ANNA UNIVERSITY, CHENNAI

NON-AUTONOMOUS COLLEGES AFFILIATED COLLEGES

REGULATIONS 2021

CHOICE BASED CREDIT SYSTEM (CBCS)

B. TECH. TEXTILE TECHNOLOGY

PROGRAM EDUCATIONAL OBJECTIVES:

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

1. Have attitude and knowledge for the successful professional and technical career
2. Have strong foundation in basic sciences, engineering, management, mathematics and computational platforms
3. Have knowledge on the theory and practices in the field of textile manufacturing technology and allied areas
4. Engross in life-long learning to keep themselves abreast of new developments, and practiceand inspire high ethical values and technical standards

PROGRAM OUTCOMES:

The Textile Technology Graduates will have the ability to

1. Apply knowledge of mathematics, sciences, engineering and textile technology to get solution for the technological problems in textile industry
2. Identify, formulate, review literature and critically analyze the technological problems in the textile industry to reach substantiated conclusion
3. Design and develop the solutions to the technological and managerial problems in textile industry with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations
4. Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions to the technological problems in textile industry
5. Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools for managing textile manufacturing companies with an understanding of the limitations
6. Apply reasoning gained through the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the profession
7. Understand the impact of the developed solutions in societal and environmental contexts, and demonstrate the knowledge for sustainable development
8. Understand ethical and professional responsibilities
9. Function effectively as an individual, and as a member or leader in diverse teams in the profession
10. Communicate effectively on complex engineering activities with the engineering community and with society at large. Able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

11. Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projectsand 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 fundamental and the technical knowledge for managing textile manufacturing industry
2. Be a successful entrepreneur and designer in textile clothing.
3. Design and develop novel products and manufacturing processes in textile fields

PEO's – PO's & PSO's MAPPING

PEO	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
I	3	3	3	1	2	2	2	3	2	3	2	1	3	3	2
II	3	3	3	3	1	1	2	1	1	2	2	1	2	2	1
III	3	3	3	2	2	1	2	2	2	2	1	1	3	3	2
IV	1	2	1	1	1	2	2	3	1	1	1	3	2	2	2

PROGRESS THROUGH KNOWLEDGE

Year	Semester	Course Name	PO												PSO		
		HUMANITIES AND SOCIALSCIENCES INCLUDING MANAGEMENT COURSES	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
I	I	Professional English - I															
I	II	Professional English - II															
IV	VII	Ethics and Human values															
IV	VII	Elective - Management															
		Basic Science Courses [BSC]	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
I	I	Matrices and Calculus															
I	I	Engineering Physics															
I	I	Engineering Chemistry															
I	I	Physics and Chemistry Laboratory															
I	II	Statistics and Numerical Methods															
I	II	Physics for Textile Technologists															
I	II	Chemistry for Textile Technologists															
II	III	Probability and Statistical Methods															
II	IV	Environmental Science and Sustainability *															
		ENGINEERING SCIENCE COURSE [ESC]	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
I	I	Problem Solving and Python Programming															
I	I	Problem Solving and Python Programming Laboratory															
I	II	Basic Electrical, Electronics and Instrumentation Engineering															
I	II	Engineering Graphics															
I	II	Engineering Practices Laboratory															
I	II	Basic Electrical, Electronics and Instrumentation Engineering															

		Laboratory															
II	III	Engineering Mechanics for Textile Technologists	3	3	3	2	2	1	1	-	1	1	1	2	2	2	1
		PROFESSIONAL CORE COURSES [PCC]	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
II	III	Technology of Pre-Spinning Process	2.8	2.8	3	2	2	-	-	-	-	-	-	1	3	1	1
II	III	Preparatory process for woven Fabric Manufacture	3	3	3	2.28	2	-	-	-	2	2	2	1	3	1	2.71
II	III	Structure and Properties of Textile Fibres	3	3	2.28	3	2	-	1	-	1	2	1	1	3	1	2
II	III	Production of Textile Fibres	3	3	2	2	1	2	2	-	-	-	-	1	3	1	3
II	III	Pre Spinning Laboratory	3	3	3	3	2	-	1	-	2	2	2	1	3	1	2
II	IV	Technology of Yarn Spinning	3	3	3	2.28	2	-	1	-	2	2	2	1	3	1	1.28
II	IV	Technology of woven Fabric Manufacture	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
II	IV	Knitting Technology	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
II	IV	Chemical Processing of Textile Materials I	3	2	2	2	2	-	2	-	-	-	-	1	3	1	2
II	IV	Woven Fabric Structure and Design	1	1	1.8	-	2.8	1	1	1	2	1	1	1	2	2	2
II	IV	Fabric Manufacture Laboratory	3	3	3	3	2	-	1	-	2	2	2	1	3	2	3
II	IV	Fabric Structure Analysis Laboratory	3	3	3	1	-	-	-	-	2	2	2	2	3	3	3
III	V	Testing of Textile Materials	3	3	2	3	2	-	-	2	-	-	-	1	3	1	2
III	V	Testing of Textile Materials Laboratory	3	2.17	3	1	1	-	1	-	2	1.16	2	2	3	3	3
III	VI	Chemical Processing of Textile Material II	3	2	2	2	2	-	3	-	-	-	-	1	3	1	2
III	VI	Technology of Nonwoven	3	2	2	2	2	-	-	-	-	-	-	1	3	1	2
III	VI	Textile Chemical Processing Laboratory	3	3	3	3	-	1	1	-	2	1	1	1	3	1	2.33
III	VI	Textile Product Engineering	3	3	3	3	2	1	1	-	2	2	2	2	3	2	3
III	VI	Apparel and Home Furnishings Manufacture	3	1.57	2.28	2	1	-	-	-	2	2	2	1.28	2.28	2.28	2.28
III	VI	Financial Management for Textile Industries	3	3	1	2	2	-	-	-	-	2	2	1	3	2	1

