CY5251	Chemistry for Technologists	BSC	3	0	0	3	3
6.	TT5201	Basics of Textile Technology	PCC	3	0	0	3	3
PRACTICALS								
7.	GE5161	Problem solving and Python Programming laboratory	ESC	0	0	4	4	2
8.	EE5261	Electrical and Electronics Engineering Laboratory	ESC	0	0	4	4	2
			TOTAL	**19**	**1**	**8**	**28**	**24**

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SEMESTER III

SI. NO.	CODE NO.	COURSETITLE	CATE GORY	PERIODS PERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	MA5354	Probability and statistics	BSC	3	1	0	4	4
2.	TT5301	Technology of Pre-Spinning Process	PCC	3	0	0	3	3
3.	TT5302	Technology of Pre-Weaving Process	PCC	3	0	0	3	3
4.	TT5351	Characteristics of Textile Fibres	PCC	3	0	0	3	3
5.		Elective - Humanities I	HSMC	3	0	0	3	3
PRACTICALS								
6.	TT5311	Spinning Process Laboratory	PCC	0	0	4	4	2
7.	TT5312	Fibre Science Laboratory	PCC	0	0	4	4	2
			TOTAL	**15**	**1**	**8**	**24**	**20**

SEMESTER IV

SI. NO.	CODE NO.	COURSETITLE	CATE GORY	PERIODS PERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	HM5551	Fundamentals of Economics and Management	HSMC	3	0	0	3	3
2.	GE5251	Environmental Sciences	BSC	3	0	0	3	3
3.		Audit Course -I*	AC	3	0	0	3	0
4.	TT5401	Technology of Woven Fabric Manufacture	PCC	3	0	0	3	3
5.	TT5402	Technology of Yarn Spinning	PCC	2	0	2	4	3
6.	TT5403	Knitting Technology	PCC	3	0	0	3	3
7.	TT5404	Technology of Manufactured Fibre Production	PCC	3	0	0	3	3
PRACTICALS								
8.	TT5411	Fabric Manufacture Laboratory	PCC	0	0	4	4	2
9.	TT5513	Internship /Training I**	EEC	-	-	-	-	-
			TOTAL	**20**	**0**	**6**	**26**	**20**

*** Audit Courseis optional**

**Students shall undergo Internship /Training I for a minimum period of 4 weeks and assessment of the same will be held in fifth semester

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SEMESTER V

SI. NO.	CODE NO.	COURSETITLE	CATE GORY	PERIODS PERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.		Elective - Humanities I	HSMC	3	0	0	3	3
2.		Audit Course -II*	AC	3	0	0	3	0
3.	TT5501	Woven Fabric Structure	PCC	2	1	0	3	3
4.	TT5502	Chemical Processing of Textile Materials I	PCC	3	0	0	3	3
5.	TT5503	Textile Quality Evaluation	PCC	4	0	0	4	4
6.	TT5551	Technology of nonwovens	PCC	3	0	0	3	3
7.		Professional Elective I	PEC	3	0	0	3	3
PRACTICALS								
8.	TT5511	Textile Quality Evaluation Laboratory	PCC	0	0	4	4	2
9.	TT5512	Fabric Analysis Laboratory	PCC	0	0	4	4	2
10.	TT5513	Internship /Training I	EEC	-	-	-	-	2
			TOTAL	**21**	**1**	**8**	**30**	**25**

*** Audit Courseis optional**

SEMESTER VI

SI. NO.	CODE NO.	COURSETITLE	CATE GORY	PERIODS PERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	TT5601	Chemical Processing of Textile Material II	PCC	3	0	0	3	3
2.	TT5602	Garment Manufacturing Technology	PCC	3	0	0	3	3
3.	TT5603	Mechanics of Textile Machinery	PCC	3	0	0	3	3
4.		Professional Elective II	PEC	3	0	0	3	3
5.		Professional Elective III	PEC	3	0	0	3	3
6.		Professional Elective IV	PEC	3	0	0	3	3
7.		Open Elective I	OEC	3	0	0	3	3
PRACTICALS								
8.	TT5611	Textile Chemical Processing Laboratory	PCC	0	0	4	4	2
9.	TT5711	Internship/ Training II*	EEC	-	-	-	-	-
			TOTAL	**21**	**0**	**4**	**25**	**23**

*Students shall undergo Internship /Training II for a minimum period of 4 weeks and assessment of the same will be held in seventh semester

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SEMESTER VII

SI. NO.	CODE NO.	COURSETITLE	CATEGORY	PERIODSPERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	TT5701	Structural Mechanics of Yarns and Fabrics	PCC	3	0	0	3	3
2.	TT5702	Financial Management for Textile Industry	PCC	3	0	0	3	3
3.		Professional Elective V	PEC	3	0	0	3	3
4.		Professional Elective VI	PEC	3	0	0	3	3
5.		Professional Elective VII	PEC	3	0	0	3	3
6.		Open Elective II	OEC	3	0	0	3	3
PRACTICALS								
7.	TT5711	Internship/ Training II	EEC	-	-	-	-	2
8.	TT5712	Comprehension	EEC	0	2	0	2	2
	TT5713	Project I	EEC	0	0	6	6	3
			TOTAL	**18**	**2**	**6**	**26**	**25**

SEMESTER VIII

SI. NO.	CODE NO.	COURSETITLE	CATEGORY	PERIODSPERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
PRACTICALS								
1.	TT5811	Project II	EEC	0	0	16	16	8
			TOTAL	**0**	**0**	**16**	**16**	**8**

Total Credits: 170

LIST OF PROFESSIONAL ELECTIVES

Sl. No.	Code No.	Course Title	Periods per week			Credits
			Lecture	Tutorial	Practical	
1	TT5001	Process Control in Spinning	3	0	0	3
2	TT5002	Quality Control in Spinning	3	0	0	3
3	TT5003	Theory of Drafting and Twisting	3	0	0	3
4	TT5004	Long Staple Spinning Technology	3	0	0	3
5	TT5005	Special Textile Structures	3	0	0	3
6	TT5006	Characterization of Textile Polymers	2	0	2	3
7	TT5007	High Performance Fibres	3	0	0	3
8	TT5008	Advances in Textile Printing and Finishes	3	0	0	3
9	TT5009	Management of Textile Effluents	3	0	0	3
10	TT5010	Application of Statistics in Textile Industry	3	0	0	3
11	TT5075	Clothing Comfort	3	0	0	3
12	TT5011	Technical Textiles	3	0	0	3
13	TT5012	Coated Textiles	3	0	0	3
14	TT5013	Medical Textiles	3	0	0	3
15	TT5014	Textile Reinforced Composites	3	0	0	3
16	TT5015	Smart Textiles	3	0	0	3
17	TT5016	Protective Textiles	3	0	0	3
18	AT5451	Garment Production Machinery	2	0	2	3
19	AT5751	Industrial Engineering in Apparel Industry	3	0	0	3
20	AT5752	Apparel Marketing and Merchandising	3	0	0	3
21	AT5071	Enterprise Resource Planning for Apparel Industry	0	0	6	3
22	AT5303	Pattern Making I	3	0	0	3
23	AT5452	Pattern Making II (Prerequisite for this course is	3	0	0	3
24	AT5072	Production and application of sewing threads	3	0	0	3
25	TT5017	Apparel Product Development Laboratory	0	0	6	3
26	TT5018	Basic Sewing and Pattern Making Laboratory	0	0	6	3
27	TT5071	Operations Research for Textile Industry	3	0	0	3
28	TT5074	Total Quality Management for Textile Industry	3	0	0	3
29	TT5019	Textile Costing	3	0	0	3
30	TT5072	Supply Chain Management for Textile Industry	3	0	0	3
31	TT5073	Textile and Apparel EXIM Management	3	0	0	3

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HUMANITIES AND SOCIAL SCIENCES (HSMC) – MANAGEMENT AND OTHERS

Sl. No.	Code No.	Course Title	Periods per week			Credits	Semester
			Lecture	Tutorial	Practical		
1.	HS5151	Technical English	4	0	0	4	1
2.	HS5251	Professional Communication	4	0	0	4	2
3.	HM5551	Fundamentals of Economics and Management	3	0	0	3	4
					Total Credits:	**11**	

HSMC– ELECTIVES – HUMANITIES I (ODD SEMESTER)

Sl. No	Course Code	Course Title	Periods per week			Credits
			Lecture	Tutorial	Practical	
1.	HU5171	Language and Communication	3	0	0	3
2.	HU5172	Values and Ethics	3	0	0	3
3.	HU5173	Human Relations at Work	3	0	0	3
4.	HU5174	Psychological Process	3	0	0	3
5.	HU5175	Education, Technology and Society	3	0	0	3
6.	HU5176	Philosophy	3	0	0	3
7.	HU5177	Applications of Psychology in Everyday Life	3	0	0	3

BASIC SCIENCE COURSE [BSC]

Sl. No.	Code No.	Course Title	Periods per week			Credits	Semester
			Lecture	Tutorial	Practical		
1.	MA5158	Engineering Mathematics I	3	1	0	4	1
2.	PH5151	Engineering Physics	3	0	0	3	1
3.	CY5151	Engineering Chemistry	3	0	0	3	1
4.	BS5161	Basic Sciences Laboratory	0	0	4	2	1
5.	MA5252	Engineering Mathematics II	3	1	0	4	2
6.	CY5251	Chemistry (Chemistry for technologists)	3	0	0	3	2
7.	MA5354	Probability and statistics	3	1	0	4	3
8.	GE5251	Environmental Sciences	3	0	0	3	4
					Total Credits	**26**	

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ENGINEERING SCIENCE COURSE [ESC]

Sl. No	Code No.	Course Title	Periods per week			Credits	Semester
			Lecture	Tutorial	Practical		
1.	GE5151	Engineering Graphics	1	0	4	3	1
2.	GE5162	Workshop Practices Lab	0	0	4	2	1
3.	GE5153	Problem solving and Python programming	3	0	0	3	2
4.	EE5251	Basics of Electrical and Electronics Engineering	3	0	0	3	2
5.	GE5152	Engineering Mechanics	3	1	0	4	1
6.	EE5261	Electrical and Electronics Engineering Laboratory	0	0	4	2	2
7.	GE5161	Problem solving and Python Programming laboratory	0	0	4	2	2
					Total Credits:	**19**	

PROFESSIONAL CORE COURSES [PCC]

Sl. No	Code No.	Course Title	Periods per week			Credits	Semester
			Lecture	Tutorial	Practical		
1	TT5201	Basics of Textile Technology	3	0	0	3	2
2	TT5301	Technology of Pre-Spinning Process	3	0	0	3	3
3	TT5302	Technology of Pre-Weaving Process	3	0	0	3	3 3
4	TT5351	Characteristics of Textile Fibres	3	0	0	3	3
5	TT5311	Spinning Process Laboratory	0	0	4	2	3
6	TT5312	Fibre Science Laboratory	0	0	4	2	3
7	TT5401	Technology of Woven Fabric Manufacture	3	0	0	3	4
8	TT5402	Technology of Yarn Spinning	2	0	2	3	4
9	TT5403	Knitting Technology	3	0	0	3	4
10	TT5404	Technology of Manufactured Fibre Production	3	0	0	3	4
11	TT5411	Fabric Manufacture Laboratory	0	0	4	2	4
12	TT5501	Woven Fabric Structure	2	1	0	3	5
13	TT5502	Chemical Processing of Textile Materials I	3	0	0	3	5
14	TT5503	Textile Quality Evaluation	4	0	0	4	5
15	TT5551	Technology of Nonwovens	3	0	0	3	5
16	TT5511	Textile Quality Evaluation	0	0	4	2	5
17	TT5512	Fabric Analysis Laboratory	0	0	4	2	5
18	TT5601	Chemical Processing of Textile Material II	3	0	0	3	6
19	TT5602	Garment Manufacturing Technology	3	0	0	3	6
20	TT5603	Mechanics of Textile Machinery	3	0	0	3	6
21	TT5611	Textile Chemical Processing	0	0	4	2	6
22	TT5701	Structural Mechanics of Yarns and Fabrics	3	0	0	3	7

23	TT5702	Financial Management for Textile Industry	3	0	0	3	7
					Total Credits	**64**	

PROFESSIONAL ELECTIVES [PEC]

Sl.No	Code No.	Course Title	Periods per week			Credits	Semester
			Lecture	Tutorial	Practical		
1.	PEC	Professional Elective–I	3	0	0	3	6
2.	PEC	Professional Elective–II	3	0	0	3	6
3.	PEC	Professional Elective–III	3	0	0	3	7
4.	PEC	Professional Elective–IV	3	0	0	3	7
5.	PEC	Professional Elective–V	3	0	0	3	7
6.	PEC	Professional Elective–VI	3	0	0	3	8
7.	PEC	Professional Elective–VI	3	0	0	3	8
					Total Credits	**21**	

EMPLOYABILITY ENHANCEMENT COURSES (EEC)

Sl. No.	Code No.	Course Title	Periods per week			Credits	Semester
			Lecture	Tutorial	Practica		
1	TT5513	Internship / Training (Minimum 4 Weeks)	0	0	0	2	5
2	TT5711	Internship / Training (Minimum 4 Weeks)	0	0	0	2	7
3	TT5712	Comprehension	0	2	0	2	7
4	TT5713	Project I	0	0	6	3	7
5	TT5811	Project II	0	0	16	8	8
					Total Credits:	**17**	

AUDIT COURSES (AC)

Registration for any of these courses is optional to students

Sl. No.	Course Code	Course Title	Periods per week			Credits	Semester
			Lecture	Tutorial	Practical		
1.	AD5091	Constitution of India	3	0	0	0	**4/5**
2.	AD5092	Value Education	3	0	0	0	
3.	AD5093	Pedagogy Studies	3	0	0	0	
4.	AD5094	Stress Management by Yoga	3	0	0	0	
5.	AD5095	Personality Development Through Life Enlightenment Skills	3	0	0	0	
6.	AD5096	Unnat Bharat Abhiyan	3	0	0	0	
7.	AD5097	Essence of Indian Knowledge Tradition	3	0	0	0	

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8.	AD5098	Sanga Tamil Literature Appreciation	3	0	0	0	
					Total Credits:	**0**	

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Summary

	Subject Area	Credits per Semester								Credits Total
		I	II	III	IV	V	VI	VII	VIII	
1	HS MC	4	4	3	3	3	-	-	-	17
2	BSC	12	7	4	3	-	-	-	-	26
3	ES C	9	10	-	-	-	-	-	-	19
4	PC C	-	3	13	14	17	11	6	-	64
5	PE C	-	-	-	-	3	9	9		21
6	OE C	-	-	-	-	-	3	3	-	6
7	EE C	-	-	-	-	2	-	7	8	17
	Total	25	24	20	20	25	23	25	8	**170**
8	AC (Non Credit)				*	*				

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SYLLABI

HS5151	TECHNICAL ENGLISH	L	T	P	C
		4	0	0	4

OBJECTIVES:

The first semester English course entitled 'Technical English' aims to,

- Familiarise first year students of engineering and technology with the fundamental aspects of technical English.
- Develop all the four language skills by giving sufficient practice in the use of the skills in real life contexts.
- Enhance the linguistic and communicative competence of first year engineering and technology students.

UNIT I INTRODUCING ONE SELF 12

Listening: listening and filling a form, listening to speeches by specialists from various branches of engineering and completing activities such as answering questions, identifying the main ideas of the listening text, style of the speaker (tone and tenor) – speaking: introducing oneself –introducing friend/ family - reading: descriptive passages (from newspapers / magazines)- writing: writing a paragraph (native place, school life)- grammar: simple present, present continuous – vocabulary development: one word substitution

UNIT II DIALOGUE WRITING 12

Listening: listening to conversations (asking for and giving directions) –speaking: making conversation using (asking for directions, making an enquiry), role plays-dialogues- reading: reading a print interview and answering comprehension questions-writing: writing a checklist, dialogue writing- grammar: simple past – question formation (wh- questions, yes or no questions, tag questions)- vocabulary development: stress shift, lexical items related to the theme of the given unit.

UNIT III FORMAL LETTER WRITING 12

Listening: listening to speeches by famous people and identifying the central message of the speech – answering multiple-choice questions)-speaking: giving short talks on a given topic- reading: reading motivational essays on famous engineers and technologists (answering open-ended and closed questions)- writing: writing formal letters/ emails (complaint letters)-grammar: future tense forms of verbs, subject and verb agreement- vocabulary development: collocations – fixed expressions

UNIT IV WRITING COMPLAINT LETTERS 12

Listening: listening to short talks (5 minutes duration and fill a table, gap-filling exercise) note taking/note making-speaking: small group discussion, giving recommendations-reading: reading problem – solution articles/essays drawn from various sources- writing: making recommendations – writing a letter/ sending an email to the editor-note making- grammar: modals – phrasal verbs – cause and effect sentences- vocabulary development: connectives, use of cohesive devices in writing, technical vocabulary.

UNIT V WRITING DEFINITIONS AND PRODUCT DESCRIPTION 12

Listening: listening to a product description (labeling and gap filling) exercises- speaking: describing a product and comparing and contrasting it with other products- reading: reading graphical material for comparison (advertisements)-writing: writing definitions (short and long) – compare and contrast paragraphs- grammar: adjectives – degrees of comparison - compound nouns- vocabulary development: use of discourse markers – suffixes (adjectival endings).

TOTAL: 60 PERIODS

Learning Outcomes

At the end of the course the students will have gained,

CO1	Exposure to basic aspects of technical English.
CO2	The confidence to communicate effectively in various academic situations.
CO3	Learnt the use of basic features of Technical English.
CO4	Writing features of Technical English
CO5	Writing complaint letters

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Textbook:

1. Revised Edition of 'English for Engineers and Technologists' Volume 1 published by Orient Black Swan Limited 2019.

Assessment Pattern

- Assessments will assess all the four skills through both pen and paper and computer based tests.
- Assessments can be pen and paper based quizzes.

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MA5158	ENGINEERING MATHEMATICS – I (Common to all branches of B.E. / B.Tech. Programmes in I Semester)	L	T	P	C
		3	1	0	4

OBJECTIVES:

- To develop the use of matrix algebra techniques that is needed by engineers for practical applications.
- To familiarize the students with differential calculus.
- To familiarize the student with functions of several variables. This is needed in many branches of engineering.
- To make the students understand various techniques of integration.
- To acquaint the student with mathematical tools needed in evaluating multiple integrals and their applications.

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 DIFFERENTIAL CALCULUS **12**

Limit of function – One sided limit – Limit Laws – Continuity – left and right continuity – types of discontinuities – Intermediate Value Theorem – Derivatives of a function - Differentiation rules – Chain rule – Implicit differentiation – logarithmic differentiation – Maxima and minima – Mean value theorem – (Optional: Polar coordinate system – Differentiation in polar coordinates).

UNIT III 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 IV 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 V 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.

TOTAL : 60 PERIODS

UTCOMES:

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

CO1 Use the matrix algebra methods for solving practical problems.
CO2 Apply differential calculus tools in solving various application problems.
CO3 Able to use differential calculus ideas on several variable functions.
CO4 Apply different methods of integration in solving practical problems.
CO5 Apply multiple integral ideas in solving areas, volumes and other practical problems.

TEXTBOOKS:

1. Grewal B.S., "Higher Engineering Mathematics", Khanna Publishers, 44th Edition, New Delhi, 2017.
2. James Stewart, "Calculus with Early Transcendental Functions", Cengage Learning, 6th Edition, New Delhi,2013.
3. Joel Hass, Christopher Heil and Maurice D.Weir, "Thomas' Calculus", Pearson, 14th Edition, New Delhi, 2018.
4. Narayanan S. and Manicavachagom Pillai T. K., "Calculus" Volume I and II, S. Viswanathan Publishers Pvt. Ltd., Chennai, 2009.

REFERENCES:

1. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), 7th Edition, New Delhi, 2009.
2. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2015.
3. Greenberg M.D., “Advanced Engineering Mathematics”, Pearson Education2nd Edition, 5th Reprint, Delhi, 2009.
4. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”,Narosa Publications, 5th Edition, New Delhi, 2017.
5. Peter V.O’Neil, “Advanced Engineering Mathematics”, Cengage Learning India Pvt., Ltd, 7th Edition, New Delhi , 2012.
6. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., 11th Reprint, New Delhi, 2010.

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PH5151 **ENGINEERING PHYSICS** **L T P C**

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

OBJECTIVE

- To make the students in understanding the importance of mechanics.
- To equip the students on the knowledge of electromagnetic waves.
- To introduce the basics of oscillations, optics and lasers.
- To enable the students in understanding the importance of quantum physics.
- To elucidate the application of quantum mechanics towards the formation of energy bands in crystalline materials.

UNIT I MECHANICS **9**

Moment of inertia (M.I) - Radius of gyration - Theorems of M .I - M.I of circular disc, solid cylinder , hollow cylinder , solid sphere and hollow sphere - K.E of a rotating body – M.I of a diatomic molecule – Rotational energy state of a rigid diatomic molecule - centre of mass – conservation of linear momentum – Relation between Torque and angular momentum - Torsional pendulum.

UNIT II ELECTROMAGNETIC WAVES **9**

Gauss's law – Faraday's law - Ampere's law - The Maxwell's equations - wave equation; Plane electromagnetic waves in vacuum, Conditions on the wave field - properties of electromagnetic waves: speed, amplitude, phase, orientation and waves in matter - polarization - Producing electromagnetic waves - Energy and momentum in EM waves: Intensity, waves from localized sources, momentum and radiation pressure - Cell-phone reception. Reflection and transmission of electromagnetic waves from a non-conducting medium-vacuum interface for normal incidence.

UNIT III OSCILLATIONS, OPTICS AND LASERS **9**

Simple harmonic motion - resonance - waves on a string - standing waves - traveling waves - Energy transfer of a wave - sound waves - Doppler effect - reflection and refraction of light waves - total internal reflection - interference - interferometers - air wedge experiment. Theory of laser - characteristics - Spontaneous and stimulated emission - Einstein's coefficients - population inversion - Nd-YAG laser, CO_2 laser, semiconductor laser - applications.

UNIT IV BASIC QUANTUM MECHANICS **9**

Photons and light waves - Electrons and matter waves - The Schrodinger equation (Time dependent and time independent forms) - meaning of wave function - Normalization - Particle in a infinite potential well - Normalization, probabilities and the correspondence principle.

UNIT V APPLIED QUANTUM MECHANICS **9**

The harmonic oscillator - Barrier penetration and quantum tunneling - Tunneling microscope - Resonant diode - Finite potential wells - particle in a three dimensional box - Bloch's theorem for particles in a periodic potential, Kronig-Penney model and origin of energy bands.

TOTAL: 45 PERIODS

OUTCOME

After completion of this course, the students should able to

CO1 Understanding the importance of mechanics.

CO2 Express the knowledge of electromagnetic waves.

CO3 Know the basics of oscillations, optics and lasers.

CO4 Understanding the importance of quantum physics.

CO5 Apply quantum mechanical principles towards the formation of energy bands in crystalline materials.

TEXT BOOKS

1.D.Kleppner and R.Kolenkow. An Introduction to Mechanics. McGraw Hill Education, 2017.

2.D.Halliday, R.Resnick and J.Walker. Principles of Physics.John Wiley & Sons, 2015.

3.N.Garcia, A.Damask and S.Schwarz. Physics for Computer Science Students. Springer- Verlag, 2012.

Attested

REFERENCES

1. R.Wolfson. Essential University Physics. Volume 1 & 2. Pearson, 2016.
2. D.J.Griffiths. Introduction to Electrodynamics. Pearson Education, 2015
3. K.Thyagarajan and A.Ghatak. Lasers: Fundamentals and Applications. Springer, 2012.

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CY5151	ENGINEERING CHEMISTRY (COMMON TO ALL BRANCHES)	L T P C 3 0 0 3

OBJECTIVES:

- To introduce the basic concepts of polymers, their properties and some of the important applications.
- To impart knowledge on the basic principles and preparatory methods of nanomaterials.
- To facilitate the understanding of the laws of photochemistry, photoprocesses and instrumentation & applications of spectroscopic techniques.
- To familiarize the operating principles and applications of energy conversion, its processes and storage devices.
- To inculcate sound understanding of water quality parameters and water treatment techniques.

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. Structure, Properties and uses of: PE, PVC, PC, PTFE, PP, Nylon 6, Nylon 66, Bakelite, Epoxy; Conducting polymers – polyaniline and polypyrrole.

UNIT II NANOCHEMISTRY 9

Basics-distinction between molecules, nanomaterials and bulk materials; size-dependent properties. Types – nanoparticle, nanocluster, nanorod, nanowire and nanotube. Preparation of nanomaterials: sol-gel, solvothermal, laser ablation, chemical vapour deposition, electrochemical deposition and electro spinning. Characterization - Scanning Electron Microscope and Transmission Electron Microscope - Principle and instrumentation (block diagram). Properties (optical, electrical, mechanical and magnetic) and Applications of nanomaterials - medicine, agriculture, electronics and catalysis.

UNIT III PHOTOCHEMISTRY AND SPECTROSCOPY 9

Photochemistry: Laws of photochemistry - Grotthuss-Draper law, Stark-Einstein law and Lambert-Beer Law (derivation and problems). Photo physical processes – Jablonski diagram. Chemiluminescence, photo-sensitization and photoquenching – mechanism and examples. Spectroscopy: Electromagnetic spectrum - absorption of radiation - electronic, vibrational and rotational transitions. Width and intensities of spectral lines.Atomic absorption spectroscopy, UV-Vis and IR spectroscopy- principles, instrumentation (Block diagram) and applications.