		PROFESSIONAL ELECTIVES [PEC]															
		Process and Quality Control in Spinning	3	3	3	3	2	1	1	1	-	-	-	2	3	2	2
		Process and Quality Control in Fabric Manufacture	3	3	3	3	2	1	1	1	-	-	-	2	3	2	2
		Theory of Drafting and Twisting	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
		Long Staple Spinning Technology	3	2	3	2	1	-	-	-	-	-	-	-	3	1	2
		Production and application of sewing threads	3	3	1	1	1	-	-	-	-	-	-	1	3	1	2
		Mechanics of Textile Machinery	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
		Textile Chemical and Auxiliaries	2.2	1.8	1.2	-	-	2	1.4	-	-	-	-	-	2	-	-
		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	2	2	-	2	2	2	-	2	2	-	2	2	2
		Garment Production Machinery	2.57	2.28	1.14	1	1	1	1	1	1	2	2	1	2	3	3
		Industrial Engineering in Garment Industry	1.2	2	3	3	2	1	1.2	2	2	1	2.4	2	1	1	-
		Pattern Making	2	2	2	-	2	-	-	1	1	1	1	1	2	3	1
		Apparel Marketing and Merchandising	-	1	2.6	2	2	1	1	2.4	2	1.2	1	-	2	2	2
		Apparel Product Development Laboratory	1.33	-		-	-	-	-	1	1.33	1.33	1.33	1	3	2	1
		Enterprise Resource Planning for Garment Industry	-	-	2.25	-	3	-	-	2	2	1	2.5	1	-	2	-
		Basic Sewing and Pattern Making Laboratory	-	-	-	-	1	-	-	-	-	1	1	-	1	2	1
		Apparel Costing	3	2	-	-	1	-	-	-	-	-	2	1	3	2	1
		Operations Research	3	2	2	3	3	-	-	-	-	1	2	1	3	3	2
		Supply Chain Management	1	1	2	2	2	-	-	-	2	2	2	1	2	2	1
		Textile Costing	3	3	1	2	2	-	-	-	-	2	2	1	3	2	1
		Textile and Apparel EXIM Management	2	1	1	2	1	-	-	-	-	1	-	1	2	1	-
		Technical Textiles	3	2	3	3	2	-	-	-	-	-	-	1	3	2	3
		Medical Textiles	3	2	3	3	2	1	-	-	-	-	-	2	3	2	3
		High Performance Fibres	3	2	2	2	1	-	-	-	-	-	-	1	3	2	3
		Smart Textiles	3	2	2	2	-	-	-	-	-	-	-	1	3	1	2

		Protective Textiles	3	2	2	2	-	-	-	-	-	-	-	1	3	1	2
		Coated Textiles	3	2	2	2	-	-	-	-	-	-	-	1	3	1	3
		Home Textile	3	1	2	2	-	-	-	-	-	-	-	1	2	2	2
		Characterization of Textile Polymers	3	-	-	2	1	-	-	-	-	-	-	1	3	1	1
		Clothing Comfort	3	2	2	2	1	-	-	-	-	-	-	2	3	2	3
		Textile Reinforced Composites	3	2	3	1	1	-	1	-	-	-	-	2	3	2	2
		Structure Mechanics of Yarns and Fabrics	3	3	2	2	2	1	1	-	-	-	-	1	3	1	2
		Advanced Testing of Textiles	3	2	2	3	2	-	1	-	-	-	-	1	3	1	2
		EMPLOYABILITY ENHANCEMENT COURSES (EEC)	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**	**9**	**10**	**11**	**12**	**1**	**2**	**3**
II	IV	Internship /Training I	3	3	2	2.6	2.8	2	2	2.1	2.1	3	2.4	2.6	2.6	2.8	2.4
III	V	Life Skills and Soft Skills															
III	V	Summer internship	3	3	2	2.6	2.8	2	2	2.1	2.1	3	2.4	2.6	2.6	2.8	2.4
IV	VII	Summer internship	3	3	2	2.6	2.8	2	2	2.1	2.1	3	2.4	2.6	2.6	2.8	2.4
IV	VIII	Project Work	3	3	3	3	1	1	1	2	2	2	2	1	3	2	3

PROGRESS THROUGH KNOWLEDGE

ANNA UNIVERSITY, CHENNAI
NON-AUTONOMOUS COLLEGES AFFILIATED COLLEGES
REGULATIONS 2021
B. TECH. TEXTILE TECHNOLOGY
CHOICE BASED CREDIT SYSTEM (CBCS)
CURRICULUM FOR SEMESTERS I TO VIII AND SYLLABI FOR SEMESTERS III AND IV

SEMESTER I

S. No.	COURSE CODE	COURSE TITLE	CATE-GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	IP3151	Induction Programme	-	-	-	-	-	0
THEORY								
2.	HS3151	Professional English - I	HSMC	3	0	0	3	3
3.	MA3151	Matrices and Calculus	BSC	3	1	0	4	4
4.	PH3151	Engineering Physics	BSC	3	0	0	3	3
5.	CY3151	Engineering Chemistry	BSC	3	0	0	3	3
6.	GE3151	Problem Solving and Python Programming	ESC	3	0	0	3	3
7.	GE3172	அறிவியல் தமிழ் / Scientific Thoughts in Tamil	HSMC	1	0	0	1	1
PRACTICALS								
8.	GE3171	Problem Solving and Python Programming Laboratory	ESC	0	0	4	4	2
9.	BS3171	Physics and Chemistry Laboratory	BSC	0	0	4	4	2
10.	GE3172	English Laboratory $	EEC	0	0	2	2	1
			TOTAL	**16**	**1**	**10**	**27**	**22**

$ Skill Based Course

SEMESTER II

SI. NO.	COURSE CODE	COURSETITLE	CATE-GORY	PERIODS PERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	HS3251	Professional English - II	HSMC	2	0	0	2	2
2.	MA3251	Statistics and Numerical Methods	BSC	3	1	0	4	4
3.	PH3257	Physics for Textile Technologists	BSC	3	0	0	3	3
4.	BE3252	Basic Electrical, Electronics and Instrumentation Engineering	ESC	3	0	0	3	3
5.	GE3251	Engineering Graphics	ESC	2	0	4	6	4
6.	CY3252	Chemistry for Textile Technologists	BSC	3	0	0	3	3
7.	GE3252	தமிழர் மரபு / Heritage of Tamils	HSMC	1	0	0	1	1
8.		NCC Credit Course Level 1#	-	2	0	0	2	2
PRACTICALS								
9.	GE3271	Engineering Practices Laboratory	ESC	0	0	4	4	2
10.	BE3272	Basic Electrical, Electronics and Instrumentation Engineering Laboratory	ESC	0	0	4	4	2
11.	GE3272	Communication Laboratory / Foreign Language $	EEC	0	0	4	4	2
			TOTAL	**17**	**1**	**16**	**34**	**26**

NCC Credit Course level 1 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.
$ Skill Based Course

SEMESTER III

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	MA3357	Probability and Statistical Methods	BSC	3	1	0	4	4
2.	TT3301	Engineering Mechanics for Textile Technologists	ESC	3	1	0	4	4
3.	TT3354	Technology of Pre-Spinning Process	PCC	3	0	0	3	3
4.	TT3351	Preparatory process for woven Fabric Manufacture	PCC	3	0	2	5	4
5.	TT3353	Structure and Properties of Textile Fibres	PCC	3	0	2	5	4
6.	TT3352	Production of Textile Fibres	PCC	3	0	0	3	3
PRACTICALS								
7.	TT3361	Pre Spinning Laboratory	PCC	0	0	3	3	1.5
8.	GE33361	Professional Development$	EEC	0	0	2	2	1
			TOTAL	**18**	**2**	**9**	**29**	**24.5**

$ Skill Based Course

SEMESTER IV

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	TT3454	Technology of Yarn Spinning	PCC	3	0	2	5	4
2.	TT3453	Technology of woven Fabric Manufacture	PCC	3	0	0	3	3
3.	TT3452	Knitting Technology	PCC	3	0	0	3	3
4.	TT3451	Chemical Processing of Textile Materials I	PCC	3	0	0	3	3
5.	TT3401	Woven Fabric Structure and Design	PCC	3	0	0	3	3
6.	GE3451	Environmental Sciences and Sustainability	BSC	2	0	0	2	2
7.		NCC Credit Course Level 2#		3	0	0	3	3 #
PRACTICALS								
8.	TT3461	Fabric Manufacture Laboratory	PCC	0	0	3	3	1.5
9.	TT3462	Fabric Structure Analysis Laboratory	PCC	0	0	3	3	1.5
10.	TT3511	Industrial Training/Internship I*	EEC	-	-	-	-	-
			TOTAL	**17**	**0**	**8**	**25**	**21**

NCC Credit Course level 2 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

*Four weeks industrial training/internship carries two credits. Industrial training/internship during IV Semester Summer Vacation will be evaluated in V semester

SEMESTER V

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	TT3591	Testing of Textile Materials	PCC	3	0	0	3	3
2.		Professional Elective I	PEC	3	0	0	3	3
3.		Professional Elective II	PEC	3	0	0	3	3
4.		Professional Elective III	PEC	3	0	0	3	3
5.		Professional Elective IV	PEC	3	0	0	3	3
6.		Mandatory Course-I[&]	MC	3	0	0	3	0
PRACTICALS								
7.	TT3511	Industrial Training/Internship I**	EEC	0	0	0	0	2
8.	TT3581	Testing of Textile Materials Laboratory	PCC	0	0	3	3	1.5
			TOTAL	**15**	**0**	**3**	**18**	**18.5**

[&] Mandatory Course-I is a Non-credit Course (Student shall select one course from the list given under MC-I)

**Four weeks industrial training/internship carries two credits. Industrial training/internship during IV Semester Summer Vacation will be evaluated in V semester

SEMESTER VI

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	TT3651	Chemical Processing of Textile Material II	PCC	3	0	0	3	3
2.	TT3691	Technology of Nonwoven	PCC	3	0	0	3	3
3.	TT3601	Mechanics of Textile Machinery	PCC	3	0	0	3	3
4.		Open Elective – I*	OEC	3	0	0	3	3
5.		Professional Elective V	PEC	3	0	0	3	3
6.		Professional Elective VI	PEC	3	0	0	3	3
7.		Mandatory Course-II[&]	MC	3	0	0	3	0
8.		NCC Credit Course Level 3[#]		3	0	0	3	3 #
PRACTICALS								
9.	TT3661	Textile Chemical Processing Laboratory	PCC	0	0	3	3	1.5
10.	TT3611	Textile Product Engineering	PCC	0	0	3	3	1.5
11.	TT3711	Industrial Training/Internship II**	EEC	-	-	-	-	-
			TOTAL	**21**	**0**	**6**	**27**	**21**

***Open Elective – I shall be chosen from the emerging technologies.**

**Two weeks industrial training/internship carries one credit. Industrial training/Internship during VI Semester Summer Vacation will be evaluated in VII semester

[&] Mandatory Course-II is a Non-credit Course (Student shall select one course from the list given under MC- II)

[#] NCC Credit Course level 3 is offered for NCC students only. The grades earned by the students will be recorded in the Mark Sheet, however the same shall not be considered for the computation of CGPA.

SEMESTER VII/VIII*

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	TT3751	Apparel and Home Furnishings Manufacture	PCC	3	0	2	5	4
2.	TT3752	Financial Management for Textile Industries	PCC	3	0	0	3	3
3.	GE3791	Human values and Ethics	HSMC	2	0	0	2	2
4.		Elective- Management #	HSMC	3	0	0	3	3
5.		Open Elective – II**	OEC	3	0	0	3	3
6.		Open Elective – III***	OEC	3	0	0	3	3
7.		Open Elective – IV***	OEC	3	0	0	3	3
PRACTICALS								
8.	TT3711	Industrial Training/ Internship II##	EEC	-	-	-	-	2
			TOTAL	**20**	**0**	**2**	**22**	**23**

***If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.**

****Open Elective – II shall be chosen from the emerging technologies.**

*****Open Elective III and IV (Shall be chosen from the list of open electives offered by other Programmes**

Elective- Management shall be chosen from the Elective Management courses

##Two weeks industrial training/internship carries one credit. Industrial training/Internship during VI Semester Summer Vacation will be evaluated in VII semester

SEMESTER VIII/VII*

S. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
THEORY								
1.	TT3811	Internship#/ Project Work	EEC	0	0	20	20	10
			TOTAL	**0**	**0**	**20**	**20**	**10**

***If students undergo internship in Semester VII, then the courses offered during semester VII will be offered during semester VIII.**

#15 weeks of continuous Internship in an organization carries 10 credits.

TOTAL CREDITS: 166

ELECTIVE – MANAGEMENT COURSES

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PERWEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	GE3751	Principles of Management	HSMC	3	0	0	3	3
2.	GE3752	Total Quality Management	HSMC	3	0	0	3	3
3.	GE3753	Engineering Economics and Financial Accounting	HSMC	3	0	0	3	3
4.	GE3754	Human Resource Management	HSMC	3	0	0	3	3
5.	GE3755	Knowledge Management	HSMC	3	0	0	3	3
6.	GE3792	Industrial Management	HSMC	3	0	0	3	3

MANDATORY COURSES I

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	MX3081	Introduction to Women and Gender Studies	MC	3	0	0	3	0
2.	MX3082	Elements of Literature	MC	3	0	0	3	0
3.	MX3083	Film Appreciation	MC	3	0	0	3	0
4.	MX3084	Disaster Management	MC	3	0	0	3	0

MANDATORY COURSES II

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	MX3085	Well Being with traditional practices (Yoga, Ayurveda and Siddha)	MC	3	0	0	3	0
2.	MX3086	History of Science and Technology in India	MC	3	0	0	3	0
3.	MX3087	Political and Economic Thought for a Humane Society	MC	3	0	0	3	0
4.	MX3088	State, Nation Building and Politics in India	MC	3	0	0	3	0
5.	MX3089	Industrial Safety	MC	3	0	0	3	0

PROFESSIONAL ELECTIVE COURSES : VERTICALS

Vertical I Spinning, Weaving and chemical processing	Vertical II Garment Manufacturing	Vertical III Management of Textile Industries	Vertical IV Technical Textiles	Vertical V Advancements in textiles
Process and Quality Control in Spinning	Garment Production Machinery	Operations Research in Textile Industry	Technical Textiles	Characterization of Textile Polymers
Process and Quality Control in Fabric Manufacture	Industrial Engineering in Garment Industry	Supply Chain Management	Medical Textiles	Clothing Comfort
Theory of Drafting and Twisting	Pattern Making	Apparel Costing	Home Textiles	Textile Reinforced Composites
Production and application of sewing threads	Apparel Marketing and Merchandising	Textile and Apparel EXIM Management	Smart Textiles	High Performance Fibres
Structural Mechanics of Yarns and Fabrics	Apparel Product Development Laboratory	Enterprise Resource Planning for Garment Industry	Protective Textiles	Advanced Testing of Textiles
Textile Chemicals and Auxiliaries	Basic Sewing and Pattern Making Laboratory	Management of Textile Effluents	Coated Textiles	Advances in Textile Printing and Finishes

Registration of Professional Elective Courses from Verticals:
Professional Elective Courses will be registered in Semesters V and VI. These courses are listed in groups called verticals that represent a particular area of specialisation. Students are permitted to choose all Professional Electives from a particular vertical or from different verticals. Further, only one Professional Elective course shall be chosen in a semester horizontally (row-wise). However, two courses are permitted from the same row, provided one course is enrolled in Semester V and another in semester VI.