UNIT IV ENERGY CONVERSIONS AND STORAGE 9

Nuclear fission - controlled nuclear fission - nuclear fusion - differences between nuclear fission and fusion - nuclear chain reactions - nuclear energy - light water nuclear power plant – fast breeder reactor.Solar energy conversion - solar cells. Wind energy. Batteries - types of batteries – primary battery (dry cell), secondary battery (lead acid, nickel-cadmium and lithium-ion-battery). Fuel cells – H_2-O_2 and microbial fuel cell. Explosives – classification, examples: TNT, RDX, Dynamite; Rocket fuels and propellants – definition and uses.

UNIT V WATER TECHNOLOGY 9

Water – sources and impurities – water quality parameters: colour, odour, pH, hardness, alkalinity, TDS, COD and BOD. Boiler feed water – requirement – troubles (scale & sludge, caustic embrittlement, boiler corrosion and priming & foaming. Internal conditioning – phosphate, calgon and carbonate treatment. External conditioning - zeolite (permutit) and ion exchange demineralization. Municipal water treatment process – primary (screening, sedimentation and coagulation), secondary (activated sludge process and trickling filter process) and tertiary (ozonolysis, UV treatment, chlorination, reverse osmosis).

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TOTAL: 45 PERIODS

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OUTCOMES:

CO1: To recognize and apply basic knowledge on different types of polymeric materials, their general preparation methods and applications to futuristic material fabrication needs.

CO2: To identify and apply basic concepts of nanoscience and nanotechnology in designing the synthesis of nanomaterials for engineering and technology applications.

CO3: To identify and apply suitable spectroscopic technique for material analysis and study different forms of photochemical reactions.

CO4: To recognize different forms of energy resources and apply them for suitable applications in energy sectors.

CO5: To demonstrate the knowledge of water and their quality in using at different industries.

TEXT BOOKS:

1. Jain P. C. & Monica Jain., "Engineering Chemistry", 16th Edition, Dhanpat Rai Publishing Company (P) Ltd, New Delhi, 2015.
2. Sivasankar B., "Engineering Chemistry", Tata McGraw-Hill Publishing Company Ltd, New Delhi, 2012.
3. S.S.Dara, "A text book of Engineering Chemistry", Chand Publications, 2014.

REFERENCE BOOKS:

1. Schdeva M V, "Basics of Nano Chemistry", Anmol Publications Pvt Ltd
2. B.Sivasankar, "Instrumental Methods of Analysis", Oxford University Press. 2012.
3. Friedrich Emich, "Engineering Chemistry", Scientific International Ltd.
4. V RGowariker, N V Viswanathan and Jayadev Sreedhar, "Polymer Science" New AGE International Publishers, 2009.

GE5151 **ENGINEERING GRAPHICS** **L T P C**
1 0 4 3

COURSE OBJECTIVES: The main learning objective of this course is to prepare the students for:

1. Drawing free hand sketches of basic geometrical shapes and multiple views of objects.
2. Drawing orthographic projections of lines and planes.
3. Drawing orthographic projections of solids.
4. Drawing development of the surfaces of objects.
5. Drawing isometric and perspective views of simple solids.

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.

UNIT I PLANE CURVES AND FREE HANDSKETCHING **14**

Basic Geometrical constructions, Curves used in engineering practices-Conics – Construction of ellipse, parabola and hyperbola by different methods – 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

UNIT II PROJECTION OF POINTS, LINES AND PLANE SURFACES **15**

Orthographic projection- principles-Principle 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 **15**

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 VI PROJECTION OF SECTIONED SOLIDS AND DEVELOPMENT OF SURFACES **15**

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.

UNIT V ISOMETRIC AND PERSPECTIVE PROJECTIONS **12**

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

TOTAL (L: 15 + P: 60)=75 PERIODS

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

CO1. Draw free hand sketching of basic geometrical shapes and multiple views of objects.
CO2. Draw orthographic projections of lines and planes
CO3. Draw orthographic projections of solids
CO4. Draw development of the surfaces of objects
CO5. Draw isometric and perspective views of simple solids.

TEXT BOOKS:

1. Bhatt, N. D.,Panchal V M and Pramod R. Ingle, “Engineering Drawing”, Charotar Publishing House, 53rd Edition, 2014.
2. Parthasarathy, N. S. and Vela Murali, “Engineering Drawing”, Oxford University Press, 2015

REFERENCES:

1. Agrawal, B. and Agrawal C.M., “Engineering Drawing”, Tata McGraw, N.Delhi, 2008.
2. Gopalakrishna, K. R., “Engineering Drawing”, Subhas Stores, Bangalore, 2007.
3. Natarajan, K. V., “A text book of Engineering Graphics”, 28th Ed., Dhanalakshmi Publishers, Chennai, 2015.
4. Shah, M. B., and Rana, B. C., “Engineering Drawing”, Pearson, 2nd Ed., 2009.
5. Venugopal, K. and Prabhu Raja, V., “Engineering Graphics”, New Age,2008.

Publication of Bureau of Indian Standards:

1. IS 10711 – 2001: Technical products Documentation – Size and lay out of drawing 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.
4. The students will be permitted to use appropriate scale to fit solution within A3 size.
5. The examination will be conducted in appropriate sessions on the same day.

GE5152	ENGINEERING MECHANICS	L T P C
		3 1 0 4

COURSE OBJECTIVES: The main learning objective of this course is to prepare the students for:

1. Applying the various methods to determine the resultant forces and its equilibrium acting on a particle in 2D and 3D.
2. Applying the concept of reaction forces (non-concurrent coplanar and noncoplanar forces) and moment of various support systems with rigid bodies in 2D and 3D in equilibrium. Reducing the force, moment, and couple to an equivalent force - couple system acting on rigid bodies in 2D and 3D.
3. Applying the concepts of locating centroids/center of gravity of various sections / volumes and to find out area moments of inertia for the sections and mass moment of inertia of solids.
4. Applying the concepts of frictional forces at the contact surfaces of various engineering systems.
5. Applying the various methods of evaluating kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces.

UNIT I STATICS OF PARTICLES (9+3)

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.

UNITII EQUILIBRIUM OF RIGID BODIES (9+3)

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.

UNITIII DISTRIBUTED FORCES (9+3)

Centroids of lines and areas – symmetrical and unsymmetrical shapes, determination of centroids by integration, theorems of pappus-guldinus, distributed loads on beams, centre 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 (9+3)

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

UNIT V DYNAMICS OF PARTICLES (9+3)

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.

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

COURSE OUTCOMES:

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

CO1. Apply the various methods to determine the resultant forces and its equilibrium acting on a particle in 2D and 3D.
CO2. Apply the concept of reaction forces (non-concurrent coplanar and noncoplanar forces) and moment of various support systems with rigid bodies in 2D and 3D in equilibrium. Reducing the force, moment, and couple to an equivalent force - couple system acting on rigid bodies in 2D and 3D.
CO3. Apply the concepts of locating centroids / center of gravity of various sections / volumes and to find out area moments of inertia for the sections and mass moment of inertia of solids.
CO4. Apply the concepts of frictional forces at the contact surfaces of various engineering systems.
CO5. Apply the various methods of evaluating kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces.

TEXT BOOKS:

1. Beer Ferdinand P, Russel Johnston Jr., David F Mazurek, Philip J Cornwell, SanjeevSanghi, Vector Mechanics for Engineers: Statics and Dynamics, McGraw Higher Education., 11th Edition, 2017.
2. Vela Murali, “Engineering Mechanics-Statics and Dynamics”, Oxford University Press, 2018.

REFERENCES:

1. Boresi P and Schmidt J, Engineering Mechanics: Statics and Dynamics, 1/e, Cengage learning, 2008.
2. Hibbeller, R.C., Engineering Mechanics: Statics, and Engineering Mechanics: Dynamics, 13th edition, Prentice Hall, 2013.
3. Irving H. Shames, Krishna Mohana Rao G, Engineering Mechanics – Statics and Dynamics, 4thEdition, Pearson Education Asia Pvt. Ltd., 2005.
4. Meriam J L and Kraige L G, Engineering Mechanics: Statics and Engineering Mechanics: Dynamics, 7th edition, Wiley student edition, 2013.
5. Timoshenko S, Young D H, Rao J V and Sukumar Pati, Engineering Mechanics, 5thEdition, McGraw Hill Higher Education, 2013.

BS5161	BASIC SCIENCES LABORATORY (Common to all branches of B.E. / B.Tech. Programmes)	L T P C 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 and band gap determination.

LIST OF EXPERIMENTS:

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. Photoelectric effect
14. Michelson Interferometer.
15. Estimation of laser parameters.
16. Melde's string experiment

TOTAL: 30 PERIODS

OUTCOME

Upon completion of the course, the students will be able

CO1. To determine various moduli of elasticity and
CO2. To determine various thermal and optical properties of materials.
CO3. To determine the velocity of ultrasonic waves,
CO4. To determine band gap determination
CO5. To determine viscosity of liquids.

CHEMISTRY LABORATORY: (Minimum of 8 experiments to be conducted)

OBJECTIVES:

- To inculcate experimental skills to test basic understanding of water quality parameters, such as, acidity, alkalinity, hardness, DO, chloride and copper.
- To induce the students to familiarize with electroanalytical techniques such as, pH metry, potentiometry and conductometry in the determination of impurities in aqueous solutions.
- To demonstrate the analysis of metals and polymers by spectroscopy and viscometry methods.

LIST OF EXPERIMENTS:

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.

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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 polyvinylalcohol using Ostwald viscometer.
12. Pseudo first order kinetics-ester hydrolysis.
13. Corrosion experiment-weight loss method.
14. Phase change in a solid.

TOTAL: 30 PERIODS

OUTCOMES:

CO1:To analyse the quality of water samples with respect to their acidity, alkalinity, hardness and DO.
CO2:To determine the amount of metal ions through volumetric and spectroscopic techniques
CO3:To determine the molecular weight of polymers by viscometric method.
CO4:To quantitatively analyse the impurities in solution by electroanalytical techniques
CO5:To design and analyse the kinetics of reactions and corrosion of metals

TEXTBOOKS:

1. Laboratory Manual- Department of Chemistry, CEGC, Anna University (2014).
2. Vogel"s Textbook of Quantitative Chemical Analysis (8th edition, 2014).

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GE5162	WORKSHOP PRACTICES LABORATORY (Common to all Branches of B.E. / B.Tech. Programmes)	L T P C 0 0 4 2

COURSE OBJECTIVES: The main learning objective of this course is to provide hands on training to the students in:

1. Drawing pipe line plan; laying and connecting various pipe fittings used in common household plumbing work; Sawing; planing; making joints in wood materials used in common household wood work.
2. Wiring various electrical joints in common household electrical wire work.
3. Welding various joints in steel plates using arc welding work; Machining various simple processes like turning, drilling, tapping in parts; Assembling simple mechanical assembly of common household equipments; Making a tray out of metal sheet using sheet metal work.
4. Soldering and testing simple electronic circuits; Assembling and testing simple electronic components on PCB.

GROUP – A (CIVIL & ELECTRICAL)

PART I CIVIL ENGINEERING PRACTICES 15

PLUMBING WORK:

a) Connecting various basic pipe fittings like valves, taps, coupling, unions, reducers, elbows and other components which are commonly used in household.
b) Preparing plumbing line sketches.
c) Laying pipe connection to the suction side of a pump
d) Laying pipe connection to the delivery side of a pump.
e) Connecting pipes of different materials: Metal, plastic and flexible pipes used in household appliances.

WOOD WORK:

a) Sawing,
b) Planning and
c) Making joints like T-Joint, Mortise joint and Tenon joint and Dovetail joint.

Wood Work Study:

a) Studying joints in door panels and wooden furniture
b) Studying common industrial trusses using models.

PART II ELECTRICAL ENGINEERING PRACTICES 15

WIRING WORK:

a) Wiring Switches, Fuse, Indicator and Lamp etc. such as in basic household,
b) Wiring Stair case light.
c) Wiring tube – light.
d) Preparing wiring diagrams for a given situation.

Wiring Study:

a) Studying an Iron-Box wiring.
b) Studying a Fan Regulator wiring.
c) Studying an Emergency Lamp wiring.

GROUP – B (MECHANICAL AND ELECTRONICS)

PART III MECHANICAL ENGINEERING PRACTICES 15

WELDING WORK:

a) Welding of Butt Joints, Lap Joints, and Tee Joints using arc welding.
b) Practicing gas welding.

BASIC MACHINING WORK:

a) (simple)Turning.
b) (simple)Drilling.
c) (simple)Tapping.

ASSEMBLY WORK:

a) Assembling a centrifugal pump.
b) Assembling a household mixer.
c) Assembling an air conditioner.

SHEET METAL WORK:

a) Making of a square tray

FOUNDRY WORK:

a) Demonstrating basic foundry operations.

PART IV ELECTRONIC ENGINEERING PRACTICES 15

SOLDERING WORK:

a) Soldering simple electronic circuits and checking continuity.

ELECTRONIC ASSEMBLY AND TESTING WORK:

a) Assembling and testing electronic components on a small PCB.

ELECTRONIC EQUIPMENT STUDY:

a) Studying a FM radio.
b) Studying an electronic telephone.

TOTAL (P: 60) = 60 PERIODS

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

CO1. Draw pipe line plan; lay and connect various pipe fittings used in common household plumbing work; Saw; plan; make joints in wood materials used in common household wood work.
CO2. Wire various electrical joints in common household electrical wire work.
CO3. Weld various joints in steel plates using arc welding work; Machine various simple processes like turning, drilling, tapping in parts
CO4. Assemble simple mechanical assembly of common household equipments; Make a tray out of metal sheet using sheet metal work.
CO5: Solder and test simple electronic circuits; Assemble and test simple electronic components on PCB.

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SEMESTER II

HS5251	PROFESSIONAL COMMUNUCATION	L	T	P	C
		4	0	0	4

COURSE OBJECTIVES

The course entitles ‘professional communication'aims to,

- Improve the relevant language skills necessary for professional communication.
- Develop linguistic and strategic competence in workplace context.
- Enhance language proficiency and thereby the employability of budding engineers and technologists.

UNIT I TECHNICAL COMMUNICATION 12

Listening: Listening to telephone conversations (intent of the speaker and note taking exercises)-Speaking: Role play exercises based on workplace contexts, introducing oneself- Reading: Reading the interview of an achiever and completing exercises (skimming, scanning and predicting)- Writing: Writing a short biography of an achiever based on given hints- Grammar: Asking and answering questions, punctuation in writing, prepositional phrases- Vocabulary Development: use of adjectives.

UNIT II SUMMARY WRITING 12

Listening: Listening to talks/lectures both general and technical and summarizing the main points- Speaking: Participating in debates- Reading: Reading technical essays/ articles and answering comprehension questions- Writing: Summary writing-Grammar: Participle forms, relative clauses- Vocabulary Development: Use of compound words, abbreviations and acronyms.

UNIT III PROCESS DESCRIPTION 12

Listening: Listening to a process description and drawing a flowchart-Speaking: Participating in Group Discussions, giving instructions- Reading: Reading instruction manuals- Writing: Writing process descriptions- Writing instructions- Grammar: Use of imperatives, active and passive voice, sequence words- Vocabulary Development: Technical jargon

UNIT IV REPORT WRITING 12

Listening: Listening to a presentation and completing gap-filling exercises- Speaking: Making formal presentations- Reading: Reading and interpreting charts/tables and diagrams- Writing: Interpreting charts/tables and diagrams, writing a report- Grammar: Direct into indirect speech, use of phrases- Vocabulary Development: reporting words

UNIT V WRITING JOB APPLICATIONS 12

Listening: Listening to a job interview and completing gap=filling exercises- Speaking: Mock interview, telephone interviews- Reading: Reading a job interview, SOP, company profile and completing comprehension exercises- Writing: job applications and resumes and SOPs-Grammar: Present perfect and continuous tenses- Vocabulary Development: Technical vocabulary.

TOTAL :60 PERIODS

LEARNING OUTCOMES

At the end of the second semester the learners should be able to,

CO1. Read technical texts effortlessly.
CO2. Comprehend technical texts effortlessly.
CO3. Write reports of a technical kind.
CO4. Speak with confidence in interviews and
CO5. Thereby gain employability

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Textbook

1. Revised Edition of 'English for Engineers and Technologists' Volume 1 published by Orient Black Swan Limited 2019.

Assessment Pattern

- Assessments will assess all the four skills through both pen and paper and computer based tests.
- Assessments can be pen and paper based, quizzes.

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MA5252	ENGINEERING MATHEMATICS – II (Common to all branches of B.E. / B.Tech. Programmes in II Semester)	L	T	P	C	4
		3	1	0		

OBJECTIVES:

- To acquaint the students with the concepts of vector calculus which naturally arises in many engineering problems.
- To develop an understanding of the standard techniques of complex variable theory in particular analytic function and its mapping property.
- To familiarize the students with complex integration techniques and contour integration techniques which can be used in real integrals.
- To acquaint the students with Differential Equations which are significantly used in Engineering problems.
- To make the students appreciate the purpose of using transforms to create a new domain in which it is easier to handle the problem that is being investigated.

UNIT I VECTOR CALCULUS **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 theorem, Stoke's theorem and Gauss divergence theorem – Verification and application in evaluating line, surface and volume integrals.

UNIT II ANALYTIC FUNCTION **12**

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

UNIT III 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 IV DIFFERENTIAL EQUATIONS **12**

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

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

OUTCOMES:

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

CO1. Calculate grad, div and curl and use Gauss, Stokes and Greens theorems to simplify calculations of integrals.

CO2. Construct analytic functions and use their conformal mapping property in application problems.

CO3. Evaluate real and complex integrals using the Cauchy's integral formula and residue theorem.

CO4. Apply various methods of solving differential equation which arise in many application problems.

CO5. Apply Laplace transform methods for solving linear differential equations.

TEXTBOOKS:

1. Erwin Kreyszig, "Advanced Engineering Mathematics", John Wiley and Sons, 10th Edition, New Delhi, 2015.
2. Grewal B.S., “Higher Engineering Mathematics”, Khanna Publishers, 44th Edition, New Delhi, 2017.

REFERENCES:

1. Bali N., Goyal M. and Watkins C., “Advanced Engineering Mathematics”, Firewall Media (An imprint of Lakshmi Publications Pvt., Ltd.,), 7th Edition, New Delhi, 2009.
2. Glyn James, “Advanced Modern Engineering Mathematics”, Pearson Education, 4th Edition, New Delhi, 2011.
3. Jain R.K. and Iyengar S.R.K., “Advanced Engineering Mathematics”, Narosa Publications, 5th Edition, New Delhi, 2017.
4. Peter V.O’Neil, “Advanced Engineering Mathematics”, Cengage Learning India Pvt., Ltd, 7th Edition, New Delhi, 2012.
5. Ramana B.V., “Higher Engineering Mathematics”, Tata McGraw Hill Co. Ltd., 11th Reprint, New Delhi, 2010.

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GE5153 **PROBLEM SOLVING AND PYTHON PROGRAMMING** **L T P C**
3 0 0 3

OBJECTIVES:

- To know the basics of algorithmic problem solving.
- To develop Python programs with conditionals and loops.
- To define Python functions and use function calls.
- To use Python data structures - lists, tuples, dictionaries.
- To do input/output with files in Python.

UNIT I INTRODUCTION TO COMPUTING AND PROBLEM SOLVING **9**

Fundamentals of Computing – Computing Devices – Identification of Computational Problems – Pseudocodesand Flowcharts – Instructions – Algorithms – Building Blocks of Algorithms – Introduction to Python Programming – Python Interpreter and Interactive Mode – Variables and Identifiers – Arithmetic Operators– Values and Types – Statements.

Suggested Activities:

- Developing Pseudocodes and flowcharts for real life activities such as railway ticket booking using IRCTC, admission process to undergraduate course, academic schedules during a semester etc.
- Developing algorithms for basic mathematical expressions using arithmetic operations.
- Installing Python.
- Simple programs on print statements, arithmetic operations.

Suggested Evaluation Methods:

- Assignments on pseudocodes and flowcharts.
- Tutorials on Python programs.

UNIT II CONDITIONALS AND FUNCTIONS **9**

Operators – Boolean Values – Operator Precedence – Expression – Conditionals: If-Else Constructs – Loop Structures/Iterative Statements – While Loop – For Loop – Break Statement – Function Call and Returning Values – Parameter Passing – Local and Global Scope – Recursive Functions.

Suggested Activities:

- Simple Python program implementation using Operators, Conditionals, Iterative Constructs and Functions.
- Implementation of a simple calculator.
- Developing simple applications like calendar, phone directory, to-do lists etc.
- Flow charts for GCD, Exponent Functions, Fibonacci Series using conditionals and iterative statements.
- External learning - Recursion vs. Iteration.

Suggested Evaluation Methods:

- Tutorials on the above activities.
- Group Discussion on external learning.

UNIT III SIMPLE DATA STRUCTURES IN PYTHON **10**

Introduction to Data Structures – List – Adding Items to a List – Finding and Updating an Item – Nested Lists – Cloning Lists – Looping Through a List – Sorting a List – List Concatenation – List Slices – List Methods – List Loop – Mutability – Aliasing – Tuples: Creation, Accessing, Updating, Deleting Elements in a Tuple, Tuple Assignment, Tuple as Return Value, Nested Tuples, Basic Tuple Operations – Sets.

Suggested Activities:

- Implementing python program using lists, tuples, sets for the following scenario:
  - Simple sorting techniques
  - Student Examination Report
  - Billing Scheme during shopping.
- External learning - List vs. Tuple vs. Set – Implementing any application using all the three data structures.

Suggested Evaluation Methods:

- Tutorials on the above activities.
- Group Discussion on external learning component.

UNIT IV STRINGS, DICTIONARIES, MODULES 10

Strings: Introduction, Indexing, Traversing, Concatenating, Appending, Multiplying, Formatting, Slicing, Comparing, Iterating – Basic Built-In String Functions – Dictionary: Creating, Accessing, Adding Items, Modifying, Deleting, Sorting, Looping, Nested Dictionaries Built-in Dictionary Function – Finding Key and Value in a Dictionary – Modules – Module Loading and Execution – Packages – Python Standard Libraries.

Suggested Activities:

- Implementing Python program by importing Time module, Math package etc.
- Creation of any package (student's choice) and importing into the application.

Suggested Evaluation Methods:

- Tutorials on the above activities.

UNIT V FILE HANDLING AND EXCEPTION HANDLING 7

Introduction to Files – File Path – Opening and Closing Files – Reading and Writing Files – File Position – Exception: Errors and Exceptions, Exception Handling, Multiple Exceptions.

Suggested Activities:

- Developing modules using Python to handle files and apply various operations on files.
- Usage of exceptions, multiple except blocks -for applications that use delimiters like age, range of numerals etc.
- Implementing Python program to open a non-existent file using exceptions.

Suggested Evaluation Methods:

- Tutorials on the above activities.
- Case Studies.

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1. Develop algorithmic solutions to simple computational problems.
CO2. Develop and execute simple Python programs.
CO3. Write simple Python programs for solving problems and decompose a Python program into functions.
CO4. Represent compound data using Python lists, tuples, dictionaries etc.
CO5. Read and write data from/to files in Python programs.

TEXT BOOK:

1. Reema Thareja, “Python Programming using Problem Solving Approach”, Oxford University Press, 2017.
2. Allen B. Downey, “Think Python: How to Think Like a Computer Scientist”, Second Edition, Shroff/O‘Reilly Publishers, 2016.
   (http://greenteapress.com/wp/thinkpython/).

REFERENCES:

1. Guido van Rossum, Fred L. Drake Jr., “An Introduction to Python – Revised and Updated for Python 3.2”, Network Theory Ltd., 2011.
2. John V Guttag, “Introduction to Computation and Programming Using Python”, Revised and Expanded Edition, MIT Press , 2013
3. Charles Dierbach, “Introduction to Computer Science using Python”, Wiley India Edition, 2016.
4. Timothy A. Budd, “Exploring Python”, Mc-Graw Hill Education (India) Private Ltd., 2015.
5. Kenneth A. Lambert, “Fundamentals of Python: First Programs”, Cengage Learning, 2012.

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EE5251 BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING L T P C
3 0 0 3

OBJECTIVES:

- To understand the basic concepts of electric circuits, magnetic circuits and wiring.
- To understand the operation of AC and DC machines.
- To understand the working principle of electronic devices and circuits.

UNIT I BASIC CIRCUITS AND DOMESTIC WIRING 9

Electrical circuit elements (R, L and C)-Dependent and independent sources – Ohm's Law- Kirchhoff's laws - mesh current and node voltage methods (analysis with only independent source) - Phasors – RMS-average values-sinusoidal steady state response of simple rlc circuits. types of wiring- domestic wiring - specification of wires-earthing-methods-protective devices.

UNIT II THREE PHASE CIRCUITS AND MAGNETIC CIRCUITS 9

Three phase supply – star connection – delta connection –balanced and unbalanced loads- power in three-phase systems – comparison of star and delta connections – advantages-magnetic circuits-definitions-MMF, flux, reluctance, magnetic field intensity, flux density, fringing, self and mutual inductances-simple problems.

UNIT III ELECTRICAL MACHINES 9

Working principle of DC generator, motor-EMF and torque equation-types –shunt, series and compound-applications.working principle of transformer-EMF equation-operating principles of three phase and single phase induction motor-applications. working principles of alternator-emf equation-operating principles of synchronous motor, stepper motor-applications.

UNIT IV BASICS OF ELECTRONICS 9

Intrinsic semiconductors, Extrinsic semiconductors – P-type and N-type, P-N junction, VI Characteristics of PN junction diode, Zener effect, Zener diode, Zener diode Characteristics-Rectifier circuits-Wave shaping.

UNIT V CURRENT CONTROLLED AND VOLTAGE CONTROLLED DEVICES 9

Working principle and characteristics - BJT, SCR, JFET, MOSFET.