The registration of courses for B.E./B.Tech (Honours) or Minor degree shall be done from Semester V to VIII. The procedure for registration of courses explained above shall be followed for the courses of B.E/B.Tech (Honours) or Minor degree also. For more details on B.E./B.Tech (Honours) or Minor degree refer to Regulations 2021 Clause 4.10.
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PROFESSIONAL ELECTIVE COURSES : VERTICALS

VERTICAL I: SPINNING, WEAVING AND CHEMICAL PROCESSING

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CTT344	Process and Quality Control in Spinning	PEC	3	0	0	3	3
2.	CTT343	Process and Quality Control in Fabric Manufacture	PEC	3	0	0	3	3
3.	CTT353	Theory of Drafting and Twisting	PEC	3	0	0	3	3
4.	CTT345	Production and application of sewing threads	PEC	3	0	0	3	3
5.	CTT357	Structure Mechanics of Yarns and Fabrics	PEC	3	0	0	3	3
6.	CTT351	Textile Chemicals and Auxiliaries	PEC	3	0	0	3	3

VERTICAL II: GARMENT MANUFACTURING

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CTT337	Garment Production Machinery	PEC	3	0	0	3	3
2.	CFT331	Industrial Engineering in Garment Industry	PEC	3	0	0	3	3
3.	CTT342	Pattern Making	PEC	3	0	0	3	3
4.	FT3691	Apparel Marketing and Merchandising	PEC	3	0	0	3	3
5.	CTT361	Apparel Product Development Laboratory	PEC	0	0	6	3	3
6.	CTT362	Basic Sewing and Pattern Making Laboratory	PEC	0	0	6	3	3

VERTICAL III: MANAGEMENT OF TEXTILE INDUSTRIES

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CTT341	Operations Research in Textile Industry	PEC	3	0	0	3	3
2.	CTT348	Supply Chain Management	PEC	3	0	0	3	3
3.	CTT336	Enterprise Resource Planning for Apparel Industry	PEC	3	0	0	3	3
4.	CTT354	Apparel Costing	PEC	3	0	0	3	3
5.	CTT355	Management of Textile Effluents	PEC	0	0	6	6	3
6.	CTT356	Textile and Apparel EXIM Management	PEC	3	0	0	3	3

VERTICAL IV: TECHNICAL TEXTILES

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CTT349	Technical Textiles	PEC	3	0	0	3	3
2.	CTT340	Medical Textiles	PEC	3	0	0	3	3
3.	CTT339	Home Textiles	PEC	3	0	0	3	3
4.	CTT347	Smart Textiles	PEC	3	0	0	3	3
5.	CTT346	Protective Textiles	PEC	3	0	0	3	3
6.	CTT335	Coated Textiles	PEC	3	0	0	3	3

VERTICAL V: ADVANCEMENTS IN TEXTILES

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CTT333	Characterization of Textile Polymers	PEC	3	0	0	3	3
2.	CTT334	Clothing Comfort	PEC	3	0	0	3	3
3.	CTT352	Textile Reinforced Composites	PEC	3	0	0	3	3
4.	CTT338	High Performance Fibres	PEC	3	0	0	3	3
5.	CTT331	Advanced Testing of Textiles	PEC	3	0	0	3	3
6.	CTT332	Advances in Textile Printing and Finishes	PEC	3	0	0	3	3

OPEN ELECTIVES

(Students shall choose the open elective courses, such that the course contents are not similar to any other course contents/title under other course categories.

OPEN ELECTIVE I AND II
(EMERGING TECHNOLOGIES)

To be offered other than Faculty of Information and Communication Engineering

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OCS351	Artificial Intelligence and Machine Learning Fundamentals	OEC	2	0	2	4	3
2.	OCS352	IoT Concepts and Applications	OEC	2	0	2	4	3
3.	OCS353	Data Science Fundamentals	OEC	2	0	2	4	3
4.	OCS354	Augmented and Virtual Reality	OEC	2	0	2	4	3

OPEN ELECTIVES – III

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OHS351	English for Competitive Examinations	OEC	3	0	0	3	3
2.	OCE353	Lean Concepts, Tools And Practices	OEC	3	0	0	3	3
3.	OMG352	NGOs and Sustainable Development	OEC	3	0	0	3	3
4.	OMG353	Democracy and Good Governance	OEC	3	0	0	3	3
5.	OME353	Renewable Energy Technologies	OEC	3	0	0	3	3
6.	OME354	Applied Design Thinking	OEC	2	0	2	4	3
7.	OMF351	Reverse Engineering	OEC	3	0	0	3	3
8.	OMF353	Sustainable Manufacturing	OEC	3	0	0	3	3
9.	OAU351	Electric and Hybrid Vehicle	OEC	3	0	0	3	3
10.	OAS352	Space Engineering	OEC	3	0	0	3	3
11.	OIM351	Industrial Management	OEC	3	0	0	3	3
12.	OIE354	Quality Engineering	OEC	3	0	0	3	3
13.	OSF351	Fire Safety Engineering	OEC	3	0	0	3	3
14.	OML351	Introduction to non-	OEC	3	0	0	3	3

		destructive testing						
15.	OMR351	Mechatronics	OEC	3	0	0	3	3
16.	ORA351	Foundation of Robotics	OEC	3	0	0	3	3
17.	OAE352	Fundamentals of Aeronautical engineering	OEC	3	0	0	3	3
18.	OGI351	Remote Sensing Concepts	OEC	3	0	0	3	3
19.	OAI351	Urban Agriculture	OEC	3	0	0	3	3
20.	OEN351	Drinking Water Supply and Treatment	OEC	3	0	0	3	3
21.	OEE352	Electric Vehicle technology	OEC	3	0	0	3	3
22.	OEI353	Introduction to PLC Programming	OEC	3	0	0	3	3
23.	OBT352	Biomedical Instrumentation	OEC	3	0	0	3	3
24.	OFD352	Traditional Indian Foods	OEC	3	0	0	3	3
25.	OFD353	Introduction to food processing	OEC	3	0	0	3	3
26.	OPY352	IPR for Pharma Industry	OEC	3	0	0	3	3
27.	OCH351	Nano Technology	OEC	3	0	0	3	3
28.	OCH352	Functional Materials	OEC	3	0	0	3	3
29.	OPE351	Introduction to Petroleum Refining and Petrochemicals	OEC	3	0	0	3	3
30.	OPE352	Energy Conservation and Management	OEC	3	0	0	3	3
31.	OPT351	Basics of Plastics Processing	OEC	3	0	0	3	3
32.	OEC351	Signals and Systems	OEC	3	0	0	3	3
33.	OEC352	Fundamentals of Electronic Devices and Circuits	OEC	3	0	0	3	3
34.	OBM351	Foundation Skills in integrated product Development	OEC	3	0	0	3	3
35.	OBM352	Assistive Technology	OEC	3	0	0	3	3
36.	OMA352	Operations Research	OEC	3	0	0	3	3
37.	OMA353	Algebra and Number Theory	OEC	3	0	0	3	3
38.	OMA354	Linear Algebra	OEC	3	0	0	3	3

OPEN ELECTIVES – IV

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	OHS352	Project Report Writing	OEC	3	0	0	3	3
2.	OCE354	Basics of Integrated Water Resources Management	OEC	3	0	0	3	3
3.	OMA355	Advanced Numerical Methods	OEC	3	0	0	3	3
4.	OMA356	Random Processes	OEC	3	0	0	3	3
5.	OMA357	Queuing and Reliability Modelling	OEC	3	0	0	3	3
6.	OMG354	Production and Operations Management for Entrepreneurs	OEC	3	0	0	3	3
7.	OMG355	Multivariate Data Analysis	OEC	3	0	0	3	3
8.	OME352	Additive Manufacturing	OEC	3	0	0	3	3
9.	OME353	New Product Development	OEC	3	0	0	3	3
10.	OME355	Industrial Design & Rapid Prototyping Techniques	OEC	2	0	2	4	3
11.	OMF352	Micro and Precision Engineering	OEC	3	0	0	3	3
12.	OMF354	Cost Management of Engineering Projects	OEC	3	0	0	3	3
13.	OAU352	Batteries and Management system	OEC	3	0	0	3	3
14.	OAU353	Sensors and Actuators	OEC	3	0	0	3	3
15.	OAS353	Space Vehicles	OEC	3	0	0	3	3
16.	OIM352	Management Science	OEC	3	0	0	3	3
17.	OIM353	Production Planning and Control	OEC	3	0	0	3	3
18.	OIE353	Operations Management	OEC	3	0	0	3	3
19.	OSF352	Industrial Hygiene	OEC	3	0	0	3	3
20.	OSF353	Chemical Process Safety	OEC	3	0	0	3	3
21.	OML352	Electrical, Electronic and Magnetic materials	OEC	3	0	0	3	3
22.	OML353	Nanomaterials and applications	OEC	3	0	0	3	3
23.	OMR352	Hydraulics and Pneumatics	OEC	3	0	0	3	3
24.	OMR353	Sensors	OEC	3	0	0	3	3
25.	ORA352	Foundation of Automation	OEC	3	0	0	3	3

26.	ORA353	Concepts in Mobile Robotics	OEC	3	0	0	3	3
27.	OMV351	Marine Propulsion	OEC	3	0	0	3	3
28.	OMV352	Marine Merchant Vehicles	OEC	3	0	0	3	3
29.	OMV353	Elements of Marine Engineering	OEC	3	0	0	3	3
30.	OAE353	Drone Technologies	OEC	3	0	0	3	3
31.	OGI352	Geographical Information System	OEC	3	0	0	3	3
32.	OAI352	Agriculture Entrepreneurship Development	OEC	3	0	0	3	3
33.	OEN352	Biodiversity Conservation	OEC	3	0	0	3	3
34.	OEE353	Introduction to control systems	OEC	3	0	0	3	3
35.	OEI354	Introduction to Industrial Automation Systems	OEC	3	0	0	3	3
36.	OBT353	Environment and Agriculture	OEC	3	0	0	3	3
37.	OFD354	Fundamentals of Food Engineering	OEC	3	0	0	3	3
38.	OFD355	Food safety and Quality Regulations	OEC	3	0	0	3	3
39.	OPY353	Nutraceuticals	OEC	3	0	0	3	3
40.	OCH353	Energy Technology	OEC	3	0	0	3	3
41.	OCH354	Surface Science	OEC	3	0	0	3	3
42.	OPE353	Industrial safety	OEC	3	0	0	3	3
43.	OPE354	Unit Operations in Petro Chemical Industries	OEC	3	0	0	3	3
44.	OPT352	Plastic Materials for Engineers	OEC	3	0	0	3	3
45.	OPT353	Properties and Testing of Plastics	OEC	3	0	0	3	3
46.	OEC353	VLSI Design	OEC	3	0	0	3	3
47.	OEC354	Industrial IoT and Industry 4.0	OEC	2	0	2	4	3
48.	OBM353	Wearable devices	OEC	3	0	0	3	3
49.	OBM354	Medical Informatics	OEC	3	0	0	3	3

SUMMARY

B.TECT TEXTILE TECHNOLOGY										
S.No	Subject Area	Credits per Semester								Total Credits
		I	II	III	IV	V	VI	VII/VIII	VIII/VII	
1	HSMC	4	3					5		12
2	BSC	12	10	4	2					28
3	ESC	5	11	4						20
4	PCC			15.5	19	4.5	12	7		58
5	PEC					12	6			18
6	OEC						3	9		12
7	EEC	1	2	1		2		2	10	18
8	Non-Credit /(Mandatory)					√	√			
Total		22	26	24.5	21	18.5	21	23	10	166

PROGRESS THROUGH KNOWLEDGE

Enrollment for B.E. / B. Tech. (Honours) / Minor degree (Optional)

A student can also optionally register for additional courses (18 credits) and become eligible for the award of B.E./B.Tech. (Honours) Minor degree.

For B.E. / B. Tech. (Honours), a student shall register for the additional courses (18 credits) from semester V onwards. These courses shall be from the same vertical or a combination of different verticals of the same programme of study only.

For minor degree, a student shall register for the additional courses (18 credits) from semester V onwards. All these courses have to be in a particular vertical from any one of the other programmes, Moreover, for minor degree the student can register for courses from any one of the following verticals also.
Complete details are available in clause 4.10 of Regulations 2021.