TOTAL: 45 PERIODS

OUTCOMES:

CO1 To be able to understand the concepts related with electrical circuits and wiring.
CO2 To be able to study the different three phase connections and the concepts of magnetic circuits.
CO3 Capable of understanding the operating principle of DC machines and transformer.
CO4 To be able to understand the working principle of electronic devices such as diode and zener diode.
CO5 To be able to understand the characteristics and working of current controlled and voltage controlled devices.

TEXT BOOKS:

1. Kothari DP and I.J Nagrath, "Basic Electrical and Electronics Engineering", McGraw Hill Education, 2014
2. Del Toro, "Electrical Engineering Fundamentals", Second edition, Pearson Education, New Delhi, 1989.
3. John Bird, "Electrical Circuit theory and technology", Routledge; 5th edition, 2013

REFERENCES:

1. Thomas L. Floyd, 'Electronic Devices', 10th Edition, Pearson Education, 2018.
2. Albert Malvino, David Bates, '**Electronic Principles**, McGraw Hill Education; 7th edition, 2017
3. Kothari DP and I.J Nagrath, "Basic Electrical Engineering", McGraw Hill, 2010.
4. Muhammad H.Rashid, "Spice for Circuits and electronics", 4th ed.,Cengage India,2019.

CY5251	CHEMISTRY FOR TECHNOLOGISTS	L	T	P	C
		3	0	0	3

OBJECTIVE

- The students will be imparted the knowledge on
- 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.

UNITI WATERTECHNOLOGY **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.

UNITII 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.

UNITIII 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 PERIODS: 45

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.
CO4. Will understand chemistry of dyes
CO5. Will understand the auxiliaries required for dyeing

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.

TT5201 **BASICS OF TEXTILE TECHNOLOGY** **L T P C**
3 0 0 3

OBJECTIVES:
To enable the students to learn about the basics of fibre forming, yarn production, fabric formation, coloration of fabrics and garment manufacturing

UNIT I NATURAL FIBRES **9**
Introduction: Definition of staple fibre, filament; Classification of natural and man-made fibres, essential and desirable properties of fibres. Production and cultivation of Natural Fibers: Cultivation of cotton, production of silk (sericulture), wool and jute – physical and chemical structure of these fibres..

UNIT II REGENERATED AND SYNTHETIC FIBRES **9**
Production sequence of regenerated and modified cellulosic fibres: viscose rayon, Acetate Rayon, high wet modulus and high tenacity fibres; synthetic fibres – chemical structure, fibre forming polymers, production principles.

UNIT III BASICS OF SPINNING **9**
Spinning – principle of yarn formation, sequence of machines for yarn production with short staple fibres and blends, principles of opening and cleaning machines; yarn numbering - calculations

UNIT IV BASICS OF WEAVING **9**
Woven fabric – warp, weft, weaving, path of warp; looms – classification, handloom and its parts, powerloom, automatic looms, shuttleless looms, special type of looms; preparatory machines for weaving process and their objectives; basic weaving mechanism - primary, secondary and auxiliary mechanisms,

UNIT V BASICS OF KNITTING AND NONWOVEN **9**
Knitting – classification, principle, types of fabrics; nonwoven process –classification, principle, types of fabrics.

TOTAL : 45 PERIODS

OUTCOMES:
On completion of this course, the students shall have the basic knowledge on
CO1: Classification of fibres and production of natural fibres
CO2: Regenerated and synthetic fibres
CO3: Yarn spinning
CO4: Weaving
CO5: Knitting and nonwoven

TEXTBOOKS

1. Mishra S. P. , “A Text Book of Fibre Science and Technology”, New Age Publishers, 2000, ISBN: 8122412505
2. Marks R., and Robinson. T.C., “Principles of Weaving”, The Textile Institute, Manchester, 1989, ISBN: 0 900739 258.
3. Spencer D.J., “Knitting Technology”, III Ed., Textile Institute, Manchester, 2001, ISBN: 185573 333 1.

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1. Hornberer M., Eberle H., Kilgus R., Ring W. and Hermeling H., “Clothing Technology: From Fibre to Fabric”, Europa LehrmittelVerlag, 2008, ISBN: 3808562250 / ISBN: 978-3808562253.
2. Wynne A., “Motivate Series-Textiles”, Maxmillan Publications, London, 1997.
3. Carr H. and Latham B., “The Technology of Clothing Manufacture” Backwell Science, U.K., 1994, ISBN: 0632037482 / ISBN:13: 9780632037483.Klein W., “The Rieter Manual of Spinning, Vol.1”, Rieter Machine Works Ltd., Winterthur, 2014, ISBN 10 3-9523173-1-4 / ISBN 13 978-3-9523173-1-0.
4. Klein W., “The Rieter Manual of Spinning, Vol.2”, Rieter Machine Works Ltd., Winterthur, 2014, ISBN 10 3-9523173-2-2 / ISBN 13 978-3-9523173-2-7.
5. 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.
6. Talukdar. M.K., Sriramulu. P.K., and Ajgaonkar. D.B., “Weaving: Machines, Mechanisms, Management”, Mahajan Publishers, Ahmedabad, 1998, ISBN: 81-85401-16-0.
7. 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
8. Gohl E. P. G., “Textile Science”, CBS Publishers and distributors, 1987, ISBN 0582685958

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.	Classification of fibres and production of natural fibres	-	-	-	-	-	-	-	2	1	-	1	1	-	1	-
CO2.	Regenerated and synthetic fibres	-	-	-	-	-	-	-	2	1	-	1	1	-	1	-
CO3.	Yarn spinning	-	-	-	-	-	-	-	2	1	-	1	1	-	1	-
CO4.	Weaving	-	-	-	-	-	-	-	2	1	-	1	1	-	1	-
CO5.	Knitting and nonwoven	-	-	-	-	-	-	-	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

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GE5161 PROBLEM SOLVING AND PYTHON PROGRAMMING LABORATORY L T P C
0 0 4 2

OBJECTIVES:

- To understand the problem solving approaches.
- To learn the basic programming constructs in Python.
- To articulate where computing strategies support in providing Python-based solutions to real world problems.
- To use Python data structures - lists, tuples, dictionaries.
- To do input/output with files in Python.

EXPERIMENTS:

1. Identification and solving of simple real life or scientific or technical problems, and developing flow charts for the same.
2. Python programming using simple statements and expressions.
3. Scientific problems using Conditionals and Iterative loops.
4. Implementing real-time/technical applications using Lists, Tuples.
5. Implementing real-time/technical applications using Sets, Dictionaries.
6. Implementing programs using Functions.
7. Implementing programs using Strings.
8. Implementing programs using written modules and Python Standard Libraries.
9. Implementing real-time/technical applications using File handling.
10. Implementing real-time/technical applications using Exception handling.
11. Exploring Pygame tool.
12. Developing a game activity using Pygame like bouncing ball, car race etc.

TOTAL: 60 PERIODS

OUTCOMES:

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

CO1 Develop algorithmic solutions to simple computational problems
CO2 Develop and execute simple Python programs.
CO3 Structure simple Python programs for solving problems.
CO4 Decompose a Python program into functions.
CO5 Represent compound data using Python data structures and apply Python features in developing software applications.

EE5261 ELECTRICAL AND ELECTRONICS ENGINEERING LABORATORY L T P C
0 0 4 2

OBJECTIVES

1. To impart hands on experience in verification of circuit laws and measurement of circuit parameters
2. To train the students in performing various tests on electrical motors.
3. It also gives practical exposure to the usage of CRO, power sources & function generators

List of Experiments

1. Verification of Kirchhoff's Law.
2. Steady state response of AC and DC circuits (Mesh, Node Analysis)
3. Frequency response of RLC circuits.
4. Measurement power in three phase circuits by two-watt meter method.
5. Regulation of single phase transformer.
6. Performance characteristics of DC shunt generator.
7. Performance characteristics of single phase induction motor.
8. Characteristics of PN diode and Zener diode
9. Characteristics of Zener diode
10. Half wave and full wave Rectifiers
11. Application of Zener diode as shunt regulator.
12. Characteristics of BJT and JFET

TOTAL: 60 PERIODS

OUTCOMES:

CO1 To become familiar with the basic circuit components and know how to connect them to make a real electrical circuit;
CO2 Ability to perform speed characteristic of different electrical machines
CO3 Ability to use logic gates and Flip flop
CO4 Ability to use diodes
CO5 Ability to use rectifiers

SEMESTER III

MA5354 PROBABILITY AND STATISTICS L T P C
3 1 0 4

OBJECTIVES

- To understand the basics of random variables with emphasis on the standard discrete and continuous distributions.
- To understand the basic probability concepts with respect to two dimensional random variables along with the relationship between the random variables and the significance of the Central Limit theorem.
- To apply the small/ large sample tests through Tests of hypothesis.
- To understand the concept of analysis of variance and use it to investigate factorial dependence.
- To monitor a process and detect a situation when the process is out of control.

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

Type I and Type II errors – tests for single mean, proportion, difference of means (large and small samples) – tests for single variance and equality of variances – chi-square 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 – factorial design – taguchi's robust parameter design.

UNIT V STATISTICAL QUALITY CONTROL 12

Control charts for measurements ($\bar{X}$ and R charts) – control charts for attributes (p, c and np charts) tolerance limits – acceptance sampling.

TOTAL: 60 PERIODS

OUTCOMES

CO1 To 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. Devore, J.L. "Probability and Statistics for Engineering and the Sciences", Cengage Learning, 9th Edition, Boston, 2017.
2. Johnson, R.A. and Gupta, C.B. "Miller and Freund's Probability and Statistics for Engineers", Pearson India Education, Asia, 9th Edition, New Delhi, 2017.
3. Walpole, R.E., Myers R.H., Myres S.L., and Ye, K. "Probability and Statistics for Engineers and Scientists", Pearson Education, Asia, 9th Edition, New Delhi, 2011.

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REFERENCES:

1. Krishnaiah, K. and Shahabudeen, P. "Applied Design of Experiments and Taguchi Methods", Prentice Hall of India, New Delhi, 2012.

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2. Milton, J.S. and Arnold, J.C. “Introduction to Probability and Statistics”, Tata McGraw Hill, 4th Edition, 3rd Reprint, New Delhi, 2008.
3. Ross, S.M. “Introduction to Probability and Statistics for Engineers and Scientists”, Elsevier, 5th Edition, New Delhi, 2014.
4. Spiegel, M.R., Schiller, J., Srinivasan, R.A. and Goswami, D., “Schaum’s Outline of Theory and Problems for Probability and Statistics”, McGraw Hill Education, 3rd Edition, Reprint, New Delhi, 2017.

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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO 3	PO 4	PO 5	PO 6	PO7	PO8	PO 9	PO 10	PO11	PO1 2	PSO1	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 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 testing)	2	2	1	3	1	-	-	-	-	-	2	2	1	-	-
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

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TT5301 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 9

Sequence of spinning machinery for producing carded, combed and blended yarns in short staple spinning system; numbering systems for textile materials and conversions; influence of fibre characteristics on yarn spinnability, yarn quality and machine performance

UNIT II GINNING AND BLOWROOM MACHINERY 9

Description and working of different types of gins; ginning performance on yarn quality; blow room - objectives, principle and description of opening and cleaning, blending machines, scutcher, chutefeed, metal detectors, foreign matter detectors; cleaning efficiency, production calculations

UNIT III CARDING MACHINE 9

Objectives and principle of carding operations; study of carding machine; autolevelling; card clothing and its maintenance; draft and production calculation

UNIT IV COMBER 9

Study of comber preparatory machines; objectives and principles of combing; sequence of combing operation; study of combing machine; combing efficiency and production calculation

UNIT V DRAWFRAME AND ROVING FRAME 9

Drawframe – objectives, construction of machine; drafting systems used in modern draw frames; autolevelling; draft and production calculation; objectives of roving frame; working of roving frame; bobbinbuilder 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

TEXTBOOKS

1. Klein W., “The Rieter Manual of Spinning, Vol.1”, Rieter Machine Works Ltd., Winterthur, 2014, ISBN 10 3-9523173-1-4 / ISBN 13 978-3-9523173-1-0.
2. Klein W., “The Rieter Manual of Spinning, Vol.2”, Rieter Machine Works Ltd., Winterthur, 2014, ISBN 10 3-9523173-2-2 / ISBN 13 978-3-9523173-2-7.
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.

REFERENCES

1. Carl A. Lawrence., “Fundamentals of Spun Yarn Technology”, CRC press, 2003, ISBN 1-56676-821-7
2. Eric Oxtoby, “Spun Yarn Technology “, Butterworth, Boston, London, 1987, **ISBN:** 0408014644 9780408014649
3. Lord P.R., “Yarn Production: Science, Technology and Economics”, The Textile Institute, Manchester, 1999.
4. Iredale John A., “Yarn Preparation: A Handbook”, Intermediate Technology, London, 1992, ISBN:1853390429.
5. 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

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TT5302 **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 WINDING MACHINE **9**

Objectives of winding; principles and study of precision and drum winding machines; uniform build of yarn package; types of drums – half accelerated and fully accelerated drums; weft winding; winding for colouration; sewing thread winding; production calculations

UNIT II PROCESS CONTROL IN WINDING **9**

Classification of yarn faults and its removal; concepts in yarn clearing – mechanical, optical and electronic clearers; package defects - causes and remedies; winding synthetic and blended yarns; winding performance and maintenance; material handling; knotters and splicers - quality of knots and splices

UNIT III WARPING AND SIZING MACHINES **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; study of sizing machine; concept of single end sizing, combined dyeing and sizing; production calculations.

UNIT IV PROCESS CONTROL IN WARPING AND SIZING **9**

Warping defects – causes and remedies, sizing defects – causes and remedies; control of yarn breaks, hard waste in warping; sizing of filament yarns; control systems used in sizing machine; size pickup control

UNIT V DRAWING-IN **9**

Need for drawing-in operation; manual and automatic drawing-in, denting, leasing; knotting machines; selection and care of reeds, heald wires and drop pins, control of cross ends and extra ends and calculations; safety measures at pre-weaving processes -equipment's 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

TEXTBOOKS

1. Baneerjee.P.K., "Principles of Fabric Formation", CRC Press, London, 2014, ISBNNumber:13:978-1-4665-5445-0.
2. Abhijit Majumdar, Apurba Das, R.Alagirusamy and V.K.Kothari., "Process Control in TextileManufacturing", Wood Head Publishing Limited, Oxford, 2013, ISBN: 978-0-85709-027-0.
3. Goswami B.C., Anadjiwala R.D. and Hall D.M.., "Textile Sizing"., Marcel Dekker, NewYork, 2004,ISBN: 0-8247-5053-5.

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1. John A. Iredale "Yarn Preparation: A Hand Book", Textile Institute, Manchester, 1992, ISBN:1853390429.
2. Ormerod A. and Sondhelm W. S., "Weaving: Technology and Operations", Textile Institute,1995, ISBN: 187081276X.
3. 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	2	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	2	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	2	2	2	2	2	2
Overall CO		2.2	2	1.4	2	2.2	1.4	1.4	1.6	1.4	1.8	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

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TT5351 CHARACTERISTICS OF TEXTILE FIBRES L T P C
3 0 0 3

OBJECTIVES:

To enable the students to understand the

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

UNIT I STRUCTURE OF FIBRES 9

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 sperulite conformations

UNIT II STRUCTURE INVESTIGATION TECHNIQUES 9

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 9

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 9

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 9

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: 45 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

TEXTBOOKS

1. MortonW.E.,andHearleJ.W.S.,"PhysicalPropertiesofTextileFibres",TheTextileInstitute, Washington D.C., 2008, ISBN978-1-84569-220-95
2. HearleJ.W.S.,LomasB.,andCookeW.D.,"AtlasofFibreFractureandDamagetoTextiles", The Textile Institute, 2nd Edition, 1998, ISBN:1855733196

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1. Meredith R., and Hearle J. W. S., "Physical Methods of Investigation of Textiles", Wiley Publication, New York, 1989, ISBN: B00JCV6ZWU ISBN-13:
2. MukhopadhyayS. K., "Advances in Fibre Science", The Textile Institute,1992, ISBN: 1870812379
3. MeredithR.,"MechanicalPropertiesofTextileFibres",NorthHolland,Amsterdam,1986,ISBN: 1114790699, ISBN-13:9781114790698
4. RaheelM. (ed.)., "Modern Textile Characterization Methods", Marcel Dekker, 1995, ISBN:0824794737
5. Mukhopadhyay. S. K., "The Structure and Properties of Typical Melt Spun Fibres", Textile Progress, Vol. 18, No. 4, Textile Institute, 1989, ISBN:1870812115

6. Hearle J.W.S., “Polymers and Their Properties : Fundamentals of Structures and Mechanics Vol1”,EllisHorwood,England,1982,ISBN:047027302X|ISBN-13:9780470273029
7. Greaves. P. H., and Saville B.P., “Microscopy of Textile Fibres”, Bios Scientific, U.K., 1995, ISBN: 1872748244 | ISBN-13:9781872748245
8. Seville. B. P., “Physical Testing of Textiles”, Woodhead Publishing, 1999,ISBN: 1855733676 | ISBN-13:9781855733671
9. Hearle J. W. S., and Peters. R. H., “Fibre structure”, Elsevier Ltd, 1963, ISBN: 1483212211 | ISBN-13:9781483212210

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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	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

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TT5311 **SPINNING PROCESS LABORATORY** **L T P C**
0 0 4 2

OBJECTIVES:
To enable the students to learn material passage in the spinning preparatory machines and identify the parts of machine and carryout production, draft and twist calculations.

LIST OF EXPERIMENTS
1. Construction details of blow room machines and material passage
2. Cleaning intensity 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 count of card and comber web
14. Determination of actual roller speed, eccentricity of roller and top arm loading

TOTAL: 60 PERIODS

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

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

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TT5312 **FIBRESCIENCE LABORATORY** **L T P C**
0 0 4 2

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. Preparation of density gradient column and determination of density of various fibres
3. Determination of denier of synthetic fibres
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. Cotton/ regenerated cellulose
    b. Polyester/ protein fibres
    c. Cellulose/polyester fibres
    d. Cotton/ viscose/polyester
7. Viscosity and molecular weight determination
8. Analysis of Thermograms of fibers
9. Analysis of FTIR spectrograms of fibers
10. Coagulation of polymers in wet spinning
    a. Viscose
    b. Acrylic
11. Analysis of XRD patterns of various fibres

TOTAL: 60 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

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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	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

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SEMESTER IV

HM5551 FUNDAMENTALS OF ECONOMICS AND MANAGEMENT L T P C
3 0 0 3

OBJECTIVE :

- To explain principles of economics relevant to managing an organization, to describe principles of economics to have the understanding of economic environment of business.
- To study the Evolution, Functions and Principles of Management.

UNIT I : BASIC CONCEPTS OF ECONOMICS AND MARKET 9

Definition, scope of economics; fundamental concepts; demand, supply, equilibrium; theory of production, cost; forms of market; concepts of revenue; pricing in perfect and imperfect competition.

UNIT II : NATIONAL INCOME AND MONEY 9

National income - concept, measurement, economic welfare; concept of consumption, saving and investment; economic growth - measurement, fluctuation, control; Money-theory, exchange - Demand and supply of money.

UNIT III : INFLATION AND GOVERNMENT POLICY 9

Inflation - causes, effect , control; Inflation VS Unemployment, Philips curve; Government policies, Fiscal and Monitoring Policy, planning - economic growth and public welfare.

UNIT IV : MANAGEMENT PRINCIPLES AND ORGANIZATIONS 9

Definition of Management - Science or Art - Manager vs. Entrepreneur - Types of Managers - Managerial Roles and Skills - Evolution of Management - Scientific, Approaches of Management - Types of Business Organization - Sole Proprietorship, Partnership, Company - Public and Private Sector Enterprises - Organization Culture and Environment.

UNIT V : FUNCTIONS OF MANAGEMENT 9

Planning - Nature and Purpose- Objectives - Strategies - Policies and Planning Premises - Decision Making - Organizing - Nature and Process - Premises - Departmentalization - Line and Staff - Decentralization - Organizational culture, Staffing - Selection and training - Placement - Performance appraisal - Career Strategy - Leadership - Communication, Controlling - Process of Controlling - Controlling techniques, productivity and operations management - Preventive control, Industrial Safety.

Total : 45 Periods

OUTCOME :

Upon completion of the course, Students are expected to become familiar with
CO1: Principles of economics and market
CO2: Concepts of consumption and national income
CO3: Government policy and economic growth
CO4: Management principles and business organisation
CO5: Able to perform managerial functions like planning, organizing, staffing, leading & controlling

REFERENCES :

1. Stephen P. Robbins & Mary Coulter, "Management", Prentice Hall of India, 10th Edition, 2009.
2. JAF Stoner, Feeman R.E and Daniel R Gilbert "Management", Pearson Education, 6th Ed.2004.
3. Stephen A. Robbins, David A. Decenzo and Mary Coulter, "Fundamentals of Management" Pearson Education, Seventh Edition, 2011.
4. Pau. A. Samuelson, William D., Nordhaus, Sudip Chaudhuri and Anindya Sen, Economics, 19th eidtion, Tata McGraw Hill, New Delhi, 2010.
5. Richard Lipsey & Alec Charystal, Economics, 12th ed., Oxford University Press, New Delhi, 2011.
6. Kari E. Case and Ray C.fair, "Principles of Economics", 6th ed., Pearson, Education Asia, ND, 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	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	Principles of economics and market	-	-	1	-	-	2	-	-	-	-	2	2	1	2	-
CO2	Concepts of consumption and national income	-	-	2	-	-	2	-	-	-	-	1	2	1	2	-
CO3	Government policy and economic growth	-	-	1	-	-	1	-	-	-	-	1	2	1	2	-
CO4	Management principles and business organisation	-	-	3	-	3	2	-	3	2	-	3	2	3	2	-
CO5	Able to perform managerial functions like planning, organizing, staffing, leading & controlling	-	-	3	-	3	2	-	3	2	-	3	2	3	2	-
Overall CO		-	-	2	-	1.2	1.8	-	1.2	0.8	-	2	2	1.8	2	-

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

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GE5251 **ENVIRONMENTAL SCIENCES** **L T P C**
3 0 0 3

OBJECTIVES:

- To introduce the basic concepts of environment, ecosystems and biodiversity and emphasize on the biodiversity of India and its conservation.
- To impart knowledge on the causes, effects and control or prevention measures of environmental pollution and natural disasters.
- To facilitate the understanding of global and Indian scenario of renewable and non-renewable resources, causes of their degradation and measures to preserve them.
- To familiarize the influence of societal use of resources on the environment and introduce the legal provisions, National and International laws and conventions for environmental protection.
- To inculcate the effect of population dynamics on human and environmental health and inform about human right, value education and role of technology in monitoring human and environmental issues.

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 – bio geographical 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 47 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 protection 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. Anubha Kaushik and C. P. Kaushik's "*Perspectives in Environmental Studies", 6th Edition,* New Age International Publishers (2018).
2. Benny Joseph, 'Environmental Science and Engineering', Tata McGraw-Hill, New Delhi, (2016).
3. Gilbert M.Masters, 'Introduction to Environmental Engineering and Science', 2nd edition, Pearson Education (2004).

REFERENCE BOOKS:

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).
5. Erach Bharucha "Textbook of Environmental Studies for Undergraduate Courses" Orient Blackswan Pvt. Ltd. (2013).

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	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 applications in for technological advancement and societal development.	1	1	1	-	-	3	3	3	-	-	-	-	2	0	0
CO5	To demonstrate the knowledge of societal activity on the long and short term environmental issues and abide by the legal provisions,	-	-	-	-	-	3	2	2	1	-	-	-	2	0	0

	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.															
Overall CO		0.8	0.8	0.8	-	-	2.4	2.8	2.8	0.6	-	-	-	2	-	-

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

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TT5401 **TECHNOLOGY OF WOVEN FABRIC MANUFACTURE** **L T P C**
3 0 0 3

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 AND TAPPET SHEDDING **9**

Yarn quality requirements for different looms; principle of weaving - primary, secondary and auxiliary motions; loom timing; shed geometry and shedding requirement; types of shed; tappet shedding - positive and negative; shedding by link mechanism, reversing mechanisms; kinetics of heald shaft

UNIT II DOBBY AND JACQUARD SHEDDING **9**

Dobby and jacquard shedding mechanisms- type, drive arrangement and principle of working; electronic dobby and jacquards; pattern card preparation; harness tie-up used in jacquards

UNIT III WEFT INSERTION **9**

Shuttle – construction, types; shuttle picking and checking mechanisms, shuttle flight timing; mechanism of weft insertions in shuttleless looms - projectile, rapier, air-jetand water-jet; multi-phase weaving systems

UNIT IV BEAT UP, SECONDARY AND AUXILARY MOTIONS **9**

Kinematics of sley, sley eccentricity; beat up mechanism in modern looms;take up and let-off motions; warp protector and, warp and weft stop motion; automatic weft replenishment in shuttle looms – pirn changing and shuttle changing mechanism; multi shuttle looms- box changing principle; weft accumulators in shuttleless looms; selvedges – types, formation techniques

UNIT V PROCESS CONTROL & SPECIAL WEAVING PROCESS **9**

Techno economics of shuttleless loom; loom monitoring and control, loom stoppages and efficiency; fabric defect - analysis and grading, causes and remedies;filament weaving – silk &texturized yarns; principles and mechanisms in weaving - pile fabrics, tapes, tri-axial and 3D fabrics; loom production calculation; safety measures to be taken at weaving industry.

TOTAL PERIODS: 45

OUTCOMES:

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

CO1: Basics of weaving operation and tappet shedding
CO2: Working of dobby and Jacquard shedding mechanism
CO3: Principle of weft insertion in shuttle and shuttleless weaving
CO4: Beatup, secondary and auxiliary motions
CO5: Control of process variables at loom and understand the principle of producing special fabrics

TEXTBOOKS

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.