VERTICALS FOR MINOR DEGREE (IN ADDITIONS TO ALL THE VERTICALS OF OTHER PROGRAMMES)

Vertical I Fintech and Block Chain	**Vertical II Entrepreneurship**	**Vertical III Public Administration**	**Vertical IV Business Data Analytics**	**Vertical V Environment and Sustainability**
Financial Management	Foundations of Entrepreneruship	Principles of Public Administration	Statistics For Management	Sustainable infrastructure Development
Fundamentals of Investment	Team Building & Leadership Management for Business	Constitution of India	Datamining For Business Intelligence	Sustainable Agriculture and Environmental Management
Banking, Financial Services and Insurance	Creativity & Innovation in Entrepreneurship	Public Personnel Administration	Human Resource Analytics	Sustainable Bio Materials
Introduction to Blockchain and its Applications	Principles of Marketing Management For Business	Administrative Theories	Marketing And Social Media Web Analytics	Materials for Energy Sustainability
Fintech Personal Finance and Payments	Human Resource Management for Entrepreneurs	Indian Administrative System	Operation And Supply Chain Analytics	Green Technology
Introduction to Fintech	Financing New Business Ventures	Public Policy Administration	Financial Analytics	Environmental Quality Monitoring and Analysis
-	-	-	-	Integrated Energy Planning for Sustainable Development
-	-	-	-	Energy Efficiency for Sustainable Development

(Choice of courses for Minor degree is to be made from any one vertical of other programmes or from anyone of the following verticals)

VERTICAL 1: FINTECH AND BLOCK CHAIN

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG331	Financial Management	PEC	3	0	0	3	3
2.	CMG332	Fundamentals of Investment	PEC	3	0	0	3	3
3.	CMG333	Banking, Financial Services and Insurance	PEC	3	0	0	3	3
4.	CMG334	Introduction to Blockchain and its Applications	PEC	3	0	0	3	3
5.	CMG335	Fintech Personal Finance and Payments	PEC	3	0	0	3	3
6.	CMG336	Introduction to Fintech	PEC	3	0	0	3	3

VERTICAL 2: ENTREPRENEURSHIP

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG337	Foundations of Entrepreneruship	PEC	3	0	0	3	3
2.	CMG338	Team Building & Leadership Management for Business	PEC	3	0	0	3	3
3.	CMG339	Creativity & Innovation in Entrepreneurship	PEC	3	0	0	3	3
4.	CMG340	Principles of Marketing Management For Business	PEC	3	0	0	3	3
5.	CMG341	Human Resource Management for Entrepreneurs	PEC	3	0	0	3	3
6.	CMG342	Financing New Business Ventures	PEC	3	0	0	3	3

VERTICAL 3: PUBLIC ADMINISTRATION

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG343	Principles of Public Administration	PEC	3	0	0	3	3
2.	CMG344	Constitution of India	PEC	3	0	0	3	3
3.	CMG345	Public Personnel Administration	PEC	3	0	0	3	3
4.	CMG346	Administrative Theories	PEC	3	0	0	3	3
5.	CMG347	Indian Administrative System	PEC	3	0	0	3	3
6.	CMG348	Public Policy Administration	PEC	3	0	0	3	3

VERTICAL 4: BUSINESS DATA ANALYTICS

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CMG349	Statistics For Management	PEC	3	0	0	3	3
2.	CMG350	Datamining For Business Intelligence	PEC	3	0	0	3	3
3.	CMG351	Human Resource Analytics	PEC	3	0	0	3	3
4.	CMG352	Marketing And Social Media Web Analytics	PEC	3	0	0	3	3
5.	CMG353	Operation And Supply Chain Analytics	PEC	3	0	0	3	3
6.	CMG354	Financial Analytics	PEC	3	0	0	3	3

VERTICAL 5: ENVIRONMENT AND SUSTAINABILITY

SL. NO.	COURSE CODE	COURSE TITLE	CATE GORY	PERIODS PER WEEK			TOTAL CONTACT PERIODS	CREDITS
				L	T	P		
1.	CES331	Sustainable infrastructure Development	PEC	3	0	0	3	3
2.	CES332	Sustainable Agriculture and Environmental Management	PEC	3	0	0	3	3
3.	CES333	Sustainable Bio Materials	PEC	3	0	0	3	3
4.	CES334	Materials for Energy Sustainability	PEC	3	0	0	3	3
5.	CES335	Green Technology	PEC	3	0	0	3	3
6.	CES336	Environmental Quality Monitoring and Analysis	PEC	3	0	0	3	3
7.	CES337	Integrated Energy Planning for Sustainable Development	PEC	3	0	0	3	3
8.	CES338	Energy Efficiency for Sustainable Development	PEC	3	0	0	3	3

MA3357 PROBABILITY AND STATISTICAL METHODS

L	T	P	C
3	1	0	4

COURSE OBJECTIVES:

- To develop Probability techniques in manufacturing and quality evaluation process.
- To familiarize the students with two dimensional random variables.
- To familiarize the student with Differential Equations.
- To make the students to understand various techniques of Correlation and Time series Analysis.
- To acquaint the student with mathematical tools needed in evaluating Statistical quality control and to apply in the textile manufacturing industry.

UNIT I PROBABILITY AND RANDOM VARIABLES 9+3

Probability – axioms of probability – Conditional probability – Baye's theorem - Discrete and continuous random variables – Moments – Moment Generating functions – Binomial, Poisson, Geometric, Uniform , Exponential , Gamma and Normal distributions.

UNIT II TWO DIMENSIONAL RANDOM VARIABLES 9+3

Join distributions – Marginal distributions and conditional distributions –Moments - Covariance - Transforms of random variables – Central limit theorem.

UNIT III DIFFERENTIAL EQUATIONS 9+3

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

UNIT IV CORRELATION, REGRESSION, INDEX NUMBERS AND TIMES SERIES ANALYSIS 9+3

Correlation analysis, estimation of regression line. Time series analysis: Variations in time series, trend analysis , cyclical variations , seasonal variations and irregular variations. Index Numbers – Lasperyre's, Paasche's and Fisher's Ideal Index.

UNIT V STATISTICAL QUALITY CONTROL 9+3

Control charts for measurements (X and R chart) – Control charts for attributes (p ,C and np) charts – Tolerance limits – acceptance Sampling.

TOTAL: 60 PERIODS

COURSE OUTCOMES:

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

CO1: Use the Probability techniques for solving practical problems.

CO2: Apply two dimensional random variable tools in solving various problems.

CO3: Able to solve differential Equations by applying various techniques.

CO4: Apply different methods of Correlation, Regression, Index Numbers and Times series analysis in solving practical problems.

CO5: Apply statistical techniques in solving manufacturing and management related problems

TEXT BOOKS:

1. Johnson, R.A., Miller, I and Freund J., "Miller and Freund's Probability and Statistics for Engineers", Pearson Education, Asia, 8th Edition, 2015.
2. Milton. J. S. and Arnold. J.C., "Introduction to Probability and Statistics", Tata McGraw Hill, 4th Edition, 2007.
3. Kreyszig.E, "Advanced Engineering Mathematics", John Wiley and Sons, 10 th Edition, New Delhi, 2016.
4. Grewal.B.S., "Higher Engineering Mathematics", Khanna Publishers, New Delhi, 44 th Edition , 2018.
5. Richard I. Levin, David S. Rubin, Sanjay Rastogi Masood Husain Siddiqui, Statistics for Management, Pearson Education, 7th Edition, 2016.

REFERENCES:

1. Devore. J.L., "Probability and Statistics for Engineering and the Sciences", Cengage Learning, New Delhi, 8th Edition, 2014.
2. Papoulis, A. and Unnikrishnapillai, S., "Probability, Random Variables and Stochastic Processes", McGraw Hill Education India, 4th Edition, New Delhi, 2010.
3. Jain . R.K. and Iyengar. S.R.K., " Advanced Engineering Mathematics ", Narosa Publications, New Delhi, 5 th Edition, 2016.
4. Ramana. B.V., " Higher Engineering Mathematics ", McGraw Hill Education Pvt. Ltd, New Delhi, 2016.
5. Prem.S.Mann, "Introductory Statistics" 7th Edition, Wiley India, 2016.
6. Gareth James, Daniela Witten, Trevor Hastie, Robert Tibshirani, "An Introduction to Statistical Learning with Applications in R", Springer, 2016.
7. Aczel A.D. and Sounderpandian J., "Complete Business Statistics", 6th edition, Tata McGraw Hill Publishing Company Ltd., New Delhi, 2012.

TT3301 ENGINEERING MECHANICS FOR TEXTILE TECHNOLOGISTS 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 subjectedto 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 non-coplanar 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 momentof 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, VectorMechanics 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, 7thedition, Wiley student edition, 2013.
5. Timoshenko S, Young D H, Rao J V and Sukumar Pati, Engineering Mechanics 5thEdition, McGraw HillHigher Education, 2013.

ANNA UNIVERSITY
PROGRESS THROUGH KNOWLEDGE

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	Apply the various methods to determine the resultant forces and its equilibrium acting on a particle in 2D and 3D	3	3	3	2	2	1	1	-	1	1	1	2	2	2	1
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	3	3	3	2	2	1	1	-	1	1	1	2	2	2	1
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 momentof inertia of solids.	3	3	3	2	2	1	1	-	1	1	1	2	2	2	1
CO4	Apply the concepts of frictional forces at the contact surfaces of various engineering systems.	3	3	3	1	1	1	1	-	1	1	1	2	2	2	1
CO5	Apply the various methods of evaluating kinetic and kinematic parameters of the rigid bodies subjected to concurrent coplanar forces	3	3	3	3	3	1	1	-	1	1	1	2	2	2	1
Overall CO		3	3	3	2	2	1	1	-	1	1	1	2	2	2	1

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

TT3354 TECHNOLOGY OF PRE SPINNING PROCESS L T P C
3 0 0 3

OBJECTIVES:

- To expose the students to the yarn numbering system used to specify textile yarns.
- To enable the students to understand the processes involved in the production of yarn from fibres.
- To enable the students to understand the machinery used for the production of yarns using short staple spinning system.

UNIT I INTRODUCTION TO SPINNING 9

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

UNIT II GINNING AND BLOWROOM 9

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

UNIT III CARDING 9

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

UNIT IV COMBING 9

Objectives of comber preparatory; detailed study of sliver lap, ribbon lap and super lap formers; objectives and principle of combing; sequence of combing operation; combing efficiency and production calculation.

UNIT V DRAWING AND ROVING 9

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

TOTAL: 45 PERIODS

OUTCOMES:

Upon the completion of this course the student will be able to,
CO1: Explain the staple yarn spinning and fibre characteristics.
CO2: Explain the ginning and blow room process and calculations.
CO3: Describe the objective, principle and production calculation of carding.
CO4: Explain the different combing process and production calculation.
CO5: Explain the process of drawing, roving and draft, twist and production calculations.

TEXT BOOKS:

1. Klein W., Vol. 1-3, “The Technology of Short Staple Spinning”, “A Practical Guide to Opening & Carding” and “A Practical Guide to Combing, Drawing, and Roving frame”, The Textile Institute, Manchester, U.K., 1998.

2. Chattopadhyay R. (Ed), Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002.

3. Klein W., Vol.4 -5, “A Practical Guide to Ring Spinning, 1987” and “New Spinning Systems, 1993" The Textile Institute, Manchester, 1987.

4. Gowda R.V.M, “New Spinning Systems”, NCUTE, IIT Delhi, 2003.

REFERENCES:

1. Oxtoby E., “Spun Yarn Technology “, Butterworth, London, 1987

2. Klein W., “The Technology of Short-staple Spinning “, The Textile Institute, Manchester, 1998

3. Klein W., “A Practical Guide to Opening and Carding “, The Textile Institute, Manchester, 1999

4. Klein W., “A Practical Guide to Combing, Drawing and Roving Frame “, The Textile Institute, Manchester, 1999

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

6. Salhotra K.R. and Chattopadhyay R., “Book of papers on Blowroom and Card “, Indian Institute of Technology, Delhi, 1998 41

7. Iredale J., “Yarn Preparation: A Handbook “, Intermediate Technology, 1992

8. Doraiswamy I., Chellamani P. and Pavendhan A., “Cotton Ginning, Textile Progress”, The Textile Institute, Manchester, 1993.

ANNA UNIVERSITY
PROGRESS THROUGH KNOWLEDGE

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	PO1 0	PO1 1	PO1 2	PSO 1	PSO 2	PSO3
CO1	Explain the staple yarn spinning and fibre characteristics.	2	2	3	2	2	-	-	-	-	-	-	1	3	1	1
CO2	Explain the ginning and blow room process and calculations.	3	3	3	2	2	-	-	-	-	-	-	1	3	1	1
CO3	Describe the objective, principle and production calculation of carding.	3	3	3	2	2	-	-	-	-	-	-	1	3	1	1
CO4	Explain the different combing process and production calculation.	3	3	3	2	2	-	-	-	-	-	-	1	3	1	1
CO5	Explain the process of drawing, roving and draft, twist and production calculations.	3	3	3	2	2	-	-	-	-	-	-	1	3	1	1
Overall CO		2.8	2.8	3	2	2	-	-	-	-	-	-	1	3	1	1

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

TT3351 PREPARATORY PROCESS FOR WOVEN FABRIC MANUFACTURE L T P C
3 0 2 4

OBJECTIVES:

- The main objective of this course is to enable the students to understand the preparatory processes involved in the production of fabrics.

UNIT I WINDING 13

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

UNIT II PROCESS CONTROL IN WINDING 5

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

UNIT III WARPING AND SIZING 18

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

UNIT IV PROCESS CONTROL IN WARPING AND SIZING 5

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

UNIT V DRAWING- IN 4

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

TOTAL: 75 PERIODS (45L + 30P)

LIST OF EXPERIMENTS:

1. Analysis of Yarn faults
2. Control of production, package density, yarn faults in cone / cheese winding machine
3. Study of pirn winding
4. Study of warping machine
5. Study of sectional warping machine
6. Study of drawing – in, denting and tying

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

- Cone / Cheese winding machine – 1 No.
- Warping machine – 1 No
- Pirn winding machine – 1 No.
- Loom - 1 No.