REFERENCES

1. Marks R., and Robinson. T.C., “Principles of Weaving”, The Textile Institute, Manchester,1989, ISBN: 0 900739 258.
2. SabitAdanur., “Handbook of Weaving”, Technomic Publishing Co. Inc., 2001, ISBN:1587160137 | ISBN-13: 9781587160134

3. Vangheluwe L., “Air- Jet Weft Insertion”, Textile progress, Vol. 29, No. 4, Textile InstitutePublication, 1999, ISBN; 1870372255.
4. Valeriy V. Choogin., PalithaBandara., and Elena V. Chepelyuk., “Mechanisms of Flat WeavingTechnology”, Wood Head Publishing, 2013, ISBN: 0857097806 | ISBN-13: 9780857097804
5. Prabir Kumar Banerjee., “Principles of Fabric Formation” CRC Press, 2014, ISBN:1466554444 | ISBN-13: 9781466554443
6. Majumdar A., Das A., AlagirusamyR.,and Kothari V.K., “ Process Control in Textile Manufacturing”, wood Head publishing, 2012, ISBN: 0857090275 | ISBN-13: 9780857090270
7. “Weaving: The knowledge in Technology”, Papers Presented at the Textile Institute WeavingConference 1998, Textile Institute, ISBN: 1870372182 ISBN-13: 9781870372183.

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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	Basics of weaving operation and tappet shedding	1	1	2	2	1	1	1	2	1	1	1	2	3	3	3
CO2	Working of dobby and Jacquard shedding mechanism	1	3	2	2	2	2	1	2	2	2	2	2	3	3	3
CO3	Principle of weft insertion in shuttle and shuttleless weaving	1	2	3	2	2	2	2	2	2	2	2	2	3	3	3
CO4	Beatup, secondary and auxiliary motions	1	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	3	3	2	2	1	2	3	2	3	2	3	3	3
Overall CO		1.4	2.2	2.4	2.2	1.8	1.8	1.4	2	2	1.8	2	2	3	3	3

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

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TT5402 **TECHNOLOGY OF YARN SPINNING** **L T P C**
2 0 2 3

OBJECTIVES:

To enable the students to understand the

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

and to practice the students to prepare yarn using ring and rotor spinning machine

UNIT I RING SPINNING - I **6**

Principle of yarn formation in ring frame-drafting, twisting and winding; mechanism of cop building, top arm loading; draft, twist and production calculations

UNIT II RING SPINNING – II **6**

Design features of important machine elements of ring frame – ring, traveller, spindle, drive arrangement; end breakage rate – causes and remedies; automations; condensed yarn spinning – principle, different methods, properties; comparison with ring spun yarn

UNIT III ROTOR SPINNING **6**

Principle of open end spinning; principle of yarn production by rotor spinning system; design features of important elements used in rotor spinning; techno economic study of rotor spinning

UNIT IV OTHER SPINNING SYSTEMS **6**

Friction, air vortex and air-jet spinning systems – principle of yarn production, raw material used, structure, properties and applications; principle of yarn production by self-twist, core, wrap, adhesive, electrostatic, disc spinning systems

UNIT V PLYING AND FANCY YARN SPINNING **6**

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; fancy yarns- types, method of production; safety measures at spinning machines – equipments used, safety practices

TOTAL (L 30+P:30) = 60 PERIODS

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. Construction details of rotor spinning machine and material passage
5. Draft, Twist and production calculations in rotor spinning machine
6. Production of yarn using ring spinning machine from fibre
7. Production of yarn using rotor spinning machine from fibre

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 features and elements of ring spinning machine and its automation, principle of compact spinning system,
CO3: Understand the working of rotor spinning and design features of important elements CO4: Understand the working principle of friction, air vortex, air jet and other spinning system
CO5: Understand the concept and production of ply yarns and fancy yarns
CO6: Understand material passage and calculate draft, twist and production rate of ring and rotor spinning machines
CO7: Produce yarn using ring and rotor spinning machine

TEXTBOOKS

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.

REFERENCES

1. 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.
2. Oxtoby E., “Spun Yarn Technology”, Butterworth Publications, London, 1987.
3. James Brayshaw., and Everett Backe., “Short-staple Ring Spinning, Textile Progress”, TheTextile Institute, Manchester, 1999, ISBN: 0890898979 | ISBN-13: 9780890898970
4. Iredale J., “Yarn Preparation: A Handbook”, Intermediate Technology, 1992, ISBN:
5. 1853390429 | ISBN-13: 9781853390425
6. Lawrence C. A., “Advances in Yarn Spinning Technology”, Wood Head publishing, 2010,ISBN:1845694449 | ISBN-13: 9781845694449

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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 features and elements of ring spinning machine and its automation, principle of compact spinning system,	3	3	2	3	2	1	1	2	2	2	2	2	3	2	3
CO3	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
CO4	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
CO5	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
CO6	Understand material passage and calculate draft, twist and production rate of ring and rotor spinning machine	2	2	2	2	2	1	1	2	2	2	2	2	3	2	3
CO7	Produce yarn using ring and rotor spinning machine	2	2	2	2	2	1	1	2	2	2	2	2	3	2	3
Overall CO		2.28	2.28	2.14	2.28	1.57	1.28	1.28	2.14	2.28	2.14	2.14	2.14	3	2	3

Attested

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

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TT5403 **KNITTING TECHNOLOGY** **L T P C**
3 0 0 3

OBJECTIVES:

To enable the students to learn about

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

UNIT I INTRODUCTION **5**

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 **9**

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

UNIT III WEFT KNITTING **13**

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 structures; 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 MACHINE **9**

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 **9**

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: 45 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

TEXTBOOKS

1. Chandrasekhar Iyer, Bernd Mammel and Wolfgang Schach., “Circular Knitting”, Meisenbach GmbH, Bamberg, 1995, ISBN: 3-87525-066-4.
2. Spencer D.J., “Knitting Technology”, III Ed., Textile Institute, Manchester, 2001, ISBN: 185573 333 1.

REFERENCES

1. Ajgaonkar D.B., “Knitting Technology”, Universal Publishing Corporation, Mumbai, 1998, ISBN: 81-85027-34-X.
2. Samuel Raz., “Flat Knitting: The new generation”, Meisenbach GmbH, Bamberg, 1997, ISBN: 3-87525-054-0.
3. Samuel Raz., “Warp Knitting production”, MelliandTextilberichte, GmbH, Rohrbacher, 1987, ISBN: 3-87529-022.

4. Baneerjee.P.K., “Principles of Fabric Formation”, CRC Press, London, 2014, ISBN Number:13:978-1-4665-5445-0.
5. Ray.S.C., “Fundamentals and advances in Knitting Technology”, Woodhead Publishing India Pvt., Ltd, New Delhi. 2011, ISBN: 978-93-80308-16-6.
6. 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.
7. Gajjap B.J., “Handbook of warp Knitting Technology”, Textile Institute, Manchester, 2004, ISBN: 1 85573 7701.

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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

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TT5404 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 PREPARATION **9**

Monomer used for polymer preparation, methods of polymerization of different fibers; polymer rheology- Newtonian and non-Newtonian fluids.

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 DRAWING AND SPIN FINISH **9**

Neck drawing, drawing systems, influence of drawing on structure and properties of various fibres; spin finish – requirements, compositions and methods of application;

UNIT V HEAT SETTING AND TEXTURING **9**

Types of heat setting, influencing parameters on heat setting, influence of heat setting on various fibre properties; texturizing – principles and methods

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Synthesis of polymers
CO2: Melt spinning of polymers
CO3: Solution spinning of polymers
CO4: Drawing and spin finish of fibres and filaments
CO5: Heat setting and texturising process

TEXTBOOKS

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.

REFERENCES

1. Vaidya A. A., “Production of Synthetic Fibres”, Prentice Hall of India Pvt. Ltd., New Delhi, 1988.ISBN: 0876925786 / ISBN: 9780876925782.
2. Cook J. G., “Handbook of Textile Fibres: Vol. 2: Man Made Fibres”, The Textile Inst., 5th Ed., 1984, ISBN: 1855734850.
3. Srinivasa Murthy H. V., “Introduction to Textile Fibres”, Textile Association, India, 1987.
4. 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	Synthesis of polymers	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	Drawing and spin finish of fibres and filaments	3	3	2	2	1	2	2	2	2	2	2	2	3	3	2
CO5	Heat setting and Texturizing process	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

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TT5411 **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. Measurement and analysis of yarn faults
2. Determination of package density of cones
3. Study of tappet shedding mechanism
4. Study of jacquard shedding mechanism
5. Calculation of sley eccentricity
6. Study of let-off mechanisms
7. Study of take-up mechanisms
8. Study of weft replenishment mechanism in shuttle looms
9. Method of achieving the required colour patterns in 4 X 1 drop box motion
10. Study of warp stop motion, warp protector, weft fork mechanisms
11. Study of plain, rib and interlock circular knitting machines
12. Study of flat knitting machines
13. Preparation of fabric samples in loom and knitting machine

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of this practical course, the students will be able to
CO1: Test and analyze the yarn faults
CO2: Control the weaving mechanism in consideration with fabric quality and loom performance
CO3: Control the knitting mechanism in consideration with fabric quality and knitting performance
CO4: Produce the knit fabric samples in knitting machines
CO5: Produce the woven fabric samples in power loom

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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	Test and analyse the yarn faults	3	3	2	2	2	2	2	2	3	2	2	1	3	3	3
CO2	Control the weaving mechanism in consideration with fabric quality and loom performance	3	3	2	2	2	2	2	2	3	2	2	2	3	3	3
CO3	Control the knitting mechanism in consideration with fabric quality and knitting performance	3	3	2	2	2	2	2	2	3	2	2	2	3	3	3
CO4	Produce the knit fabric samples in knitting machines	3	3	2	2	1	2	2	2	3	2	2	1	3	3	3
CO5	Produce the woven fabric samples in power loom	3	3	2	2	2	2	2	2	3	2	2	1	3	3	3
Overall CO		3	3	2	2	1.8	2	2	2	3	2	2	1.4	3	3	3

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

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SEMESTER V

TT5501	WOVEN FABRIC STRUCTURE	L T P C
		2 1 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**

Introduction – methods of representing weave in point paper, construction of design, draft and lifting plan, types of draft, heald calculation, order of denting; elementary 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; colour and weave effects; loom requirements

UNIT III **9**

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, and weft plush – loom requirements

UNIT V **9**

Double cloth, types of stitches; Damasks; Gauze and Leno principles – loom requirements; trade name of popular structures

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

TEXTBOOKS

1. Grosicki Z. J., “Watson’s Textile Design and Colour”, Vol.1, Wood head Publications, Cambridge England, 2004, ISBN: 1 85573 7701 24.
2. Grosicki Z. J., “Watson’s Advanced Textile Design and Colour”, Vol. II, Butterworths, London, 1989, ISBN-9781855739963

REFERENCES

1. Wilson J., “Handbook of Textile Design”, Textile Institute, Manchester, 2001, ISBN: 1 85573 5733.
2. Horne C.E., “Geometric Symmetry in Patterns and Tilings”, Textile Institute, Manchester, 2000, ISBN: 1 85573 4923.
3. Seyam A. M., “Structural Design of Woven Fabrics, Theory and Practice”, Textile Institute, Manchester, 2002, ISBN: 1 87037 2395.
4. GeornerD., “Woven Structure and Design, part 1: Single Cloth Construction”, WIRA, U.K., 1986, ISBN: 0900820179 | ISBN-13: 9780900820175
5. GeornerD., “Woven Structure and Design, Part 2: Compound Structures”, WIRA, U.K., 1989, ISBN: 090366951X | ISBN-13: 9780903669511
6. Jan Shenton., “Woven Textile Design”, Laurence King Publishing, 2014, ISBN: 178067337X | ISBN-13: 9781780673370.

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

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TT5502 **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 in textiles; singeing and desizing of natural and synthetic fibres and its blends; heat setting of fabrics

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; assessment of finishes; Application of Nanotechnology in finishing; safety measures to be taken at the textile chemical processing industry.

TOTAL: 45 PERIODS

OUTCOMES:
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
CO5: Various finishing treatments on fabric

TEXTBOOKS

1. Trotman E. R., “Dyeing and Chemical Technology of Textile Fibres”, B.I Publishing Pvt.Ltd., New Delhi, 1994.
2. Menachem Lewin and Eli M. Pearce, “Handbook of Fibre Chemistry: Second Edition, Revised and Expanded, Marcel Dekker, Inc., 1998.

REFERENCS

1. Menachem Lewin and Stephen B. Sello., “Handbook of Fibre Science and Technology: Volume I: Chemical Processing of Fibres and Fabrics-Fundamentals and Preparation Part A”, Marcel Dekker, Inc., 1983.
2. Karmakar S. R., “Chemical Technology in the Pre-treatment Process of Textiles”, Elsevier sciences B.V., 1999.
3. Choudhury A. K. R., “Textile Preparation and Dyeing”, SDC India Region,2011.
4. Bhagwat R. S., “Handbook of Textile Processing”, Colour Publication, Mumbai. 1999.
5. Cavaco-Paulo A. and Gubitz G. M., “Textile Processing with enzymes”, Woodhead Publication Ltd., 2003.
6. Schindler W.D and Hauser P., “Chemical Finishing of Textiles”., Wood head Publications, ISBN: 1855739054
7. Heywood D,“Textile Finishing”, Wood head Publishing Ltd., 2003, ISBN 090195681.
8. Yin-Ling Lam , Chi-Wai Kan& Chun-Wah Marcus Yuen, " Developments in functional finishing of cotton fibres – wrinkle-resistant, flame retardant and antimicrobial treatments", Textile Progress, Vol. 44, Nos. 3-4, September-December 2012, 175–249

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	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

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TT5503 **TEXTILE QUALITY EVALUATION** **L T P C**
4 0 0 4

OBJECTIVES:

To make the students understand the principle and method of working of equipments used for testing of textile materials

UNIT I FIBRE TESTING **12**

Fibre testing – importance, sampling methods, conditioning; test procedure – length, strength, fineness, maturity, moisture, colour and trash content-direct and indirect method of testing; AFIS and HVI for testing of fibers; standards and norms

UNIT II YARN TESTING **12**

Yarn testing - importance, sampling methods, conditioning; test procedure - yarn numbering, twist in single and ply yarns, single yarn strength, lea strength, yarn mass evenness, yarn hairiness; yarn friction– static and dynamic; standards and norms

UNIT III FABRIC TESTING I **12**

Fabric testing - importance, sampling methods, conditioning; test procedure -tensile, tear , bursting strength, ballistic impact, stiffness, drapeability, crease recovery, wrinkle recovery, air permeability; standards and norms

UNIT IV FABRIC TESTING II **12**

Test procedure - abrasion resistance, pilling resistance, Low stress mechanical properties - Kawabata Evaluation System; FAST; standards and norms

UNIT V FABRIC INSPECTION AND GARMENT QUALITY **12**

Fabric defects – inspection and grading, acceptable quality level; quality assessment of garments - cutting, sewing, pressing, finishing and packaging defects; standards

TOTAL: 60 PERIODS

OUTCOMES:

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

CO1: Importance and test procedure for various fibres and its properties
CO2: Testing of various yarn properties
CO3: Various test procedure for fabric mechanical and aesthetic related properties
CO4: Test procedure for determining low stress mechanical properties of fabric
CO5: Fabric inspection and quality assessments of garment

TEXTBOOKS

1. Booth J.E., “Principle of Textile Testing”, Butterworth Publications, London, 1989, ISBN: 0592063259 | ISBN-13: 9780592063256.
2. Kothari V. K., “Progress in Textiles: Science & Technology Vol 1 Testing & QualityManagement”, IAFL Publications, New Delhi, 1999, ISBN: 819010330X | ISBN-13: 9788190103305

REFERENCS

1. Seville B.P., “Physical Testing of Textiles”, Textile Institute, Manchester, 1999, ISBN: 1855733676 | ISBN-13: 9781855733671.
2. Ruth E.Glock., and Grace I. Kunz., “Apparel Manufacturing – Sewn Product Analysis FourthEdition”, Pearson/Prentice Hall, 2005, ISBN: 0131119826 / ISBN: 978-0131119826
3. Pradip V. Mehta P.E., and Satish K. Bhardwaj., “Managing Quality in the Apparel Industry”, National Institute of Fashion Technology, India 1998, ISBN: 8122411665 | ISBN-13: 9788122411669
4. Sara J. Kadolph., “Quality Assurance for Textiles and Apparels”, Fair child Publications, New York, 2007, ISBN: 1563675544 | ISBN-13: 9781563675546.
5. Slater K., “Physical Testing and Quality Control”, The Textile Institute, Vol.23, No.1/2/3 Manchester, 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	Importance and test procedure for various fibres and its properties	2	2	2	3	2	1	-	2	-	2	2	-	2	3	3
CO2	Testing of various yarn properties	2	3	3	3	2	2	-	2	-	2	2	-	2	3	3
CO3	Various test procedure for fabric mechanical and aesthetic related properties	3	2	2	3	2	2	-	1	-	3	3	-	3	3	3
CO4	Test procedure for determining low stress mechanical properties of fabric	3	2	2	3	2	2	-	1	-	3	3	-	3	3	3
CO5	Fabric inspection and quality assessments of garment	2	3	2	2	1	1	-	2	-	3	3	-	3	3	3
Overall CO		2.4	2.4	2.2	2.8	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

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TT5551 **TECHNOLOGY OF NONWOVENS** **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 WEB FORMATION **9**

Definitions and classification of bonded fabrics; web formation – dry and wet method of production, fibre requirements; web laying – types, influence on web structure and nonwoven properties; quality control of web

UNIT II MECHANICALBONDING **9**

Bonded fabric production by mechanical bonding - needling, stitching, water-jet consolidation; factors influencing the properties; applications

UNIT III CHEMICAL AND THERMAL BONDING **9**

Chemical bonding – binder polymers and bonding technologies; thermal bonding technologies; factors influencing the properties; applications

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 attenuation; effect of processing parameters on fabric characteristics; applications

UNIT V FINISHING AND CHARACTERIZATION OF BONDED FABRICS **9**

Dry and wet finishing; characterization – tensile, tear, bursting, thickness, abrasion, puncture, permeability, porosity; safety measures to be taken at the nonwoven industry

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Basics of nonwoven web formation techniques
CO2: Mechanical bonding technique to produce nonwovens
CO3: 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

TEXTBOOKS

1. Lunenschloss J., Albrecht W. and David Sharp., “Nonwoven Bonded Fabrics”, Ellis HorwoodLtd., New York, 1985, ISBN: 0-85312-636-4.
2. Mrstina V. and Feigl F., “Needle Punching Textile Technology”, Elsevier, New York, 1990,ISBN: 0444988041 | ISBN-13: 9780444988041

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1. Dharmadhikary R. K., Gilmore T. F., Davis H. A. and Batra S. K., “Thermal Bonding ofNonwoven Fabrics”, Textile Progress, Vol.26, No.2, Textile Institute Manchester, 1995, ISBN:1870812786.
2. Jirsak O. and Wadsworth L. C., “Nonwoven Textiles”, Textile Institute, Manchester, 1999,ISBN: 0 89089 9788.
3. Russell S., “Hand Book of Nonwovens”, Textile Institute, Manchester, 2004, ISBN: 1855736039.
4. Chapman R., “Applications of Nonwovens in Technical Textiles”, Textile Institute,Manchester, 2010, ISBN: 1 84569 4376
5. 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.

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 nonwoven web formation techniques	1	1	1	1	1	1	1	2	1	2	2	2	2	2	2
CO2	Mechanical bonding technique to produce nonwovens	1	2	2	2	2	1	1	2	1	2	2	2	2	2	3
CO3	Chemical and thermal bonding methods to produce nonwovens and their end uses	1	2	2	2	2	1	1	2	1	2	2	2	2	2	3
CO4	Production of spun bonded and melt blown nonwoven fabrics.	1	2	2	2	2	1	1	2	1	2	2	2	2	2	3
CO5	Understand the finishing and characterization of bonded fabrics	1	2	2	2	2	1	1	2	1	2	2	2	2	2	3
Overall CO		1	1.8	1.8	1.8	1.8	1	1	2	1	2	2	2	2	2	2.8

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

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TT5511 **TEXTILE QUALITY EVALUATION LABORATORY** **L T P C**
0 0 4 2

OBJECTIVES:

To make the students practically learn various textile material evaluation procedures to determine its characteristics

LIST OF EXPERIMENTS

Determination of

1. Fineness, length , strength, trash and maturity of fibers
2. Single and bundle yarn strength
3. Yarn impact strength
4. Yarn single and ply yarn twist
5. Yarn to yarn abrasion
6. Yarn unevenness and appearance
7. Fabric tensile strength
8. Fabric tear strength
9. Fabric bursting strength
10. Fabric bending modulus and flexural rigidity
11. Fabric Crease recovery
12. Fabric wrinkle recovery
13. Fabric drape
14. Fabric abrasion and pilling resistance
15. Seam strength
16. Air permeability of fabrics and
17. Knitted fabric analysis
18. Analysis of Nonwoven

TOTAL: 60 PERIODS

OUTCOMES:

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

CO1: The fiber properties
CO2: The yarn properties
CO3: The woven fabric properties
CO4: The knitted and nonwoven fabric properties
CO5: Interpret the results obtained during the evaluation of textile materials

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	The fiber properties	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO2	The yarn properties	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO3	The woven fabric properties	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO4	The knitted and nonwoven fabric properties	3	1	2	2	2	1	-	1	1	2	2	1	3	2	2
CO5	Interpret the results obtained during the evaluation of textile materials	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

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TT5512 **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. Identification of commercially available woven, knitted and nonwoven fabrics

2. Analysis of construction details of the following fabric structure
    1) Plain and its derivatives
    2) Twill and its derivatives
    3) Satin (regular and irregular)
    4) Sateen (regular and irregular)
    5) Honeycomb (ordinary and brighton)
    6) Huck-a-back
    7) Extra warp and extra weft figuring
    8) Pile fabrics (warp and weft)
    9) Backed fabrics
    10) Gauze and Leno
    11) Double cloth
    12) Crepe
    13) Tapestry
    14) Mock-leno
    15) Bedford cord
    16) Single jersey
    17) Double jersey structures

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 of the woven fabric structure
CO4: Draw peg plan of the woven fabric structure
CO5: Analyze the knitted fabric structure

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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	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 the knitted fabric structure	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

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SEMESTER VI

TT5601 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, colour assessment and colour matching; whiteness and yellowness indices.

UNIT II DYEING I **9**

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; determination of fastness properties.

UNIT III DYEING II **9**

Indigo and non-indigo dyes on yarn used for denim; low salt or no salt reactive dyeing; sustainable aspects in processing.

UNIT IV PRINTING **9**

Printing with paste - methods and styles of printing; printing machines; printing with direct, reactive, acid and disperse dyes; printing with pigments; printing with inks- transfer and digital Printing.

UNIT V PROCESSING OF KNITS AND GARMENTS **9**

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: Different classes of dyes, chemistry application and fastness properties
CO3: Dyes used for Denim processing and sustainable aspect in processing
CO4: Methods and styles of printing
CO5: Chemical processing of knits and garments

TEXTBOOKS

1. Trotman E. R., "Dyeing and Chemical Technology of Textile Fibres", B.I Publishing Pvt.Ltd. New Delhi, 1994 , ISBN: 0471809101 | ISBN-13: 9780471809104
2. Shenai V.A., "Chemistry of Dyes and Principles of Dyeing", Sevak Publications, Mumbai, 1995.

REFERENCES

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
3. Gulrajani M.L.(Ed.)., "Colour Measurement - Principles, advances and industrial applications", Wood head Publishing Ltd, 2010, ISBN: 1845695593 | ISBN-13:9781845695590
4. Vickerstaff T., "The Physical Chemistry of Dyeing", Interscience Publications, Newyork-London,1954, ISBN: 1114785733 | ISBN-13: 9781114785731
5. Alan Johnson., "The Theory of Colouration of Textiles", 2nd ed., Society of Dyers and chemists, United Kingdom, 1995, ISBN: 0901956481 | ISBN-13: 9780901956484.
6. Broadbent A.D., "Basic Principles of Textile Colouration", SDC, 2001, ISBN: 0901956767 /ISBN: 978-0901956767
7. Chakraborty J.N., "Fundamentals and practice in Colouration of Textiles", Wood head Publishing India Pvt Ltd, India, 2010, ISBN: 184569788X | ISBN-13: 9781845697884.

8. Mittal R.M., and Trivedi S.S., “Chemical Processing of Polyester/Cellulosic Blends”, 2nd ed., Tata McGraw Hill, 2000.
9. Burkinshaw S. M., “Chemical Principles of Synthetic Fibre Dyeing", Springer-Science + Business Media, B.V., 2012, ISBN: 9401042632 | ISBN-13: 9789401042635.
10. Shenai V. A., “Technology of Printing”, Sevak Publications, Mumbai, 1996.
11. .Miles W. C., “Textile Printing”, Wood head Publication, 2003, ISBN 0 901956 76 1.
12. Jones B. W., “Garment Dyeing: Ready to Wear Fashion from the Dyehouse”, Textile Progress, Vol. 19, No. 2, 1988, ISBN 1870812131.
13. Roshan Paul (Ed.)., “Denim – Manufacture Finishing and Applications”, Wood head Publishing, 2015, ISBN: 0857098438 | ISBN-13: 9780857098436

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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	Theory of colour	3	2	1	2	2	1	1	1	1	2	2	1	3	3	3
CO2	Different classes of dyes, chemistry application and fastness properties	3	1	2	2	1	2	2	2	2	2	2	1	3	3	3
CO3	Dyes used for Denim processing and sustainable aspect in processing	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	1	2	2	2	2	2	2	1	3	3	3
CO5	Chemical processing of knits and garments	2	2	2	2	1	2	2	2	2	2	2	1	3	3	3
Overall CO		2.8	1.8	1.8	2	1.2	1.8	1.8	1.8	1.8	2	2	1	3	3	3

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

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TT5602 **GARMENT MANUFACTURING TECHNOLOGY** **L T P C**
3 0 0 3

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 **9**

Anthropometry, specification sheet, pattern making – principles, basic pattern set drafting, grading, marker planning, spreading & cutting

UNIT II **9**

Different types of seams and stitches; single needle lock stitch machine - mechanism and accessories; needle – functions, special needles, needlepoint

UNIT III **9**

Sewing thread-construction, material, thread size, packages, accessories - labels, linings, interlinings, wadding, lace, braid, elastic, hook and loop fastening, shoulder pads, eyelets and laces, zip fasteners, buttons

UNIT IV **9**

Design and construction procedure – formal shirt, trouser, women's top and skirt; raw material, in process and final inspection

UNIT V **9**

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

TOTAL: 45 PERIODS

OUTCOME:

Upon completion of the course, the students will know about

CO1: Pattern making, marker planning, cutting
CO2: Types of seams, stitches and functions of needles
CO3: Components and trims used in garment
CO4: Construction procedure of men's and women's garment
CO5: Garment pressing, packing and care labeling

TEXTBOOKS

1. Carr H., and Latham B., "The Technology of Clothing Manufacture", Blackwell Science Ltd., Oxford, 1994, ISBN: 0632037482.
2. Winifred Aldrich., "Metric Pattern Cutting", Blackwell Science Ltd., Oxford, 2004, ISBN: 1405102780 | ISBN-13: 9781405102780

REFERENCES

1. Peggal H., "The Complete Dress Maker", Marshall Caverdish, London, 1985.
2. Gerry Cooklin., Steven George Hayes., and John McLoughlin, "Introduction to Clothing Manufacture", Blackwell Scientific Publications, London, 2006, ISBN: 0632058463 | ISBN-13: 9780632058464.
3. Jai Prakash., and Gaur R.K., "Sewing Thread", NITRA, 1994.
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
5. Pradip V. Mehta., "An Introduction to Quality Control for the Apparel Industry", J.S.N. Internationals, 1992, ISBN: B015X4YGIE.

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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	Pattern making, marker planning, cutting	1	1	1	-	2	-	1	1	-	2	3	1	2	3	3
CO2	Types of seams, stitches and functions of needles	2	2	1	1	1	-	1	1	-	2	2	1	2	2	2
CO3	Components and trims used in garment	1	1	1	1	1	1	1	1	-	1	2	1	1	3	3
CO4	Construction procedure of men's and women's garment	2	1	1	1	2	2	2	1	1	2	3	1	2	3	3
CO5	Garment pressing, packing and care labeling	2	2	1	1	1	1	2	1	-	2	2	1	2	2	2
Overall CO		1.6	1.4	1	0.8	1.4	0.8	1.4	1	0.2	1.8	2.4	1	1.8	2.6	2.6

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

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TT5603 **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 **9**

Gears – nomenclature, types, features, applications in textile machinery; gear trains; power transmission – different modes, advantages and limitations, applications in textile machinery

UNIT II **9**

Linear and circular motion, force, energy, power; energy stored in rotating masses; design of drive transmitting shafts, balancing of rotating masses in textile machinery

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**

Clutches and brakes – types, features, application in textile machines; friction, bearings-types, features; design of winder drums

UNIT V **9**

Kinematics of shedding; design of tappets and cams; beat up force, sley eccentricity; power for picking in weaving machine

TOTAL: 45 PERIODS

OUTCOMES

Upon completion of the course students will

CO1: Have knowledge of types of gears, gear trains and their applications
CO2: Be able to understand the design aspects of machine elements for specific requirements
CO3: Be able to design the cone drums, piano feed regulation and builder mechanisms
CO4: Have knowledge on clutches and brakes
CO5: Be able to understand cams, tappets and kinematics of shedding, picking

TEXTBOOKS

1. Booth J. E., “Textile Mathematics”, Vol. 2&3, The Textile Institute, Manchester, 1975,ISBN-10: 0900739193.

REFERENCES

1. Slater K., “Textile Mechanics”, Vol. 1&2, The Textile Institute, Manchester, 1977, ISBN:0900739274.
2. 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	Have knowledge of types of gears, gear trains and their applications	3	3	3	2	2	1	1	2	1	1	1	2	2	2	1
CO2	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
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	Have knowledge on clutches and brakes	2	2	2	1	1	1	1	1	1	1	1	2	2	2	1
CO5	Be able to understand cams, tappets and kinematics of shedding, 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

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

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TT5611 **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. Processing of textile substrates using open vat process
2. Processing of textile substrates with Pilot machines
3. Printing of cotton fabrics using discharge style
4. Pigment printing of cotton fabrics
5. Assessment of fastness to wash, rub, light and perspiration
6. Assessment of water repellant and flame retardant finishes on finished fabrics
7. Measurement of shrinkage in fabrics
8. Measurement of Skew and Bow in fabrics
9. Measurement of achromatic and chromatic colors using spectrophotometer.

TOTAL: 60 PERIODS

OUTCOME:
Upon completing this practical course, the student would be able to
CO1: Prepare and dye the fabric with different types of colourants,
CO2: Prepare and Print the fabric with different types of colourants
CO3: Finish the fabric with different types of chemicals
CO4: Evaluate the fabrics for fastness
CO5: Evaluate the dimensional stability and assessment of finished 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	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	Prepare and Dye the fabric with different types of colourants,	2	2	3	2	-	2	2	2	2	2	2	-	3	2	2
CO2	Prepare and Print the fabric with different types of colourants	2	2	3	2	-	2	2	2	2	2	2	-	3	2	2
CO3	Finish the fabric with different types of chemicals	2	2	3	2	-	2	2	2	2	2	2	-	3	2	2
CO4	Evaluate the fabrics for fastness	2	1	2	1	2	1	-	2	1	2	2	-	3	2	2
CO5	Evaluate the dimensional stability and assessment of finished fabric	2	2	2	1	-	1	-	2	1	2	2	-	3	2	2
Overall CO		2	1.8	2.6	1.6	0.4	1.6	1.2	2	1.6	2	2	-	3	2	2

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

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SEMESTER VII

TT5701	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; idealized packing; measurement of packing density and radial packing density of yarn

UNIT II FIBRE MIGRATION 9

Ideal migration, tracer fibre technique, characterization of migration behavior, mechanismsof migration in filament and spun yarn, effect of various parameters on migration behavior; twist contraction and retraction

UNIT III TENSILE BEHAVIOUR OF YARNS 9

Analysis of tensile behavior of yarn – filament strain and yarn strain; prediction of breakage of filament yarn; analysis of tensile behavior of spun yarn- deduction based on fibre obliquity and slippage; influence of fibre length, fineness and friction on tensile behavior; strength prediction model for blended yarns

UNIT IV GEOMETRY OF FABRIC STRUCTURE 9

Geometry of fabric - Peirce model, rigid thread model; Jamming of threads; Balance of crimp;geometry of knitted structures

UNIT V STRUCTURE VS PROPERTY 9

Structure- property relationship for yarns and fabrics

TOTAL:45 PERIODS

OUTCOMES:

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

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. Relate the structure of yarn and fabrics with their properties

TEXTBOOKS

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 JafargholiAmirbayat., “Mechanics of FlexibleFibreAssemblies”, Sijthoff and Noordhoff, 1980, ISBN : 902860720X.

REFERENCES

1. Jinlian Hu., “Structure and Mechanics of Woven Fabrics”, Woodhead Publishing Ltd.,2004,ISBN: 1855739046.
2. Hassan M. Berery., “Effect of Mechanical and Physical Properties on Fabrics Hand”, Woodhead publishing Ltd., 2005, ISBN : 13: 978 – 1- 85573 -9185
3. 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	Relate the structure of yarn and fabrics with their properties	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

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TT5702 FINANCIAL MANAGEMENT FOR TEXTILE INDUSTRY L T P C
3 0 0 3

OBJECTIVES:

To enable the students to understand

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

UNIT I **9**

Costing - concepts; costing types; different methods of costing, standard costing, analysis of variance; classification of costs; preparation of cost sheet; cost profit volume analysis, breakeven analysis

UNIT II **9**

Costing of yarn, fabrics and garments; tax structure

UNIT III **9**

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

UNIT IV **9**

Capital structure; sources and cost of capital; working capital management; Budget, types of budgets, budgeting and control in textile industry

UNIT V **9**

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

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Understand types and methods of costing, and preparation of cost sheet
CO2: Determine the cost of yarn, fabrics and garments
CO3: Carryout investment appraisal and calculate depreciation
CO4: Understand different sources and cost of capital, and preparation of budget
CO5: Analyze and interpret the financial statements of textile company

TEXTBOOKS

1. Pandey I. M., “Financial Management”, Vikas Publishing House Pvt. Ltd., New Delhi, 10thEdition, 2010, ISBN: 8125937145 / ISBN: 9788125937142.
2. Bhave P.V., and Srinivasan V., “Costing Accounting to Textile Mills”, ATIRA, Ahmadabad, 1976

REFERENCES

1. ThukaramRao M.E., “Cost and Management Accounting” NewAge International, Bangalore, 2004, ISBN: 812241513X / ISBN: 978-8122415131.
2. ThukaramRao M.E., “Cost Accounting and Financial Management” New Age International, Bangalore, 2004, ISBN: 8122415148/ ISBN: 978-8122415148.
3. Prasanna Chandra., “Financial Management - Theory and Practice”, 8th Edition, Tata McGraw- Hill Publishing Company Ltd, New Delhi, 2011, ISBN :0071078401 / ISBN: 0071078401.62
4. James C. Vanhorne., “Financial Management and Policy”, Pearson Education Asia (Low Priced Edition) 12th Edition, 2002, ISBN: 0130326577 | ISBN-13: 9780130326577.

5. Narang, G. B. S., and Kumar V., “Production and Costing”, Khanna Publishers, New Delhi,1988, ISBN: 8174092897 | ISBN-13: 9788174092892
6. AswatDamodaran., “Corporate Finance Theory and Practice”, John Wiley & Sons, 2001,ISBN: 0471283320 | ISBN-13: 9780471283324.
7. Hrishikes Bhattacharya., “Working Capital Management, Strategies and Techniques”, Prentice Hall of India Pvt. Ltd., New Delhi, 2014, ISBN: 8120349040 | ISBN-13: 9788120349049.
8. Khan and Jain, “Basic Financial Management and Practice”, Tata McGraw Hill, New Delhi, 7thEdition, 2014, ISBN: 933921305X / ISBN: 978-9339213053.
9. Kantwala D.N., “Costing and Cost Control – A Marginal Approach for Textile Industry”, Texcons, Bombay, 1977.

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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	PO 10	PO 11	PO 12	PSO 1	PSO 2	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	2	1	-	2	-
CO4	Understand different sources and cost of capital, and preparation of budget	-	-	2	-	3	1	-	2	2	2	3	1	-	2	-
CO5	Analyze and interpret the financial statements of textile company	-	-	2	-	3	1	-	2	2	2	3	1	-	2	-
Overall CO		-	-	2.4	-	2.6	1	-	2	2	2	2.4	1	-	2	-

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

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TT 5713 **PROJECT I** **L T P C**
0 0 6 3

OBJECTIVES:

- To train the students in preparing project reports and to face reviews and viva-voce
- To develop the structured methodology to solve the identified problem in textile industry.
- To consolidate and write reports on the findings of the project

SYLLABUS:

The student individually works on a specific topic approved by faculty member who is familiar in this area of interest. The student can select any topic which is relevant to his/her specialization of the programme. The topic may be experimental or analytical or case studies. At the end of the semester, a detailed report on the work done should be submitted which contains clear definition of the identified problem, detailed literature review related to the area of work and methodology for carrying out the work.

TOTAL: 90 PERIODS

OUTCOME

At the end of the course, the students will carryout project work iIn 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

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TT5811	PROJECT II	L T P C 0 0 16 8

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: 240 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

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TT5712	Comprehension	L T P C 0 2 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.

TOTAL: 30 PERIODS

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	0	1
CO2	Technical report writing abilities	3	2	3	3	3	1	2	2	3	3	2	2	3	0	2
CO3	Industry related problems and their potential solutions	3	2	3	3	2	3	3	3	3	2	3	3	3	0	3
CO4	Sustainable solutions for textile industry	3	2	3	3	1	3	3	3	3	2	3	3	3	0	3
CO5	Leadership qualities	3	2	2	2	1	1	2	2	3	2	3	2	2	0	1
Overall CO		3	2	2.6	2.8	2	2	2.4	2.4	3	2.4	2.6	2.6	2.8	0	2

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

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TT5513/TT5711	INTERNSHIP / TRAINING	L T P C 0 0 0 2

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														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	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	2.1	2.1	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

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PROFESSIONAL ELECTIVES

TT5001 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 hook level

UNIT III WASTE CONTROL 9
Waste determination and cleaning efficiency; 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; determination of yarn realization

UNIT IV PRODUCTION CONTROL 9
Balancing of machinery; 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; computation of the productivity indices

UNIT V HUMIDITY CONTROL AND MACHINERY MAINTENANCE 9
Humidity and temperature – maintenance, influence on machine performance and quality of yarn; cleaning and machinery and maintenance influence on machine performance and yarn quality; optimum processing conditions; process 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: Factors influencing production rate and efficiency of the spinning machines, calculation of machine and labour production
CO5: Special measures to be taken while processing manmade fibres and importance of humidity control and machinery maintenance

TEXTBOOKS

1. Thomas Weide., “The Rieter Manual of Spinning, Vol.7”, Rieter Machine Works Ltd.,Winterthur, 2014, ISBN: 10 3-9523173-7-3 / ISBN: 13 978-3-9523173-0-3
2. MajumdarA., Das A., Alagirusamy. R., and Kothari V.K., “Process Control in Textile Manufacturing”, wood Head publishing, 2012, ISBN: 0857090275 | ISBN-13: 9780857090270
3. Garde A.R., and Subramaniam T.A., “Process Control in Spinning”, ATIRA Publications, Ahmedabad, 1989.

REFERENCES

1. Lord P.R., “Handbook of Yarn Production; Science, Technology and Economics”, Wood head Publishing, 2003, ISBN: 1855736969 | ISBN-13: 9781855736962
2. Furter R., “Evenness Testing in Yarn Production Part I”, The Textile Institute, Manchester,1981, ISBN 10: 0900739487 ISBN 13: 9780900739484.

3. Furter R., “Evenness Testing in Yarn Production Part I”, The Textile Institute, Manchester,1982, ISBN 10: 0900739495 ISBN 13: 9780900739491
4. Van der Sluijs M., and Hunter L., “Neps in Cotton Lint, Textile Progress”,The Textile Institute,Manchester, 1999, ISBN: 1870372239 / ISBN: 978-1870372237
5. Slater K., “Yarn Evenness”, Textile Progress, The Textile Institute, Manchester, 1986.
6. Townend P.P., “Nep Formation in Carding”, Wira, U.K., 1986, ISBN: 0900739851 / ISBN: 978-0900739859.

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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	Quality control measures in terms of levelling of material	3	3	3	3	2	1	1	1	2	2	3	2	3	2	1
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	Factors influencing production rate and efficiency of the spinning machines, calculation of machine and labour production	3	2	2	3	1	1	1	1	2	2	2	2	3	2	1
CO5	Special measures to be taken while processing manmade fibres and importance of humidity control and machinery maintenance	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

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

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TT5002 **QUALITY CONTROL IN SPINNING** **L T P C**
3 0 0 3

OBJECTIVES:

To enable the students to understand quality control in spinning system

UNIT I **9**

Yarn quality standards; yarn quality requirements - high speed shuttleless looms, knitting and different end uses

UNIT II **9**

Measurement and control of count and count CV%, and strength and strength CV% of yarn; analysis of stress strain curve and data; influence on post spinning performance and fabric quality

UNIT III **9**

Measurement and control of evenness and imperfections of yarn; analysis of diagram, spectrogram and VL curve

UNIT IV **9**

Measurement and control of hairiness of yarn; influence on post spinning operations; colour variation control in yarn package; blend irregularity measurement and control and influence on fabric quality

UNIT V **9**

Yarn faults classifications - causes and remedies; yarn defects - causes and remedies; influence on fabric quality

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Quality description of yarn and quality requirement for different end uses
CO2: Control of count, count CV%, strength, strength CV%
CO3: Control of evenness and imperfections and analysis of quality charts
CO4: Control of hairiness and colour variation of yarn
CO5: Measurement and control of yarn, fabric defects

TEXTBOOKS:

1. Garde A.R. And Subramaniam T.A., “Process Control In Spinning”, ATIRA Publicaitons, Ahmedabad, 1989
2. Klein W., “Man-Made Fibres And Their Processing” ,The Textile Institute, Manchester, 1994

REFERENCES:

1. Lord P.R., “Yarn Production; Science, Technology And Economics”, The Textile Institute, Manchester, 1999
2. Furter R., “Evenness Testing In Yarn Production Part 1 And Part II “, The Textile Institute, Manchester, 1982
3. Van Der Sluijs M And Hunter L., “Neps In Cotton Lint, Textile Progess“,The Textile Institute, Manchester, 1999
4. Slater K.Yarn Evenness, “Textile Progress”, The Textile Institute, Manchester, 1986.
5. Townend P.P., “Nep Formation In Carding “, Wira, U.K., 1982

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	Quality description of yarn and quality requirement for different end uses	3	3	1	3	2	1	1	2	2	2	2	1	3	1	-
CO2	Control of count, count CV%, strength, strength CV%	2	3	1	3	2	1	1	2	2	2	2	1	3	1	-
CO3	Control of evenness and imperfections and analysis of quality charts	2	2	1	3	2	1	1	2	2	2	2	2	3	2	-
CO4	Control of hairiness and colour variation of yarn	2	2	1	3	3	2	1	2	2	3	2	1	3	1	-
CO5	Measurement and control of yarn, fabric defects	3	2	2	3	3	1	2	3	3	2	2	2	3	2	-
Overall CO		2.4	2.4	1.2	3	2.4	1.2	1.2	2.2	2.2	2.2	2	1.4	3	1.4	-

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

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TT5003 THEORY OF DRAFTING AND TWISTING L T P C
3 0 0 3

OBJECTIVES:

To enable the students to understand the theory of drafting and twisting involved in spinning system.

UNIT I IDEAL DRAFTING 9

Ideal drafting – definition, model, conditions required in roller drafting system; deviations from ideal drafting and actual drafting conditions; drafting wave – definition, causes, estimation, conditions to avoid formation, role of apron in controlling drafting wave formation, limitations of apron system

UNIT II ROLLER SLIP AND ROLLER NIP MOVEMENT 9

Roller slip – definition, conditions for the formation of forward and backward slips in the roller drafting systems, measures to avoid roller slip occurrence; causes for roller nip movement and roller speed variation, control measures

UNIT III ROLLER VS. WIRE POINT DRAFTING 9

Comparison of roller drafting system with wire point drafting system; application of wire point drafting in card and rotor spinning machine; comparison of roller drafting in drawframe, comber preparatory, comber, speedframe, ringframe, and condensed yam spinning.

UNIT IV FALSE TWISTING AND TWISTING IN RING FRAME 9

Principle of false twisting; fundamental requirements to create real twist in the strand; principle of twist insertion in ring spinning; limitations of ring twisting; mechanics of balloon formed during twisting; principle of two-for-one twisting

UNIT V TWISTING IN ALTERNATIVE SPINNING SYSTEMS 9

Principle of twist insertion in open-end spinning; application of this principle in rotor spinning and friction spinning machines; principle of twist formation in air-jetand air-vortex spinning; principle of twist insertion in core spinning, cover spinning and self-twist spinning.

TOTAL 45 PERIODS

OUTCOMES:

After completion of this course, the students would understand the

CO1: Concept of Ideal drafting and real drafting
CO2: Phenomenon of roller slip and roller nip movement
CO3: Principle of wire point drafting and its comparison with roller drafting and applications
CO4: Fundamentals of real and false twisting and twisting in ring spinning
CO5: Theory of twist formation in rotor spinning, airjet and air vortex spinning systems

TEXTBOOKS:

1. Foster G.A.R. The Principles of Roller Drafting and the Irregularity of Drafted Materials, The Textile Institute, Manchester, 1958.
2. Lord P.R. Roller Drafting, Textile Progress, The Textile Institute, Manchester, 1993.
3. Klein W., New Spinning Systems, The Textile Institute, Manchester, 1993.

REFERENCES:

1. Grosberg P and lype C. Yarn Production: Theoretical Aspects, The Textile Institute, Manchester, 1999.
2. De Barr A.E. and Catling H., The Principle and Theory of Ring Spinning, The Textile Institute, Manchester, 1965.

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	Concept of Ideal drafting and real drafting	3	3	3	2	2	1	1	-	1	1	1	1	2	1	2
CO2	Phenomenon of roller slip and roller nip movement	3	3	3	2	2	1	1	-	1	1	1	1	2	1	2
CO3	Principle of wire point drafting and its comparison with roller drafting and applications	3	3	2	2	2	1	1	-	1	1	2	1	2	1	2
CO4	Fundamentals of real and false twisting and twisting in ring spinning	2	3	2	2	2	1	2	-	2	2	2	2	3	2	2
CO5	Theory of twist formation in rotor spinning, airjet and air vortex spinning systems	2	3	2	3	2	1	1	-	2	2	1	1	2	1	2
Overall CO		2.6	3	2.4	2.2	2	1	1.2	-	1.4	1.4	1.4	1.2	2.2	1.2	2

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

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TT5004 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 INDIVIDUALISATION 9

Impurities in the long-staple fibre like wool and their removal; methods adopted to process raw flaxand jute; blending methods followed for long staple fibres; 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 II COMBINIG 9

Objective of combing; basic principles of combing; details of wool combing preparation and combing operation; worsted top finishing

UNIT III DRAWING 9

Principle of long-staple drafting; effect of doubling; drafting irregularities; working details of worsted, semi worsted, jute and flax drawing; operating principle of roving machine

UNIT IV YARN SPINNING 9

Mule spinning –drafting, twisting, backing-off, winding on; description of centrifugal spinning; flyerspinning; ring spinning – twisting, rings and travellers; condenser yarn spinning; cap spinning;

UNIT V OPEN END SPINNING 9

Open end spinning –general features of rotor and friction spinning as applicable to long-staplefibres; 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

TEXTBOOKS

1. Oxtoby E., “Spun Yarn Technology”, Butterworths, London, 1987, ISBN: 0408014644 | ISBN 13: 9780408014649
2. Happey F., “Contemporary Textile Engineering”, Academic Press, London, 1983
3. Lord P.R., “Yarn Production: Science, Technology and Economics”, The Textile Institute, Manchester, 1999, ISBN: 0123237505 | ISBN-13: 9780123237507

REFERENCES

1. Ross D.A., Carnaby G.A and Lappage J., “Woollen Yarn Manufacture (Textile Progress)”,Vol.15, North Carolina State University, 1986, ISBN: 090073986X | ISBN-13: 9780900739866
2. Richards R.T.D., and Sykes A.B., “Woollen Yarn Manufacture”, The Textile Institute,Manchester, 1994, ISBN: 1870812182 | ISBN-13: 9781870812184
3. Henshaw D.E., “Worsted Spinning”, Vol.11, Textile Progress, The Textile Institute, Manchester, 1981, ISBN: 0900739452 | ISBN-13: 9780900739453

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

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TT5005 SPECIAL TEXTILE STRUCTURES L T P C
3 0 0 3

Objectives:

To enable the students to learn about the development in special textile structures

UNIT I 3 D WOVEN FABRICS 9

3D multilayer interlock weave, 3D non crimp weave, 3D dual interlaced weave; hollow 3 woven fabrics.

UNIT II 3 D KNITTED FABRICS 9

3D knitting technologies, 3D knitted structures, multi-axial warp knit, fully fashioned 3D fabrics, Spacer fabric

UNIT III BRAIDING AND NONWOVEN 9

Tubular, bifurcated structures, track and column braiding processes; high bulk nonwovens, shaped 3D nonwovens

UNIT IV ADVANCES IN TEXTILES I 9

Development in leno weave fabrics, development in tri-axial woven fabric, interwoven fabrics, pile carpets, flocked fabric, knotted fabrics

UNIT V ADVANCES IN TEXTILES II 9

Shell woven textiles, nodal three-dimensional woven textiles

Total Periods: 45

OUTCOMES

Upon completion of the course, the student shall able to understand the development and structure of

CO1: 3D woven fabric
CO2: 3D knitted fabric
CO3: Braiding and 3D nonwovens fabrics
CO4: Specialty fabrics
CO5: Shell woven and 3D woven fabrics

TEXTBOOKS

1. Xiaogang Chen, “Advances in 3D Textiles1st Edition”, Woodhead Publishing, 2015 ISBN: 9781782422143.
2. YordanKyosev, “Braiding Technology for Textiles,1st Edition”, Woodhead Publishing, 2014, ISBN: 9780857091352.”

REFERENCES:

1. DewiGwynfa Bailey Thomas, “An introduction to warp knitting”, Merrow Publishing Company Limited, 1971, ISBN 0900541067, 9780900541063.
2. Jinlian Hu., “3D Fibrous Assemblies: Properties, Applications and Modelling of Three-Dimensional Textile structures”, CRC Press, 2008, ISBN: 1420079867 | ISBN-13:9781420079869
3. Antonio Miravete., “3D Textile Reinforcements in Composite Materials”, Wood head Publishing, 1999, ISBN: 1855733765 | ISBN-13: 9781855733763
4. Tong L., MouritzA.P., and Bannister M., “3D Fibre Reinforced Polymer Composites”, Elsevier, 2002, ISBN: 0080439381 | ISBN-13: 9780080439389
5. 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-X

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	3D woven fabric	-	-	3	2	1	1	2	-	-	1	2	2	2	3	3
CO2	3D knitted fabric	-	-	3	2	1	1	2	-	-	1	2	2	2	3	3
CO3	Braiding and 3D nonwovens fabrics	-	-	3	1	2	2	2	-	-	2	2	2	2	3	3
CO4	Specialty fabrics	-	-	3	2	2	2	2	-	-	1	2	2	2	3	3
CO5	Shell woven and 3D woven fabrics	-	-	3	2	2	2	2	-	-	1	3	3	2	3	3
Overall CO		-	-	3	1.8	1.6	1.6	2	-	-	1.2	2.2	2.2	2	3	3

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

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TT5006 **CHARACTERIZATION OFTEXTILE 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
3. Sperling L.H., “Introduction to Physical Polymer Science”, Wiley India Private Limited, 2005, ISBN: 047170606X | ISBN-13: 9780471706069
4. Campell D., and White J.R., “Polymer characterization, Physical Techniques”,Chapman& Hall, 1989 , ISBN: 0412271605 | ISBN-13: 9780412271601
5. Stamm M., “Polymer Surfaces and Interfaces”, Springer1st Ed., 2010,ISBN: 3642093116 | ISBN-13: 9783642093111.

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

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TT5007 **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

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TT5008 ADVANCES IN TEXTILE PRINTING AND FINISHES LT P C
3 0 0 3

OBJECTIVES

To enable the students to learn the advances in the field of textile printing and finishing

UNIT I SUBLIMATION TRANSFER PRINTING 9

Mechanism of sublimation transfer printing**;** selection of the paper; Printing methods; dyes and inks; Transfer prints on both man-made fibres and natural fibres; Machineries

UNIT III NKJET PRINITNG 9

Comparison with conventional printing techniques; Ink jet printing: Principles of Ink jet printing technology: CIJ and DOD; pretreatment of substrates; inks used for printing; dye- fibre interaction; post treatment of substrate; importance of digital colour management in inkjet printing

UNIT III FUNCTIONAL FINISHES I 9

Wetting and wicking; surface energy – concept, measurement and relevance to repellency; water repellent, detergency and soil release concepts, soil release agents, mechanism of soil retention and soil release; application of water repellent, soil release finishes and its assessment.

UNIT IV FUNCTIONAL FINISHES II 9

Flame retardant mechanisms, flame retarding chemicals for textile materials and testing of flame retardant finishes; UV radiation: Factors affecting UV protection, UV protection finishes, Measurement of UV protection. Antistatic finishes-Mechanism, Agents applied and its assessment.

UNIT V FUNCTIONAL FINISHES III 9

Antimicrobial finishes- classification, chemistry and application of antimicrobial finishes, evaluation of antimicrobial finishes; Anti-odour and fragrance finishes, Mosquito repellent finish: application and assessment technique.

TOTAL: 45 PERIODS

OUTCOMES

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

CO1: Sublimation transfer printing
CO2: Inkjet printing technology and its application
CO3: Water repellent and soil repellent finish
CO4: UV Protection, flame retardant and antistatic finishes
CO5: Antimicrobial, antiodour and mosquito repellent finish

TEXTBOOKS

1. Miles L W C, “Textile Printing”, Society of Dyers and Colourists, Hobbs the Printers, Hampshire, UK, 2003.
2. Shenai V A, “Technology of Printing”, Sevak Publishers, Mumbai, 1990.
3. Shore J, “Colorants & Auxiliaries”, Vol. I & II, Society of Dyers and Colourists, UK, 1990.

REFERENCES

1. Tyler D, “Textile Digital Printing Technologies”, Textile Institute Publication UK, Vol.37 No.4, 2005
2. Ujiie, “Digital Printing of Textiles”, CRC, Wood Head Publishing Ltd, UK, 2006.
3. Schindler W D and Hauser P J, “Chemical Finishing of Textiles”, The Textile Institute, Woodhead Publishing Ltd., Cambridge, 2004.
4. Charles T, “Chemistry & Technology of Fabric Preparation & Finishing”, North Carolina State University, USA, 1992.
5. Perkins W S, “Textile Colouration and Finishing”, Carolina Academic Press, UK, 1996.
6. Holme L, “New developments in chemical finishing of textiles”, Journal of Textile Institute, UK, 2008.
7. Heywood D., ”Textile Finishing”, Woodhead Publishing Ltd.,2003

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	Sublimation transfer printing	2	1	1	2	1	2	3	2	1	1	-	1	2	2	3
CO2	Inkjet printing technology and its application	3	1	1	3	1	2	3	2	1	1	-	3	2	2	3
CO3	Water repellent and soil repellent finish	2	1	1	2	1	2	2	2	1	1	-	1	2	2	3
CO4	UV Protection, flame retardant and antistatic finishes	2	1	1	3	1	3	2	2	1	1	-	1	2	2	3
CO5	Antimicrobial, antiodour and mosquito repellent finish	2	1	1	3	1	3	2	2	1	1	-	2	2	2	3
Overall CO		2.2	1	1	2.6	1	2.4	2.4	2	1	1	-	1.6	2	2	3

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

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TT5009 **MANAGEMENT OF TEXTILE EFFLUENTS** **L T P C**
3 0 0 3

OBJECTIVES

To enable the students to understand the concepts of effluent treatment methods for textile industry and their management

UNIT I CHARACTERISATION OF EFFLUENTS 9

Characteristics of textile effluents – colour, pH, hardness TSS, TDS, COD, BOD, alkalinity, estimation of metal ions.

UNIT II PRELIMINARY TREATMENT 9

Effluent treatment flow chart; preliminary treatment – screening, shredding, grit removal.primary treatment – equalization, coagulation, flocculation, sedimentation.

UNIT III SECONDARY TREATMENT AND TERTIARY TREATMENT 9

Secondary treatment – activated sludge process; tertiary treatment - adsorption, membrane technology, radiation (uv, gamma, electron beam), electrochemical, chemical (h_2o_2, chlorine, fenton's reagent), thermal, corona discharge. marine discharge of effluent.

UNIT IV RECYCLE AND REUSE 9

Recycling and reuse of waste water; reject management-importance, brine reject source; thermal evaporation – mechanical vacuum recompression evaporator, multiple effect evaporators; crystallizer; sludge management.

UNIT V EFFLUENT TREATMENT IN TEXTILE INDUSTRY 9

Generation of textile effluents; characteristics and norms of textile effluents; zero liquid discharge (zld) in chemical processing industry, zero discharge of hazardous chemicals(zdhc); effluent treatment plants in processing units.

TOTAL: 45 PERIODS

OUTCOMES

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

CO1: The characterization of effluents
CO2: Preliminary treatments
CO3: Secondary and tertiary treatments
CO3: Importance of recycling and reuse
CO4: Different treatments in textile industry

TEXTBOOKS

1. Manivasakam N, "Treatment of Textile Processing Effluents", Chemical Publishing Company, U.S.A, 2013, ISBN 978-0-82060-175-5
2. Christie R M, "Environmental aspects in Textile Dyeing", Woodhead Publishing Ltd., UK, 2007, ISBN 978-1-84569-115-8

REFERENCES

1. Karmakar S R, "Chemical Technology in the Pre-treatment Processes of Textiles", Elsevier, New York, 1999, ISBN 978-1-8044450-060-1
2. Cavaco-Paulo and Gübitz G M, "Textile Processing with Enzymes", Woodhead Publishing Ltd., UK, 2003,ISBN 978-1-85573-610-8
3. Peter J Hauser, "Advances in Treating Textile Effluent", InTech Publisher, Croatia, 2011, ISBN 978-9-53307-704-8
4. Babu B V, "Effluent Treatment: Basics & A Case Study", Chemical Engineering Department, Birla Institute of Technology and Science (BITS), PILANI, Rajasthan, 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	The characterization of effluents	2	1	2	1	-	1	2	2	1	2	1	1	2	2	-
CO2	Preliminary treatments	2	1	2	1	-	2	2	2	1	1	1	1	2	2	-
CO3	Secondary and tertiary treatments	2	1	2	1	-	2	2	2	1	1	1	1	2	2	-
CO4	Importance of recycling and reuse	2	1	3	1	-	3	2	2	1	1	1	1	2	2	-
CO5	Different treatments in textile industry	3	2	3	1	-	3	3	3	1	3	1	1	2	2	-
Overall CO		2.2	1.2	2.4	1	-	2.2	2.2	2.2	1	1.6	1	1	2	2	-

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

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TT5010 APPLICATION OF STATISTICS IN TEXTILE INDUSTRY L T P C
2 0 2 3

Outcomes:

To make the students to learn about the

- Probability distributions, sampling and testing of hypothesis
- Process control using charts and process capability
- Design of experiments for textile applications

UNIT I HYPOTHESIS TESTING **6**

Testing of hypothesis – z, t, F, chi squre, p values relevant to textile industry

UNIT II ANALYSIS OF VARIANCE AND NON PARAMETRIC TESTS **6**

ANOVA of different models; non parametric tests relevant to textile industry

UNIT III CONTROL CHARTS **6**

Construction of control charts and interpretation – illustrations from textile industry

UNIT IV DESIGN OF EXPERIMENTS **6**

2^K full factorial design; Box-Behnken design; response surface methodology; construction of experiments related to textile industry and interpretation of results

UNIT V TEXTILE APPLICATIONS **6**

Balancing of machinery for production of yarn, costing of yarn, fabric and garment, budgeting for spinning unit

Lab Experiments: **TOTAL: 30 PERIODS**

Conducting following experiments using software

- Mean standard deviation, Z test, T test, Chi square test, ANOVA test
- Construction of control charts
- Developing Response surface methodology graphs and interpretation
- Balancing of machinery for production of yarn
- Costing of yarn
- Costing of fabrics
- Costing of apparels
- Preparation of budget for spinning unit

TOTAL: 30 PERIODS

OUTCOMES

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

CO1: Carryout testing of hypothesis
CO2: Carryout ANOVA
CO3: Construct and interpret control charts
CO4: Construct the design of experiments
CO5: Carryout calculations related to textile industry
CO6: Design the experiment and conduct statistical tests and analyse the results to arrive at the conclusion using software
CO7:Carryout calculation related to textile industry using software

TEXTBOOKS

1. Leaf G.A.V., “Practical Statistics for the Textile Industry, Part I and II”, The Textile Institute, Manchester, 1984, ISBN: 0900739517.
2. Douglas C. Montgomery, “Design and analysis of experiments”, John Wiley & Sons, Inc., Singapore, 2000, ISBN 9971 51 329 3

REFERENCES:

1. Montgomery D.C., “Introduction to Statistical Quality Control”, John Wiley and Sons, Inc., Singapore, 2002, ISBN: 997151351X.
2. Ronald D. Moen, Thomas W. Nolan, Lloyd P. Provost, “Quality improvement through planned experimentation’, McGraw-Hill, 1998, ISBN 0-07-913781-4

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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	Carryout testing of hypothesis	3	3	2	3	2	-	-	1	-	2	2	-	2	1	-
CO2	Carryout ANOVA	3	3	2	3	2	-	-	1	-	2	2	-	2	1	-
CO3	Construct and interpret control charts	3	3	3	3	2	-	-	1	-	2	2	-	2	1	-
CO4	Construct the design of experiments	3	3	3	3	2	-	-	1	-	2	2	-	2	1	-
CO5	Carryout calculations related to textile industry	3	3	3	2	2	-	-	1	-	3	2	-	2	1	-
CO6	Design the experiment and conduct statistical tests and analyse the results to arrive at the conclusion using software	3	3	3	3	3	-	-	1	-	2	2	-	2	1	-
CO7	Carryout calculation related to textile industry using software	3	3	3	2	3	-	-	1	-	2	2	-	2	1	-
Overall CO		3	3	2.71	2.71	2.28	-	-	1	-	2.14	2	-	2	1	-

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

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TT5075 **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

TEXTBOOKS

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

REFERENCES

1. 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.
2. ApurbaDas.,andAlagirusamy R., "Science in clothing comfort", Wood head Publishing India Pvt. Ltd., India, 2010, ISBN: 1845697898 | ISBN-13: 9781845697891
3. Guowen Song., "Improving comfort in clothing", Wood head Publishing Ltd., UK, 2011, ISBN: 1845695399 | ISBN-13: 9781845695392
4. Ukponmwan J.O., "The Thermal-insulation Properties of Fabrics", Textile Progress 24:4, 1-54, Taylor and Francis, UK, 1993, ISBN: 1870812654 | ISBN-13: 9781870812658

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

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TT5011 **TECHNICALTEXTILES** **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.

UNITI **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.

UNITII **9**

Design and characteristics required in textiles for medical and hygiene applications; antimicrobial, disposable and reusable products; textiles in sportswear

UNITIII **13**

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

UNITIV **14**

Use of geotextiles infiltration, 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 aerosolfiltration

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

TEXTBOOKS

1. AnandS.C.,“MedicalTextiles”,TextileInstitute,Manchester,2001,ISBN:185573494X.MukhopadhyayS.K. andPartridgeJ.F.,“AutomotiveTextiles”,TextileProgress, Vol.29,No1/2, 1999, ISBN: 1870372212.
2. Horrocks A.R. and Anand S.C., “Handbook of Technical Textiles”, The Textile Institute, Manchester, 2000, ISBN: 1855733854.

REFERENCES

1. Adanur S., “Wellington Sears Handbook of Industrial Textiles”, TechnomicPublishingCo. Inc., 1995, ISBN:1–56676–340–1.
2. Scott.R.A., “Textiles for Protection”, Wood head Publishing Limited, Cambridge, UK,2005, ISBN1-85573-921-6.
3. Saville.B.P, “Physical Testing of Textiles”, Woodhead Publishing Limited, Cambridge, UK, 1999, ISBN1-85573-367-6.
4. Long.A.C, “Design and Manufacture of Textile Composities”, Wood head Publishing Ltd, Cambridge, UK, 2005, ISBN1-85573-744-2.
5. Fung.W,“CoatedandLaminatedTextiles”,WoodheadPublishingLtd.,Cambridge,UK,2002, ISBN1-85573-576-8.
6. Anand.S.C, Kennedy.J.F, Miraftab.M and Rajendran.S., “Medical Textiles andBiomaterials for Health Care”, Wood head Publishing Ltd, Cambridge, UK, 2006, ISBN1- 85573-683-7.
7. Fung.W and Hardcastle, “Textiles in Automotive Engineering”, Wood head PublishingLtd., Cambridge, UK, 2001, ISBN1-85573-493-1.
8. John.N.W.M,“GeoTextile”,BlackieandSonsLtd.,London,UK.,1987,ISBN0-412-01351-7
9. Sarsby R.W., “Geosynthetics in civil engineering”, Wood head Publishing, Cambridge, U.K., 2006, ISBN:9781855736078.

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

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TT5012 **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 behavior 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

TEXTBOOKS

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

REFERENCES

1. GuneuAkovali., Diveswar Banerjee., Sen A. K., and Dipak K. Setua., “Advances in polymer coated textiles”, SmithersRapra, 2012
2. Ashish Kumar Sen., “Coated Textiles: Principles and Application”,
3. TechnomicPublication,U.S.A.,2007, ISBN: 1420053450 | ISBN-13: 9781420053456
4. 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	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	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

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TT5013 **MEDICAL TEXTILES** **LT 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; super absorbent polymers,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 devices; scaffolds for tissue engineering: development and characterization

UNIT IV **9**

Healthcare and hygiene products: surgical gowns, masks, respirators, wipes, napkins, antibacterial, antiodour textiles

UNIT V **5**

Standards; safety, legal and ethical issues involved in conducting trials with medical textile materials; disposal of medical textile products

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

TEXTBOOKS

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

REFERENCES

1. Joon B. Park., and Joseph D. Bronzino., “Biomaterials – Principles and Applications”, CRCPress, Boca Raton London, New York, Washington, D.C. 2002, ISBN: 0849314917 | ISBN-13: 9780849314919
2. Anand S., “ Medical Textiles”, Textile Institute, 1996, ISBN: 185573317X
3. Horrocks A.R., and Anand S.C., “Technical Textiles”, Textile Institute, 1999,ISBN:185573317X
4. Adanur S., “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc.,LancasterPennylvania, 1995, ISBN 1-56676-340-1
5. Michael Szycher., and Steven James Lee., “Modern Wound Dressing: A Systematic Approachto Wound Healing”, Journal of Biomaterials Applications.

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	PO 10	PO 11	PO 12	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

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TT5014 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 and techniques 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

TEXTBOOKS

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

REFERENCES

1. White J R, and De S K, “Short Fiber-Polymer Composites”, Wood head Publishing limited, 1996.
2. 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

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TT5015 **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: Polymers and textiles for biomedical applications
CO3: Construction of smart textiles
CO4: Application of smart textiles

TEXTBOOKS

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.

REFERENCES

1. Tao X. M., “Smart Fibers, Fabrics and Clothing Fundamentals and Application”, Wood Head Publishing Ltd., October 2001, ISBN 1 855735466.
2. 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

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TT5016 **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 FABRICS 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

TEXTBOOKS

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.

REFERENCES

1. Chellamani K. P., and Chattopadhyay D., “Yarns and Technical Textiles”, SITRA, 1999.
2. Scott R.A., “Textiles for Protection”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-921-6, 2005.
3. Saville.B.P., “Physical Testing of Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-367-6, 1999.
4. Fan Q., “Chemical Testing of Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-917-8, 2005.

5. Long A.C., “Design and Manufacture of Textile Composites”, Wood head Publishing Limited, Cambridge, UK, ISBN : 1-85573-744-2, 2005.
6. Fung W., “Coated and Laminated Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-576-8, 2002.
7. Horrocks A.R. and Anand S.C., “Handbook of Technical Textiles”, Wood head Publishing Limited, Cambridge, UK, ISBN :1-85573-385-4, 2004.
8. 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, 2006.

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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	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

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AT5451 **GARMENT PRODUCTION MACHINERY** **L T P C**
2 0 2 3

OBJECTIVE:
To enable the students to learn the machines and mechanisms of machines used for garment production

UNIT I FABRIC INSPECTION, SPREADING AND CUTTING MACHINES 6

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 ultrasonic cutting machines; notches, drills and thread markers; computer interfaced cutting machines; safety measures

UNIT II SEWING MACHINES I 6

Lock stitch and chain stitch sewing machine – types, threading, driving arrangement, function of elements, stitch formation, timing, settings and feed mechanism; selection of machine and process parameters for different applications; safety measures

UNIT III SEWING MACHINES II 6

Needles-geometry and types, selection; button fixing and button holing machine – mechanism and features

UNIT IV SEWING MACHINESIII 6

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 V FINISHING MACHINES 6

Pressing machineries – buck pressing, iron pressing, block or die pressing, form pressing, steamers; folding and packing machines; safety measures

TOTAL: 30 PERIODS

PRACTICALS

LIST OF EXPERIMENTS

Study on following mechanisms

- Needle bar working
- Hook /Looper mechanism
- Feeding mechanism
- Threading and tensioning for

1. SNLS machine
2. Chain stitch machine
3. Overlock machine
4. Flatlock machine
5. Feed off arm machine

TOTAL: 60 PERIODS

OUTCOMES:

Upon completion of the course, the students would understand

CO1 - Fundamental principle and working of spreading and cutting machines
CO 2 - Stitch formation and other mechanisms of SNLS machine and chain stitch machine
CO 3 - Principle of button fixing and button holing machines
CO 4 - Stitch formation and other mechanisms of overlock, flatlock and other special sewing machines
CO 5 - Different types of finishing machines used for garments
CO 6- Drive mechanism and basic settings of SNLS and chain stitch machine
CO7- Drive mechanism and basic settings of overlock, flat lock and Feed off arm machine

TEXTBOOKS

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

REFERENCES

1. Ruth E. Glock., and Grace I. Kunz., "Apparel Manufacturing Sewn Product Analysis", 4th Edition, Pearson Prentice Hall, 2005, ISBN: 0131119826 | ISBN-13: 9780131119826
2. Villumsone-Nemes I., "Industrial Cutting of Textiles material", Wood head Publications Pvt. Ltd 2012, ISBN: 978-1-85709-134-5
3. JelkaGersak., "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

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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	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	3	2	1	1	1	1	1	1	1	2	2	1	2	3	3
CO3	Principle of button fixing and button holing machines	2	3	1	1	1	1	1	1	1	2	2	1	2	3	3
CO4	Stitch formation and other mechanisms of overlock, flatlock and other special sewing machines	3	2	1	1	1	1	1	1	1	2	2	1	2	3	3
CO5	Different types of finishing machines used for garments	2	2	1	1	1	1	1	1	1	2	2	1	2	3	3
CO6	Drive mechanism and basic settings of SNLS and chain stitch machine	3	2	1	1	1	1	1	1	1	2	2	1	2	3	3
CO7	Drive mechanism and basic settings of overlock, flat lock and Feed off arm machine	3	2	1	1	1	1	1	1	1	2	2	1	2	3	3
Overall CO		2.57	2.28	1.14	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

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AT5751 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 and different tools of industrial engineering and its application in apparel industry

UNIT I **9**
Industrial Engineering - evolution, functions, role of industrial engineer, productivity concepts, causes for low productivity in apparel industry, suggestions for productivity improvement; basic work content, added work content, reduction of work content and ineffective time, work study- introduction and procedure.

UNIT II **9**
Methods study – introduction, approach to method study; techniques of recording; method analysis techniques; method study in garment manufacture

UNIT III **9**
Motion analysis, principles of motion economy, micro motion analysis – SIMO Chart; work measurement, time study – equipment and procedure, rating concepts

UNIT IV **9**
Work sampling techniques; work measurement applied to garment industry; Standard data- PMTS, GSD, calculation of standard allowance minutes (SAM), incentive wage system

UNIT V **9**
Ergonomics - importance, division; ergonomic principles - designing of workplace, working processes, handling material, tools and environment; ergonomic conditions - lighting, ventilation, climatic condition – temperature control, humidity control, noise control, safety measures in garment industry; site selection for garment industry; plant layout - types of layouts suitable for garment industry, methods to construct layout

TOTAL: 45 PERIODS

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

CO1: Fundamental concepts of industrial Engineering and productivity
CO2: Method study
CO3: Motion analysis
CO4: Work measurement and SAM
CO5: Ergonomics and its application to garment industry

TEXTBOOKS:

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

REFERENCES

1. Norberd Lloyd Enrick., “Industrial Engineering Manual for Textile Industry”, Wiley Eastern (P) Ltd., New Delhi, 1988, ISBN: 0882756311 | ISBN-13: 9780882756318
2. Chuter A. J., “Introduction to Clothing Production Management”, Wiley-Black well Science, U.S. A., 1995, ISBN: 0632039396 | ISBN-13: 9780632039395
3. 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
4. Chase., Aquilano., and Jacobs., “Production and Operations Management”, Tata McGraw- Hill, New Delhi, 8th Edition, 1999, ISBN: 0256225567 | ISBN-13: 9780256225563
5. GavrielSalvendy., “Industrial Engineering – Technology and operations management”, WileyInterscience Publications, USA, 2001, ISBN: 0471330574 | ISBN-13: 9780471330578
6. GordanaColovic., “Ergonomics in the garment industry”, Wood publishing India Pvt. Ltd., India, 2014, ISBN: 0857098225 | ISBN-13: 9780857098221

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	Fundamental concepts of industrial Engineering and productivity	2	2	3	3	2	1	1	2	2	1	2	2	1	1	-
CO2	Method study	1	2	3	3	2	1	1	2	2	1	2	2	1	1	-
CO3	Motion analysis	1	2	3	3	2	1	1	2	2	1	2	2	1	1	-
CO4	Work measurement and SAM	1	2	3	3	2	1	1	2	2	1	3	2	1	1	-
CO5	Ergonomics and its application to garment industry	1	2	3	3	2	1	2	2	2	1	3	2	1	1	-
Overall CO		1.2	2	3	3	2	1	1.2	2	2	1	2.4	2	1	1	-

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

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AT5752 APPAREL MARKETING AND MERCHANDISING L T P C
3 0 0 3

OBJECTIVES:

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

UNIT I INTRODUCTION TO APPAREL BUSINESS 9

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 9

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, programmatic marketing; digital and autonomous interventions, conversational interfaces - Artificial intelligence chat bots

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, sourcing negotiations, global co-ordination in sourcing, materials management and quality in sourcing, quick response, ERP, supplier partnership in sourcing, JIT technology, made to fit.

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 merchandising 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.

TEXTBOOKS

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

REFERENCES

1. Dominic Kosorin., “Introduction To Programmatic Marketing”, Dominik Kosorin, 2016, ISBN 8026096118
2. Dimitris N. Chorafas., “Integrating Erp, Crm, Supply Chain Management and Smart Materials”, Auerbach, 2001, ID 54795
3. Michael Mc Tear, Zoraida Callejas, David Griol., “The Conversational Interface- Talking to Smart Devices”, Springer Publishing, 2016, ISBN 3-319-32967-3

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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	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

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AT5071 ENTERPRISE RESOURCE PLANNING FOR APPAREL INDUSTRY L T P C
0 0 6 3

OBJECTIVE

To enable the students understand about the Enterprise Resource Planning software and its modules

List of experiments

Practice on data entry, report generation in Enterprise Resource Planning software

1. Costing, order booking, MRP, purchase, production planning, production orders, inventory control, packing, shipping, scheduling, sample preparation and approval, business reports
2. ERP in apparel production – time study, cutting, production tracking, cut panel process, garment quality control, order completion, machine repairs and maintenance, reports
3. 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: 90 PERIODS

OUTCOME

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

CO1: Understand the structure of ERP software
CO2: Data entry in ERP software
CO3: Creating records and managing information at different section of apparel industry
CO4: Report generation and decision making

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome													
		PO1	PO 2	PO3	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 structure of ERP software	-	-	2	-	3	-	-	2	2	1	2	1	-	2	-
CO2	Data entry in ERP software	-	-	2	-	3	-	-	2	2	1	2	1	-	2	-
CO3	Creating records and managing information at different section of apparel industry	-	-	2	-	3	-	-	2	2	1	3	1	-	2	-
CO4	Report generation and decision making	-	-	3	-	3	-	-	2	2	1	3	1	-	2	-
Overall CO		-	-	2.25	-	3	-	-	2	2	1	2.5	1	-	2	-

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

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AT5303 **PATTERN MAKING I** **L T P C**
3 0 0 3

OBJECTIVES:

- To introduce students the anthropometrics measurements and clothing sizing systems
- To enable students understand body measurements across different age groups
- To equip students with comprehensive pattern making skills

UNIT I BASICS OF ANTHROPOMETRICS AND SIZING SYSTEM 9

Anthropometry measurements –traditional, 3D body scanning; principles of sizing systems; body appearance, its relation to clothing, illusions created by clothing, body ideals-Eight head theory, body proportions, height and weight distribution; standard measurement chart-designation and control dimensions

UNIT II BODY MEASUREMENTS AND PATTERN TERMINOLOGIES 9

Body measurements- methods of measuring body dimensions, landmark terms; measuring the dress-form, ease and allowances; functions of pattern making tools, pattern grain line, balance line terms, notches, seam allowance, jog seam, dart points, pleats, flares, gather and true bias, truing, blending.

UNIT III BODICE PATTERNS 9

Drafting method of patternmaking – basic top and bottoms blocks for men and women; draping method of pattern making – basic bodice – front, back and skirt for women

UNIT IV PATTERNS FOR OTHER GARMENT COMPONENTS 9

Pocket classification; collar classification and terms, basic shirt collar, Peter Pan collar, sailor collar, mandarin collar; built-up neck lines, halter neck lines, cowls; sleeve cap, sleeve cuffs, puff, petal, lantern and leg-of-mutton sleeves; Yoke styles, plackets; facing patterns for cut-out necklines and armholes.

UNIT V PATTERNMAKING PRINCIPLES 9

Principles of patternmaking - dart manipulation, added fullness and contouring principles; drafting method-single and two dart series-slash-spread technique, pivotal transfer technique; graduated and radiating darts; parallel, asymmetric and intersecting darts; draping method-basic bodice blocks-two and one dart blocks.

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

TEXTBOOKS:

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

REFERENCES:

1. Helen Joseph Armstrong., “Patternmaking for Fashion Design”, Pearson Education Pvt Ltd., 2005,ISBN: 067398026X | ISBN-13: 9780673980267
2. Winifred Aldrich., “Metric Pattern Cutting for Children’s Wear and Baby Wear”, Blackwell Publishing, 2009, ISBN: 140518292X | ISBN-13: 9781405182

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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	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

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AT5452 **PATTERN MAKING II** **L T P C**

(Prerequisite for this course is AT5303) **3 0 0 3**

OBJECTIVES:

To enable the students to develop better understanding on

- pattern construction and styling from basic blocks and
- grading and pattern alteration techniques to provide good fit

UNIT I MENS WEAR **9**

Basic formal shirts, bottom wear styles – slack, cullotte, trouser, jean; coats and jackets

UNIT II WOMENS WEAR **9**

Basic formal shirts, trousers, office jackets; skirts foundation – A line, straight, pegged, bell shaped; saree blouse; Salwar Kameez

UNIT III CHILDREN WEAR **9**

Basic pattern set; dresses and jumpers; pants and jump suit; baby frocks, rompers

UNIT IV CASUAL AND PARTY WEAR **9**

Beach and leisurewear-swimsuit, bikini, short blocks, beach wraps; Pajamas; Bodysuit; Princess line, strapless princess-style garments; bias styled dresses- symmetrical and asymmetrical; dresses without waist lines

UNIT V PATTERN ALTERATION AND GRADING **9**

Pattern alteration for fit, pattern grading process, grade rules and types of grading system

OUTCOMES:

On completion of the course students are expected to

CO1 Develop patterns for men's wear
CO2 Develop patterns for women's wear
CO3 Develop patterns for children's wear and dresses
CO4 Understand formal, casual and party wear design styling
CO5 Carryon pattern alteration and grading

TOTAL: 45 PERIODS

TEXTBOOKS:

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

REFERENCES:

1. Helen Joseph Armstrong., "Patternmaking for Fashion Design", Pearson Education Pvt Ltd., 2005,ISBN: 067398026X | ISBN-13: 9780673980267
2. 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	Develop patterns for men's wear	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO2	Develop patterns for women's wear	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO3	Develop patterns for children's wear and dresses	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO4	Understand formal, casual and party wear design styling	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
CO5	Carryon 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

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AT5072 **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- stress–strain behaviour of sewing threads; thermal, friction behaviour of sewing threads; sewability of the thread, seam efficiency index

UNIT II **13**

Types of sewing thread – spun threads, core spun threads, filament threads; production, properties and applications

UNIT III **5**

Yarn folding, fancy yarns – types and production; metallic yarns

UNIT IV **9**

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 V **5**

Physical testing of sewing threads, 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 Characterization of sewing thread
CO2 Production of sewing thread
CO3 Manufacturing of fancy yarns
CO4 Understand the characteristics of high performance sewing threads
CO5 Testing and quality assurance of sewing threads

TEXTBOOKS

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

REFERENCES

1. Ruth E. Glock., “Apparel Manufacturing Sewn Product Analysis”, Prentice Hall, New Jersey, 2005,ISBN: 0131119826 | ISBN-13: 9780131119826
2. Jacob Solinger., “Apparel Production Handbook”, Reinhold Publications, 1998, ISBN: 1879 570009 / ISBN: 978-1879570009
3. Rao J.V., and Rajendra Kr.Gaur., “Sewing Threads: Technology, Stitches, Seams, Problems, Needles”, NITRA, 2006.
4. Gong R.H., and Wright R.M., “Fancy yarns –Their manufacture and application”, Woodhead Publishing Ltd, England, 2002, ISBN: 0849315506 | ISBN-13: 9780849315503.

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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	Characterization of sewing thread	2	2	1	1	1	1	1	–	2	1	1	2	3	2	2
CO2	Production of sewing thread	3	3	3	3	2	2	2	–	2	1	1	2	3	3	3
CO3	Manufacturing of fancy yarns	2	2	2	2	1	1	1	–	2	1	1	2	3	2	2
CO4	Understand the characteristics of high performance sewing threads	2	2	2	2	1	1	1	–	2	2	2	2	3	2	2
CO5	Testing and quality assurance of sewing threads	2	2	2	2	1	1	1	–	2	2	2	3	3	2	2
Overall CO		2.2	2.2	2	2	1.2	1.2	1.2	-	2	1.4	1.4	2.2	3	2.2	2.2

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

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TT5017	APPAREL PRODUCT DEVELOPMENT LAB	L	T	P	C
		0	0	6	3

OBJECTIVES:

To enable the students, construct different garment components.

LIST OF EXPERIMENTS

1. Sewing practice of stitch classes.
2. Sewing practice of seam types
3. Sewing of different types of plackets
4. Sewing of different types of pockets
5. Sewing of different types of sleeves
6. Sewing of different types of collars and cuff
7. Sewing of different types of neckline finishes
8. Sewing of different types of pleats, tucks and gathers
9. Construct a men's shirt
10. construct a men's trousers
11. construct a women's skirt

TOTAL: 90 PERIODS

OUTCOMES:

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

CO1: Make different seams and stitches

CO2: Make different cut component and parts of basic garment

CO3: Carryout sewing of cut component assembly in to basic garment

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	Make different seams and stitches	1	-	1	-	-	-	-	1	1	1	1	1	3	2	1
CO2	Make different cut component and parts of basic garment	1	-	1	-	-	-	-	1	1	1	1	1	3	2	1
CO3	Carryout sewing of cut component assembly in to basic garment	2	-	2	-	-	-	-	1	2	2	2	1	3	2	1
Overall CO		1.33	-		-	-	-	-	1	1.33	1.33	1.33	1	3	2	1

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

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TT5018 BASIC SEWING AND PATTERN MAKING LABORATORY L T P C
0 0 4 2

OBJECTIVES:
To enable the students to get practical experience in understanding sewing machine components and to practically carryout pattern making

LIST OF EXPERIMENTS
1) Identification of single needle lockstitch machine (SNLS) components and understanding their functions.
2) Needle fixing and threading in single needle, double needle, over-lock, flat lock and feed-of the-arm machine.
3) Practice for pedal and knee lifter operations and winding the bobbin thread.
4) Sewing exercise on paper in SNLS
- Exercise 1 - Parallel line
- Exercise 2 - Square
- Exercise 3 - Curves
- Exercise 4 - Concentric curves
5) Stitching exercise on fabric panels in SNLS
- Exercise 1 - Parallel line
- Exercise 2 - Square
- Exercise 3 - Curves
- Exercise 4 - Concentric curves
6) Prepare samples in SNLS machine by varying the stitch length and thread tension.
7) Measuring the Dress Form – Male, female and child and formulating the measurement charts
8) Drafting the basic blocks of male
9) Drafting the basic blocks of female
10) Grading of basic block.
11) Drafting of men's shirt
12) Drafting of men's trousers.

TOTAL: 60 PERIODS

OUTCOMES:
Upon completion of this practical course, the student shall be able to
CO1. Identify the machine components and understand the basic settings in single needle machine
CO2. Identify the machine components and understand the basic settings in flatlock and feed off arm machine
CO3. Sew on line markings in paper using single needle lockstitch machine
CO4. Sew on fabric panels in single needle lockstitch machine
CO5. Draft the basic block and grade the same

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	PO 10	PO 11	PO 12	PSO 1	PSO 2	PSO3
CO1	Identify the machine components and understand the basic settings in single needle machine	-	-	-	-	1	-	-	-	-	1	1	-	1	2	1
CO2	Identify the machine components and understand the basic settings in flatlock and feed off arm machine	-	-	-	-	1	-	-	-	-	1	1	-	1	2	1
CO3	Sew on line markings in paper using single needle lockstitch machine	-	-	-	-	1	-	-	-	-	1	1	-	1	2	1
CO4	Sew on fabric panels in single needle lockstitch machine	-	-	-	-	1	-	-	-	-	1	1	-	1	2	1
CO5	Draft the basic block and grade the same	-	-	-	-	1	-	-	-	-	1	1	-	1	2	1
Overall CO		-	-	-	-	1	-	-	-	-	1	1	-	1	2	1

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

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TT5071 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; Linear programming problem – construction, solution by graphical method, the Simplex method and its extension by the Big M method; integer programming – introduction; application of the LP technique in the field of Textile technology

UNIT II **9**

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; transshipment problem

UNIT III **9**

The Assignment problem – construction, solution by Hungarian method, application in the textile industry; sequencing problems; Decisions theory - decisions under assumed certainty, decision under risk, decision under uncertainty, illustrations from textile industry

UNIT IV **9**

Replacement analysis; inventory control – ABC, VED analysis, EOQ – application in textile industry,simulation-introduction, Monte Carlo method

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
CO3: Construct and solve assignment problems and understand decision making under different conditions.
CO4: Carryout replacement analysis and inventory control
CO5: Construct and solve project scheduling by PERT and CPM techniques and resource leveling

TEXTBOOKS

1. Ronald L. and Rardin., “Optimization in Operations Research”, Pearson Education, 1998,ISBN: 0023984155 | ISBN-13: 9780023984150
2. Srivastava U.K., Shenoy G.V., and Sharma S. C., “Quantitative Techniques for ManagerialDecisions”, Second Edition, New Age International (P) Ltd., 2007, ISBN: 0470273755 | ISBN- 13: 9780470273753

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
2. Hamdy A Taha., “Operations Research – An Introduction”, Prentice Hall, 9thEdition, 2010 ISBN: 013255593X | ISBN-13: 9780132555937.
3. Fabrycky W. J.,Ghare P. M., and Torgersen P. E., “Applied Operation Research andManagement Science”, Prentice Hall, New Jersey, 1984, ISBN: 013041459X / ISBN: 9780130414595.
4. Panneerselvam R., “Operations Research”, Prentice-Hall of India Pvt. Ltd; 2nd Edition, 2004,ISBN : 8120319230 / ISBN: 978-8120329287
5. Tulsian P.C., “Quantitative Techniques Theory and Problems”, Dorling Kindersley (India) Pvt.Ltd., 2006, ISBN: 8131701867 | ISBN-13: 9788131701867

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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	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
CO3	Construct and solve assignment problems and understand decision making under different conditions.	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
CO4	Carryout replacement analysis and inventory control	-	-	2	-	3	-	-	1	2	1	2	-	-	1	-
CO5	Construct and solve project scheduling by PERT and CPM techniques and resource leveling	-	-	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

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TT5074 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

TEXTBOOKS

1. Bruce A. Henderson and Jorge L. Larco, “Lean Transformation”, The Oaklea Press, 1999
2. Don Topping, Tom Luyster, and Tom Shuker, “Value Stream Management”, Productivity Press, 2002

REFERENCES

1. Dale H.Besterfiled., “Total Quality Management”, Pearson Education Asia, Third Edition, Indian Reprint, 2006, ISBN: 0130306517 | ISBN-13: 9780130306517
2. James R.Evans., and William M. Lindsay., “The Management and Control of Quality”, (6thEdition), South-Western (Thomson Learning), 2005, ISBN: 0324202237 | ISBN-13: 9780324202236
3. Oakland J.S., “TQM – Text with Cases”, Butterworth – Heinemann Ltd., Oxford, Third Edition, 2003, ISBN: 0750657405 | ISBN-13: 9780750657402
4. SuganthiL., and Anand Samuel., “Total Quality Management”, Prentice Hall (India) Pvt.Ltd.2006, ISBN: 8120326555 / ISBN: 978-8120326552.

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5. Janakiraman B., and Gopal R.K., “Total Quality Management–Text and Cases”,Prentice Hall (India) Pvt. Ltd., 2006, ISBN: 8120329953 | ISBN-13: 9788120329959
6. Ronald G. Askin and Jeffrey B. Goldberg, “Design and Analysis of Lean Production Systems”, John Wiley & Sons, 2003

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 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	2.25	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

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TT5019 **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

TEXTBOOKS

1. Thukaram Rao M.E., “Cost and Management Accounting” New Age International, Bangalore, 2004, ISBN: 812241513X / ISBN: 978-8122415131.
2. Thukaram Rao M.E., “Cost Accounting and Financial Management” New Age International, Bangalore, 2004, ISBN: 8122415148/ ISBN: 978-8122415148.

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: 9780130326

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

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TT5072 **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 finalization.

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 optimization; the role of transportation in supply chain, modes of transportation, characteristics of transportation, transport design options for global textile and apparel network, trade-off in transport design, risk management in transportation, transport decision in practice for textile and apparel industries.

UNIT IV **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 supply and demand cycle
CO3 Knowledge on its functions in the industry
CO4 Understanding on coordination of supply chain management
CO5 Understanding supply chain management with apparel export and import

TETBOOKS

1. 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
2. Altekar Rahul V., "Supply Chain Management-Concept and Cases", PHI, 2005, ASIN: B00K7YGX2S

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.

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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	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	2.4	1	2	1	-

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

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TT5073 **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

TEXTBOOKS

1. Kapoor D.C., “Export Management”, Vikas Publishing House Pvt. Ltd., 2009, ISBN: 8125909397 / ISBN: 978-8125909392
2. Govindan N.S., “Indirect Taxes Made Easy”, C. Sitaraman& Co., 2014, ASIN: B00HYVS32K

REFERENCES

1. Charles W.I. Hill., and Arun Kumar Jain., “International Business”, 10th Edition, Tata McGraw Hill, 2014, ISBN: 007811277X / ISBN: 978-0078112775.
2. John D. Daniels., and Lee H. Radebaugh., “International Business”, 15th Edition, Pearson Education Asia, New Delhi, 2014, ISBN: 0133457230 / ISBN: 978-0133457230.
3. Aswathappa K., “International Business”, 6th Edition, Tata McGraw Hill, 2015, ISBN: 933922258X / ISBN: 978-9339222581.
4. Michael R. Czinkota., Ilkka A. Ronkainen., and Michael H.,Moffet, “International Business”,8th Edition, Wiley, 2010, ISBN: 0470530650 / ISBN: 978-0470530658
5. Aravind V. Phatak., Rabi S. Bhagat., and Roger J. Kashlak., “International Management”, 2nd Edition, Tata McGraw Hill, 2008, ISBN: 0073210579 / ISBN : 978-0073210575

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.

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Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO 1	PO 2	PO 3	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

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AUDIT COURSES (AC)

AD5091 CONSTITUTION OF INDIA L T P C
3 0 0 0

OBJECTIVES:

- Teach history and philosophy of Indian Constitution.
- Describe the premises informing the twin themes of liberty and freedom from a civil rights perspective.
- Summarize powers and functions of Indian government.
- Explain emergency rule.
- Explain structure and functions of local administration.

UNIT I INTRODUCTION 9

History of Making of the Indian Constitution-Drafting Committee- (Composition & Working) -Philosophy of the Indian Constitution-Preamble-Salient Features

UNIT II CONTOURS OF CONSTITUTIONAL RIGHTS & DUTIES 9

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

UNIT III ORGANS OF GOVERNANCE 9

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

UNIT IV EMERGENCY PROVISIONS 9

Emergency Provisions - National Emergency, President Rule, Financial Emergency

UNIT V LOCAL ADMINISTRATION 9

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

TOTAL: 45 PERIODS

OUTCOMES:

CO1: Able to understand history and philosophy of Indian Constitution.
CO2: Able to understand the premises informing the twin themes of liberty and freedom from a civil rights perspective.
CO3: Able to understand powers and functions of Indian government.
CO4: Able to understand emergency rule.
CO5: Able to understand structure and functions of local administration.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1									✓			✓
CO2									✓			✓
CO3									✓			✓
CO4									✓			✓
CO5									✓			✓

TEXTBOOKS:

1. Basu D D, Introduction to the Constitution of India, Lexis Nexis, 2015.
2. Busi S N, Ambedkar B R framing of Indian Constitution, 1st Edition, 2015.
3. Jain M P, Indian Constitution Law, 7th Edn., Lexis Nexis, 2014.
4. The Constitution of India (Bare Act), Government Publication,1950

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AD5092 **VALUE EDUCATION** **L T P C**
3 0 0 0

OBJECTIVES:

- Develop knowledge of self-development
- Explain the importance of Human values
- Develop the overall personality through value education
- Overcome the self destructive habits with value education
- Interpret social empowerment with value education

UNIT I INTRODUCTION TO VALUE EDUCATION 9

Values and self-development –Social values and individual attitudes, Work ethics, Indian vision of humanism, Moral and non- moral valuation, Standards and principles, Value judgements

UNIT II IMPORTANCE OF VALUES 9

Importance of cultivation of values, Sense of duty, Devotion, Self-reliance, Confidence, Concentration, Truthfulness, Cleanliness. Honesty, Humanity, Power of faith, National Unity, Patriotism, Love for nature, Discipline

UNIT III INFLUENCE OF VALUE EDUCATION 9

Personality and Behaviour development - Soul and Scientific attitude. Positive Thinking, Integrity and discipline, Punctuality, Love and Kindness, Avoid fault Thinking, Free from anger, Dignity of labour, Universal brotherhood and religious tolerance, True friendshipHappiness Vs suffering, love for truth.

UNIT IV REINCARNATION THROUGH VALUE EDUCATION 9

Aware of self-destructive habits, Association and Cooperation, Doing best for saving nature Character and Competence –Holy books vs Blind faith, Self-management and Good health, Science of reincarnation

UNIT V VALUE EDUCATION IN SOCIAL EMPOWERMENT 9

Equality, Non violence, Humility, Role of Women, All religions and same message,Mind your Mind, Self-control, Honesty, Studying effectively

TOTAL: 45 PERIODS

OUTCOMES:

CO1 – Gain knowledge of self-development
CO2 – Learn the importance of Human values
CO3 – Develop the overall personality through value education
CO4 – Overcome the self destructive habits with value education
CO5 – Interpret social empowerment with value education

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1							✓	✓				✓
CO2							✓	✓	✓			✓
CO3							✓	✓	✓			✓
CO4							✓	✓				✓
CO5							✓	✓				✓

REFERENCES:

1. Chakroborty , S.K. “Values and Ethics for organizations Theory and practice”, Oxford University Press ,New Delhi

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AD5093 **PEDAGOGY STUDIES** **L T P C**
3 0 0 0

OBJECTIVES:

- Understand the methodology of pedagogy.
- Compare pedagogical practices used by teachers in formal and informal classrooms in developing countries.
- Infer how can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.
- Illustrate the factors necessary for professional development.
- Identify the Research gaps in pedagogy.

UNIT I INTRODUCTION AND METHODOLOGY: 9

Aims and rationale, Policy background, Conceptual framework and terminology - Theories of learning, Curriculum, Teacher education - Conceptual framework, Research questions **-** Overview of methodology and Searching.

UNIT II THEMATIC OVERVIEW 9

Pedagogical practices are being used by teachers in formal and informal classrooms in developing countries - Curriculum, Teacher education.

UNIT III EVIDENCE ON THE EFFECTIVENESS OF PEDAGOGICAL PRACTICES 9

Methodology for the in depth stage: quality assessment of included studies - How can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy? - Theory of change - Strength and nature of the body of evidence for effective pedagogical practices - Pedagogic theory and pedagogical approaches - Teachers' attitudes and beliefs and Pedagogic strategies.

UNIT IV PROFESSIONAL DEVELOPMENT 9

Professional development: alignment with classroom practices and follow up support - Peer support - Support from the head teacher and the community - Curriculum and assessment - Barriers to learning: limited resources and large class sizes

UNIT V RESEARCH GAPS AND FUTURE DIRECTIONS 9

Research design – Contexts – Pedagogy - Teacher education - Curriculum and assessment - Dissemination and research impact.

TOTAL: 45 PERIODS

OUTCOMES:

- Understand the methodology of pedagogy.
- Understand Pedagogical practices used by teachers in formal and informal classrooms in developing countries.
- Find how can teacher education (curriculum and practicum) and the school curriculum and guidance materials best support effective pedagogy.
- Know the factors necessary for professional development.
- Identify the Research gaps in pedagogy.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1												✓
CO2												✓
CO3												✓
CO4												✓
CO5												✓

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REFERENCES:

1. Ackers J, Hardman F (2001) Classroom interaction in Kenyan primary schools, Compare, 31 (2): 245-261.
2. Agrawal M (2004) Curricular reform in schools: The importance of evaluation, Journal of Curriculum Studies, 36 (3): 361-379.
3. Akyeampong K (2003) Teacher training in Ghana - does it count? Multi-site teacher education research project (MUSTER) country report 1. London: DFID.
4. Akyeampong K, Lussier K, Pryor J, Westbrook J (2013) Improving teaching and learning of basic maths and reading in Africa: Does teacher preparation count? International Journal Educational Development, 33 (3): 272–282.
5. Alexander RJ (2001) Culture and pedagogy: International comparisons in primary education. Oxford and Boston: Blackwell.

AD5094 STRESS MANAGEMENT BY YOGA L T P C
3 0 0 0

OBJECTIVES:

- Develop healthy mind in a healthy body thus improving social health also improve efficiency
- Invent Do's and Don't's in life through Yam
- Categorize Do's and Don't's in life through Niyam
- Develop a healthy mind and body through Yog Asans
- Invent breathing techniques through Pranayam

UNIT I INTRODUCTION TO YOGA 9

Definitions of Eight parts of yog.(Ashtanga)

UNIT II YAM 9

Do`s and Don't's in life.
Shaucha, santosh, tapa, swadhyay, ishwarpranidhan

UNIT III NIYAM 9

Do`s and Don't's in life.
Ahinsa, satya, astheya, bramhacharya and aparigraha

UNIT IV ASAN 9

Various yog poses and their benefits for mind & body

UNIT V PRANAYAM 9

Regularization of breathing techniques and its effects-Types of pranayam

TOTAL: 45 PERIODS

OUTCOMES:

CO1 – Develop healthy mind in a healthy body thus improving social health also improve efficiency
CO2 – Learn Do's and Don't's in life through Yam
CO3 – Learn Do's and Don't's in life through Niyam
CO4 – Develop a healthy mind and body through Yog Asans
CO5 – Learn breathing techniques through Pranayam

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1							✓	✓				✓
CO2							✓	✓				✓
CO3							✓	✓				✓
CO4							✓	✓				✓
CO5							✓	✓				✓

Attested

REFERENCES:

1. "Rajayoga or conquering the Internal Nature" by Swami Vivekananda, Advaita Ashrama (Publication Department), Kolkata
2. 'Yogic Asanas for Group Tarining-Part-I" : Janardan Swami Yogabhyasi Mandal, Nagpur

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AD5095 PERSONALITY DEVELOPMENT THROUGH LIFE ENLIGHTENMENT SKILLS L T P C
3 0 0 0

OBJECTIVES:

- Develop basic personality skills holistically
- Develop deep personality skills holistically to achieve happy goals
- Rewrite the responsibilities
- Reframe a person with stable mind, pleasing personality and determination
- Discover wisdom in students

UNIT I NEETISATAKAM-HOLISTIC DEVELOPMENT OF PERSONALITY - I 9

Verses- 19,20,21,22 (wisdom) - Verses- 29,31,32 (pride & heroism) – Verses- 26,28,63,65 (virtue)

UNIT II NEETISATAKAM-HOLISTIC DEVELOPMENT OF PERSONALITY - II 9

Verses- 52,53,59 (dont's) - Verses- 71,73,75,78 (do's)

UNIT III APPROACH TO DAY TO DAY WORK AND DUTIES 9

Shrimad Bhagwad Geeta: Chapter 2-Verses 41, 47,48 - Chapter 3-Verses 13, 21, 27, 35 Chapter 6-Verses 5,13,17,23, 35 - Chapter 18-Verses 45, 46, 48

UNIT IV STATEMENTS OF BASIC KNOWLEDGE – I 9

Statements of basic knowledge - Shrimad Bhagwad Geeta: Chapter2-Verses 56, 62, 68 Chapter 12 - Verses 13, 14, 15, 16,17, 18

UNIT V PERSONALITY OF ROLE MODEL - SHRIMAD BHAGWADGEETA 9

Chapter2-Verses 17, Chapter 3-Verses 36,37,42 - Chapter 4-Verses 18, 38,39 Chapter18 – Verses 37,38,63

TOTAL: 45 PERIODS

OUTCOMES:

CO1: To develop basic personality skills holistically
CO2: To develop deep personality skills holistically to achieve happy goals
CO3: To rewrite the responsibilities
CO4: To reframe a person with stable mind, pleasing personality and determination
CO5: To awaken wisdom in students

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1									✓			✓
CO2									✓			✓
CO3									✓			✓
CO4									✓			✓
CO5									✓			✓

REFERENCES:

1. Gopinath,Rashtriya Sanskrit Sansthanam P, Bhartrihari's ThreeSatakam , Niti-sringar-vairagya, New Delhi,2010
2. Swami Swarupananda , Srimad Bhagavad Gita, Advaita Ashram,Publication Department, Kolkata,2016

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AD5097 **ESSENCE OF INDIAN KNOWLEDGE TRADITION** **L T P C**
3 0 0 0

COURSE OBJECTIVES

The course will introduce the students to

- get a knowledge about Indian Culture
- Know Indian Languages and Literature religion and philosophy and the fine arts in India
- Explore the Science and Scientists of Ancient, Medieval and Modern India
- Understand education systems in India

UNITI INTRODUCTION TO CULTURE **9**

Culture, civilization, culture and heritage, general characteristics of culture, importance of culture in human literature, Indian Culture, Ancient India, Medieval India, Modern India.

UNIT II INDIAN LANGUAGES AND LITERATURE **9**

Indian Languages and Literature – I: Languages and Literature of South India, – Indian Languages and Literature – II: Northern Indian Languages & Literature

UNIT III RELIGION AND PHILOSOPHY **9**

Major religions practiced in India and Understanding their Philosophy – religious movements in Modern India (Selected movements only)

UNIT IV FINE ARTS IN INDIA (ART, TECHNOLOGY& ENGINEERING) **9**

Indian Painting, Indian handicrafts, Music, divisions of Indian classic music, modern Indian music, Dance and Drama, Indian Architecture (ancient, medieval and modern), Science and Technology in India, development of science in ancient, medieval and modern India

UNIT V EDUCATION SYSTEM IN INDIA **9**

Education in ancient, medieval and modern India, aims of education, subjects, languages, Science and Scientists of Ancient India, Science and Scientists of Medieval India, Scientists of Modern India

TOTAL: 45 PERIODS

COURSE OUTCOMES

After successful completion of the course the students will be able to

- Understand philosophy of Indian culture.
- Distinguish the Indian languages and literature.
- Learn the philosophy of ancient, medieval and modern India.
- Acquire the information about the fine arts in India.
- Know the contribution of scientists of different eras.
- Understand education systems in India

REFERENCES:

1. Kapil Kapoor, “Text and Interpretation: The India Tradition”,ISBN: 81246033375, 2005
2. “Science in Samskrit”, Samskrita Bharti Publisher, ISBN 13: 978-8187276333, 2007
3. NCERT, “Position paper on Arts, Music, Dance and Theatre”, ISBN 81-7450 494-X, 200
4. Narain, “Examinations in ancient India”, Arya Book Depot, 1993
5. Satya Prakash, “Founders of Sciences in Ancient India”, Vijay Kumar Publisher, 1989
6. M. Hiriyanna, “Essentials of Indian Philosophy”, Motilal Banarsidass Publishers, ISBN 13: 978-8120810990, 2014

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AD5098 **SANGA TAMIL LITERATURE APPRECIATION** **L T P C**
3 0 0 0

Course Objectives: The main learning objective of this course is to make the students an appreciation for:

1. Introduction to Sanga Tamil Literature.
2. ‘Agathinai’ and‘Purathinai’ in SangaTamil Literature.
3. ‘Attruppadai’in SangaTamil Literature.
4. ‘Puranaanuru’in SangaTamil Literature.
5. ‘Pathitrupaththu’in SangaTamil Literature.

UNIT I SANGA TAMIL LITERATUREANINTRODUCTION **9**

Introduction to Tamil Sangam–History of Tamil Three Sangams–Introduction to Tamil Sangam Literature–Special Branches in Tamil Sangam Literature- Tamil Sangam Literature’s Grammar- Tamil Sangam Literature’s parables.

UNIT II ‘AGATHINAI’AND‘PURATHINAI’ **9**

Tholkappiyar’s Meaningful Verses–Three literature materials–Agathinai’s message- History of Culturefrom Agathinai– Purathinai–Classification–Mesaage to Society from Purathinai.

UNIT III ‘ATTRUPPADAI’. **9**

AttruppadaiLiterature–Attruppadaiin‘Puranaanuru’-Attruppadaiin‘Pathitrupaththu’-Attruppadai in ‘Paththupaattu’.

UNIT IV ‘PURANAANURU’ **9**

Puranaanuru onGood Administration,Rulerand Subjects–Emotion&itsEffectin Puranaanuru.

UNIT V ‘PATHITRUPATHTHU’ **9**

Pathitrupaththuin‘Ettuthogai’–Pathitrupaththu’sParables–Tamildynasty:Valor,Administration, Charity in Pathitrupaththu- Mesaage to Society from Pathitrupaththu.

Total (L:45) = 45 PERIODS

COURSE OUTCOMES:

Upon completionofthiscourse, the studentswillbeable to:

1. Appreciate and apply the messages in Sanga Tamil Literature in their life.
2. Differentiate‘Agathinai’ and‘Purathinai’in their personal andsocietallife.
3. Appreciate and apply the messages in‘ Attruppadai’in their personal and societalife.
4. Appreciate and apply the messages in‘ Puranaanuru’in their personal and societallife.
5. Appreciate and apply the messages in‘ Pathitrupaththu’in their personal and societallife.

REFERENCES:

1. Sivaraja Pillai, The Chronology oftheEarlyTamils,SagwanPress,2018.
2. HankHeifetz andGeorgeL. Hart, The Purananuru,Penguin Books,2002.
3. Kamil Zvelebil,TheSmile of Murugan: OnTamil Literature of South India, Brill Academic Pub,1997.
4. GeorgeL. Hart, Poetsof theTamil Anthologies: AncientPoemsofLove andWar, Princeton University Press,2015.
5. XavierS.Thani Nayagam, Landscape and poetry:astudy of nature in classical Tamil poetry,Asia Pub.House, 1967.

CO	PO												PSO		
	1	2	3	4	5	6	7	8	9	10	11	12	1	2	3
1									0.9						0.6
2									0.9						0.6
3									0.9						0.6
4									0.9						0.6
5									0.9						0.6

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HSMC– ELECTIVES – HUMANITIES I (ODD SEMESTER)

HU5171 LANGUAGE AND COMMUNICATION LT P C
3 0 0 3

COURSE DESCRIPTION

This course offers an introduction to language and communication. The primary goal of this course is to familiarize students with key ideas related to communication using language as well as non verbal means. Ideas related to the use of language and the underlying power structures are also examined. The course also examines the role of media in communication and in the dissemination of ideas as well as opinions.

Objectives

- ✓ To familiarize students with the concept of communication using linguistic and non linguistic resources.
- ✓ To help students ask critical questions regarding facts and opinions.
- ✓ To provide students with the material to discuss issues such as language and power structures.
- ✓ To help students think critically about false propaganda and fake news.

Learning Outcomes

- ➢ Students will be able to use linguistic and non linguistic resources of language in an integrated manner for communication.
- ➢ Students will be able to analyse communication in terms of facts and opinions.
- ➢ Students will be able to discuss, analyse and argue about issues related to language and power.

UNIT I LINGUISTIC AND NON-LINGUISTIC RESOURCE OF COMMUNICATION: 9

a) Writing and Speech

b) Distinction between language structure and language use, form and function, acceptability and grammaticality

c) Gestures and Body language, pictures and symbols, cultural appropriacy

d) Communicative Competency, context and situation, combination of linguistic and non-linguistic elements of communication

UNIT II STRUCTURE OF WRITING/CONVERSATION: 9

a) Language skills and the communication cycle; speaking and listening, writing and reading

b) Initiating and closing conversations, intervention, turn taking

c) Writing for target reader, rhetorical devices and strategies

d) Coherence and Cohesion in speech and writing

UNIT III POWER STRUCTURE AND LANGUAGE USE: 9

a) Gender and language use

b) Politeness expressions and their use

c) Ethical dimensions of language use

d) Language rights as part of human rights

UNIT IV MEDIA COMMUNICATION: 9

a) Print media, electronic media, social media

b) Power of media

c) Manufacturing of opinion, fake news and hidden agendas

UNIT V PERSUASIVE COMMUNICATION AND MISCOMMUNICATION: 9

a) Fundamentals of persuasive communication

b) Persuasive strategies

c) Communication barriers

TOTAL : 45 PERIODS

TEXT BOOKS:

1. Austin, 1962, J.L. How to do things with words. Oxford: Clarendon Press. Grice, P.1989. Studies in the way of words. Cambridge, M.A: Harvard University Press.
2. Chomsky, N.1966. Aspects of the theory of syntax, The MIT press, Cambridge. Chomsky, N.2006. Language and Mind, Cambridge University Press.
3. Hymes. D.N. 1972, On communication competence in J.B. Pride and J.Holmes (ed), Sociolinguistics, pp 269-293, London Penguin.
4. Gilbert, H.Harman, 1976. Psychological aspect of the theory of syntax in Journal of Philosophy, page 75-87.
5. Stephen. C. Levenson, 1983, Pragmatics, Cambridge University press.
6. Stangley, J. 2007. Language in Context. Clarendon press, Oxford. 7. Shannon, 1942. A Mathematical Theory of Communication. 8. Searle, J.R. 1969. Speech acts: An essay in the philosophy of language. Cambridge: Cambridge University Press.

HU5172 VALUES AND ETHICS L T P C
3 0 0 3

OBJECTIVES:

- Teach definition and classification of values.
- Explain Purusartha.
- Describe Sarvodaya idea.
- Summarize sustenance of life.
- Conclude views of hierarchy of values.

UNIT I DEFINITION AND CLASSIFICATION OF VALUES 9

Extrinsic values- Universal and Situational values- Physical- Environmental-Sensuous- Economic-Social-Aesthetic-Moral and Religious values

UNIT II CONCEPTS RELATED TO VALUES 9

Purusartha-Virtue- Right- duty- justice- Equality- Love and Good

UNIT III IDEOLOGY OF SARVODAYA 9

Egoism- Altruism and universalism- The Ideal of Sarvodaya and Vasudhaiva Kutumbakam

UNIT IV SUSTENANCE OF LIFE 9

The Problem of Sustenance of value in the process of Social, Political and Technological Changes

UNIT V VIEWS ON HIERARCHY OF VALUES 9

The Problem of hierarchy of values and their choice, The views of Pt. Madan Mohan Malviya and Mahatma Gandhi

TOTAL: 45 PERIODS

OUTCOMES:

CO1: Able to understand definition and classification of values.

CO2: Able to understand purusartha.

CO3: Able to understand sarvodaya idea.

CO4: Able to understand sustenance of life.

CO5: Able to understand views of hierarchy of values.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1								✓	✓			✓
CO2								✓	✓			✓
CO3								✓	✓			✓
CO4								✓	✓			✓
CO5								✓	✓			✓

TEXTBOOKS:

1. AwadeshPradhan :MahamanakeVichara. (B.H.U., Vanarasi-2007)
2. Little, William, : An Introduction of Ethics (Allied Publisher, Indian Reprint 1955)
3. William, K Frankena : Ethics (Prentice Hall of India, 1988)

HU5173 **HUMAN RELATIONS AT WORK** **L T P C**
3 0 0 3

OBJECTIVES:

- Illustrate human relations at work its relationship with self.
- Explain the importance of interacting with people at work to develop teamwork.
- Infer the importance of physical health in maintaining human relations at work.
- Describe the importance of staying psychologically healthy.
- Identify the essential qualities for progressing in career.

UNIT I UNDERSTANDING AND MANAGING YOURSELF 9

Human Relations and You: Self-Esteem and Self-Confidence: Self-Motivation and Goal Setting; Emotional Intelligence, Attitudes, and Happiness; Values and Ethics and Problem Solving and Creativity.

UNIT II DEALING EFFECTIVELY WITH PEOPLE 9

Communication in the Workplace; Specialized Tactics for Getting Along with Others in the Workplace; Managing Conflict; Becoming an Effective Leader; Motivating Others and Developing Teamwork; Diversity and Cross-Cultural Competence.

UNIT III STAYING PHYSICALLY HEALTHY 9

Yoga, Pranayam and Exercise: Aerobic and anaerobic.

UNIT IV STAYING PSYCHOLOGICALLY HEALTHY 9

Managing Stress and Personal Problems, Meditation.

UNIT V DEVELOPING CAREER THRUST 9

Getting Ahead in Your Career, Learning Strategies, Perception, Life Span Changes, and Developing Good Work Habits.

TOTAL: 45 PERIODS

OUTCOMES:

Students will be able to

CO1: Understand the importance of self-management.

CO2: Know how to deal with people to develop teamwork.

CO3: Know the importance of staying healthy.

CO4: Know how to manage stress and personal problems.

CO5: Develop the personal qualities essential for career growth.

	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12
CO1						✓		✓	✓			✓
CO2									✓	✓		✓
CO3						✓		✓	✓			✓
CO4								✓				✓
CO5								✓	✓	✓		✓

TEXT BOOK:

1. Dubrien, A. J. (2017). Human Relations for Career and Personal Success: Concepts, Applications, and Skills, 11th Ed. Upper Saddle River, NJ: Pearson.

REFERENCES:

1. Greenberg, J. S. (2017). Comprehensive stress management (14th edition), New York: McGraw Hill.
2. Udai, Y. (2015). Yogasanaurpranayam. New Delhi: N.S. Publications.

HU5174 **PSYCHOLOGICAL PROCESSES** **L T P C**
3 0 0 3

COURSE DESCRIPTION

Psychological Processes course is designed for students to be aware of the basic principles of psychology for the better understanding of people's psyche and behaviour around them. This course enables learners to use the optimal use of different forms of thinking skills and thereby results in effective communication in diverse situations. Every unit of the syllabus highlights the psychological process of people, the most powerful and constructive use of perceptions.

OBJECTIVES

The major objectives of this course is

- To develop students' awareness – on psychology, learning behavior and usage of perception effectively.
- To learn to use the various kinds of thinking in a formal context.
- To critically evaluate content and comprehend the message on the bases of perception, personality and intelligence.

UNIT 1: INTRODUCTION

What is psychology? - Why study psychology? - Psychology as science – Behavior and its role in human communication – socio-cultural bases of behaviour – Biological bases of behavior - Brain and its functions – Principles of Heredity – Cognition and its functions Fields of psychology – Cognitve and Perceptual – Industrial and Organizational.

UNIT 2: SENSORY & PERCEPTUAL PROCESSES

Some general properties of Senses: Visual system – the eye, colour vision – Auditory system – Hearing, listening, Sounds - Other senses - Selective attention; physiological correlates of attention; Internal influences on perception learning – set - motivation & emotion - cognitive styles; External influences on perception figure and ground separation – movement – organization – illusion; Internal- external interactions: Constancy - Depth Perception- Binocular & Monocular Perception; Perceptual defense & Perceptual vigilance; Sensory deprivation -Sensory bombardment; ESP - Social Perception.

UNIT 3: COGNITION & AFFECT

Learning and memory – philosophy of mind – concepts - words – images – semantic features – Association of words – Repetition – Retrieval – Chunking - Schemata - Emotion and motivation – nature and types of motivation – Biological & Psychosocial motivation – nature and types of emotions – physiological & cognitive bases of emotions – expressions of emotions – managing negative emotions - enhancing positive emotions.

UNIT 4: THINKING, PROBLEM-SOLVING & DECISION MAKING

Thinking skills – Types of thinking skills – Concrete & Abstract thinking – Convergent & Divergent - Analytical & Creative thinking – Problem & Possibility thinking – Vertical & Lateral thinking – Problem solving skills – stages of problem solving skills – Decision making - intuition and reasoning skills - Thinking and language - The thinking process- concepts, problem solving, decision-making, creative thinking; language communication.

UNIT 5: PERSONALITY & INTELLIGENCE

Psychological phenomena & Attributes of humans - cognition, motivation, and behavior - thoughts, feelings, perceptions, and actions – personality dimensions, traits, patterns - Specialized knowledge, performance accomplishments, automaticity or ease of functioning, skilled performance under challenge - generative flexibility, and speed of learning or behavior change.

TOTAL: 45 PERIODS

REFERENCES

1. Morgan, C.T.and King, R.A (1994) Introduction to Psychology, Tata McGraw Hill Co Ltd, New Delhi.
2. Robert A. Baron (2002), Psychology, 5th Edition, Prentice Hall, India.
3. Michael W.Passer, Ronald E.smith (2007), Psychology: The science of mind and Behavior,3rd Edition Tata McGraw-Hill Edition.
4. Robert S.Feldman (2004) Understanding Psychology 6th Edition Tata McGraw – Hill.
5. Endler, N. S., & Summerfeldt, L. J. (1995). Intelligence.personality. psychopathology. and adjustment. In D. H. Saklofske & M. Zeidner (Eds.). International handbook of personality and intelligence (pp. 249-284). New York: Plenum Press.
6. Ford, M. E. (1994). A living systems approach to the integration of personality and intelligence.In R. J. Sternberg.& P. Ruzgis (Eds.). Personality and intelligence (pp. 188-21 7). New York: Cambridge University Press.
7. De Bono, E (1990) Lateral Thinking, Harper Perennial, New York.

HU5175	EDUCATION, TECHNOLOGY AND SOCIETY	L	T	P	C
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COURSE DESCRIPTION

This course introduces students to multidisciplinary studies in Education, Technology and Society. Students will get an understanding of the relationship between education, technology and society. They will also learn about the long lasting impact of good education in a technologically advanced society.

COURSE OBJECTIVES:

The course aims

- To help learners understand the basics of different types of technology utilised in the field of education
- To make them realize the impact of education in society
- To make them evolve as responsible citizen in a technologically advanced society

LEARNING OUTCOMES

By the end of the course, learners will be able to

- Understand the various apps of technology apps and use them to access, generate and present information effectively.
- Apply technology based resources and other media formats equitably, ethically and legally.
- Integrate their technical education for betterment of society as well as their personal life.

UNIT I INDIAN EDUCATION SYSTEM

Gurukul to ICT education – Teacher as facilitator – Macaulay's Minutes – English medium vs Regional medium – Importance of Education in Modern India - Challenges in Education

UNIT II LEARNING THEORIES

Learning Theories – Behaviorism – Cognitivism – Social Constuctivism – Humanism Learning Styles – Multiple Intelligences – Emotional Intelligence – Blooms Taxonomy

UNIT III TECHNOLOGICAL ADVANCEMENTS

Web tools – Social media in education – elearning – MOOCs – Mobile assisted learning – Learning Apps – Blended learning - Self-directed learning

UNIT IV EDUCATIONAL TECHNOLOGY

Technological implications on Education – Teaching, Learning & Testing with Technology - Advantages and drawbacks – Critical analysis on the use of technology

UNIT V ETHICAL IMPLICATIONS

Plagiarism – Online Copyright issues – Ethical and value implications of education and technology on individual and society.

TOTAL:45 PERIODS

TEACHING METHODS

Teaching modes include guest lectures, discussion groups, presentations, visual media, and a practicum style of learning.

EVALUATION

As this is course is not a content based course, it focuses more on the ethical use of technology in education and society, and so, evaluation can be based on assignments and discussions. So there is no need for an end semester examination. Internals marks can be taken for the total marks.

INTERNAL (100 % WEIGHTAGE)

(a) Written Test (40 marks)

(b) Assignment: Write a real time report of the technology use in any school / college (15 marks)

(c) Presentation: Students choose any one of the technological tools and present its relevance to education and society (15 marks)

(d) Group discussion: Students discuss in groups on case studies relating to various challenges in education and technology use in society (20 marks)

(e) Blog entry: Making weekly blog posts in Class Blog on the topics related to the course posted by the instructor and commenting on others' posts. (10 marks)

REFERENCES

1) Education and Social order by Bertrand Russel
2) Theories of learning by Bower and Hilgard
3) Technology and Society by Jan L Harrington

Attested

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HU5176 **PHILOSOPHY** **L T P C**
3 0 0 3

OBJECTIVES

- To create a new understanding by teaching philosophy through a comparison of Indian and Western traditions.
- To Fosters critical thinking and imagination by dealing with inter-related concepts in literature and science.
- To bridge the gap between the sciences and humanities through introspective analyses.
- To nurture an understanding of the self and elucidates ways to progress towards a higher understanding of one's self and others.

UNIT I KNOWLEDGE **9**

Knowledge (Vidya) Versus Ignorance (Avidya)- Brihadaranyaka Upanishad. Unity and Multiplicity – Isha Upanishad. What is True Knowledge? Ways to True Knowledge. Introduction to Philosophy of Yoga, Socratic Debate, Plato's Views.Asking and Answering Questions to Stimulate Critical Thinking and to Draw Ideas.Argumentative Dialogues.Dialectical Methods to Arrive at Conclusions.

UNIT II ORIGIN **9**

Origin of Universe And Creation – 'Nasidiya Sukta' in Relation With Big Bang Theory. Greek Concept of Chaos.The Concept of Space – Space as the Final Goal – Udgitha. Relationship Between Teacher And Student – The Knowledge Of Combinations, Body And Speech – Siksha Valli – Taittriya Upanishad.

UNIT III WORD **9**

Aum- Speech and Breath as Pair – Chandogya Upanishad and Brihadaryanaka Upanishad.Significance of Chants, Structure of Language and Cosmic Correspondences.The Non-Dual Word – Bhartrihari's Vakyapadiyam. Sphota-Ultimate Reality Expressed Through Language. Intention.Thought 'Sabdanaor' and Speaking.

UNIT IV KNOWLEDGE AS POWER/OPPRESSION **9**

Power- as Self-Realization in Gita.Krishna's Advice to Arjuna on How to Conquer Mind. Francis Bacon – Four Idols – What Prevents One From Gaining Knowledge? Michel Foucault- Knowledge as Oppression.Panopticon.Rtam (Truth) and Satyam (Eternal Truth).

UNIT V SELF KNOWLEDGE/BRAHMAN **9**

Knowledge about Self, Transcendental Self.The Different Chakras and the Stages of Sublimation.Philosophy of Yoga and Siva for Union of Mind and Body.Concept of Yin/Yang.Aspects of the Feminine / Masculine.

TOTAL : 45 PERIODS

OUTCOMES:

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

1. Think sceptically, ask questions and to arrive at deductions.
2. Connect and relate different branches of thought.
3. Comprehends the relation between language, thought and action.
4. Arrive at a better understanding of self and others and forms a new outlook.

REFERENCES:

1. Swami Nikhilananda: The Upanishads, Swami Nikhilananda, Advaita Ashrama, Kolkata.
2. Swamy Tapasyananda: Srimad Bhagavad Gita, The Scripture of Mankind, Sri Ramakrishna Math, Chennai.
3. Subrahmanyam, Korada: Vakyapadiyam of Bhartrhari Brahmakanda, Sri Garib Dass series.
4. Swami Lokeswarananda: Chandogya Upanishad, Swami Lokeswarananda, Ramakrishna Mission Institute of Culture, Kolkata.
5. Brahma, Apuruseya: The Four Vedas: Translated in English.
6. Haich, Elizabeth: Sexual Energy and Yoga.
7. Bacon, Francis: Power as Knowledge
8. Vlastos, Gregory: Socrates Ironist and Moral Philosopher.
9. Plato: The Republic, Penguin.
10. Gutting, Garry: Foucault A Very Short Introduction, Oxford.

HU5177 APPLICATIONS OF PSYCHOLOGY IN EVERYDAY LIFE

L	T	P	C
3	0	0	3

UNITI INTRODUCTION **7**

Nature and fields.

UNITII PSYCHOLOGYININDUSTRIESAND ORGANIZATIONS **9**

Job analysis; fatigue and accidents; consumer behavior.

UNITIII PSYCHOLOGY AND MENTALHEALTH **11**

Abnormality, symptoms and causes psychological disorders

UNITIV PSYCHOLOGY AND COUNSELING **7**

Need of Counseling, Counselor and the Counselee, Counseling Process ,Areas of Counseling.

UNITV PSYCHOLOGY AND SOCIALBEHAVIOUR **11**

Group, group dynamics, team building, Prejudice and stereotypes; Effective Communication, conflict and negotiation.

TOTAL:45PERIODS

TEXTBOOKS

1. Schultz,D.&Schultz,S.E.(2009). Psychology and Work Today(10thed.). New Jersey:Pearson /Prentice Hall.
2. Butcher,J.N., Mineka,S.,& Hooley,J. M.(2010). Abnormal psychology(14th ed.).New York: Pearson
3. Gladding,S.T. (2014).Counselling:A comprehensive profession. New Delhi: Pearson Education
4. Aronson, E.,Wilson, T. D.,& Akert, R. M.(2010).Social Psychology(7th Ed.). Upper Saddle River,NJ: Prentice Hall

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