OUTCOMES:

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

CO1: Explain the types of winding, yarn faults and automatic winding

CO2: Elucidate winding package faults and winding performance

CO3: Discuss the types of warping and sizing process
CO4: Describe the process control in warping and sizing
CO5: Explain the manual and automatic drawing in process
CO6: Analyse yarn faults and control of faults in cone / cheese finding
CO7: Discuss the preparatory process of fabric manufacturing

TEXT BOOKS:

1. Sriramlu P.K., Ajgaonkar D.B. & Talukdar M.K., "Weaving Machines: Mechanisms, Management", Mahajan Publishers, Ahmedabad, 1998.
2. Lord P.R. and Mohammed M.H., "Weaving – Conversion of Yarn to Fabric", Merrow Publication, 1992.

REFERENCES:

1. John A. Iredale “Yarn Preparation: A Hand Book”, Textile Institute, Manchester, 1992, ISBN: 1853390429
2. Lord P. R. and Mohamed M.H., “Weaving: Conversion of Yarn to Fabric”, Merrow, 1992, ISBN: 090409538X
3. Ormerod A. and Sondhelm W. S., “Weaving: Technology and Operations”, Textile Institute, 1995, ISBN: 187081276X.

PROGRESS THROUGH KNOWLEDGE

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	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	Explain the types of winding, yarn faults and automatic winding	3	3	3	2	2	-	-	-	-	-	-	1	3	1	3
CO2	Elucidate winding package faults and winding performance	3	3	3	2	2	-	-	-	-	-	-	1	3	1	3
CO3	Discuss the types of warping and sizing process	3	3	3	2	2	-	-	-	-	-	-	1	3	1	3
CO4	Describe the process control in warping and sizing	3	3	3	2	2	-	-	-	-	-	-	1	3	1	3
CO5	Explain the manual and automatic drawing in process	3	3	3	2	2	-	-	-	-	-	-	1	3	1	3
CO6	Analyse yarn faults and control of faults in cone / cheese Winding	3	3	3	3	2	-	-	-	2	2	2	1	3	1	2
CO7	Discuss the preparatory process of fabric manufacturing	3	3	3	3	2	-	-	-	2	2	2	1	3	1	2
Overall CO		3	3	3	2.28	2	-	-	-	2	2	2	1	3	1	2.71

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

TT3353 STRUCTURE AND PROPERTIES OF TEXTILE FIBRES

L	T	P	C
3	0	2	4

OBJECTIVES:

The main objective of this course is to enable the students to understand the

- Structure and morphology of textile fibres
- Structure investigation techniques
- 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 behaviour 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 MECHANICAL PROPERTIES 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 effect 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 and Tm; static electricity in textile fibres

TOTAL: 75 (45 L+30 P)

LIST OF EXPERIMENTS

1. Identification of natural, regenerated and synthetic fibres
2. Determination of denier of synthetic fibres
3. Determination of moisture regain and moisture content of fibres
4. Determination of wax content and spin finish of natural and synthetic fibres
5. 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

LIST OF EQUIPMENTS

1. Microscope – 1 No.
2. Weighing balance – 1 No.
3. Conditioning Chamber – 1 No.
4. Soxhlet appratus- 2 No.

OUTCOME:

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

CO1: Explain the structure and properties of fibres
CO2: Identify the method of investigation of structure of fibres
CO3: Compare and understand moisture absorption behaviour of various fibres
CO4: Demonstrate the tensile and elongation properties of fibres
CO5: Interpret the optical, thermal and frictional characteristics of fibres
CO6: Identify the fibres using, solubility, burning and microscopic test.
CO7: Determination of linear density and moisture properties of fibres

TEXTBOOKS

1. Morton W.E., and Hearle J.W.S.,"Physical Properties of Textile Fibres", The Textile Institute, Washington D.C., 2008, ISBN978-1-84569-220-95
2. Hearle J.W.S.,Lomas B.,and CookeW.D., "Atlas of Fibre Fracture and Damage to Textiles",The Textile Institute, 2nd Edition, 1998, ISBN:1855733196

REFERENCES

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|ISBN13:9780470273029
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

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 structure and properties of fibres	3	3	2	3	-	-	1	-	-	-	-	1	3	1	2
CO2	Identify the Method of investigation of structure of fibres	3	3	2	3	-	-	1	-	-	-	-	1	3	1	2
CO3	Compare and understand moisture absorption behaviour of various fibres	3	3	2	3	-	-	1	-	-	-	-	1	3	1	2
CO4	Demonstrate the tensile and elongation properties of fibres	3	3	2	3	-	-	1	-	-	-	-	1	3	1	2
CO5	Interpret the optical, thermal and frictional characteristics of fibres	3	3	2	3	-	-	1	-	-	-	-	1	3	1	2
CO6	Identify the fibres using, solubility, burning and microscopic test.	3	3	3	3	2	-	1	-	1	2	1	1	3	1	2
CO7	Determination of linear density and moisture properties of fibres	3	3	3	3	2	-	1	-	1	2	1	1	3	1	2
Overall CO		3	3	2.28	3	2	-	1	-	1	2	1	1	3	1	2

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

TT3352 PRODUCTION OF TEXTILE FIBRES L T P C
3 0 0 3

OBJECTIVES:

- To enable the students to learn about the natural fibre production, polymer rheology and the laws, and various spinning techniques of manufactured fibre production
- To expose the students to post spinning and advance development in the spinning process

UNIT I NATURAL FIBERS 12

Natural Fibers- production, properties and applications- Evolution of cotton varieties & Cultivation and harvesting; Bast Fibers: cultivation – Retting – Fibre Extraction; Wool: Types – Rearing – Shearing – Chemical Composition; Silk: life cycle of silk worm, Types – Reeling – Throwing

UNIT II MELT SPINNING 9

Newtonian and non-newtonian fluids, Melt instabilities; Melt Spinning- Polymer Selection and Preparation, equipment, properties and applications of polyester, polyamide and polypropylene fibers.

UNIT III SOLUTION SPINNING 9

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

UNIT IV POST SPINNING OPERATIONS 9

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

UNIT V DEVELOPMENTS IN FIBER SPINNING 6

Liquid crystal spinning; Gel spinning; Profile fibres and hollow fibres; Speciality fibres: polylactic acid and chitosan fibres preparation properties and applications.

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Recognize the cultivation and production of natural fibres

CO2: Explain the polymer rheology and polymer process parameters involved in melt spinning.

CO3: Demonstrate the various spinning techniques of polymers parameter involved in spinning synthetic yarn

CO4: Infer the need of various post spinning operations

CO5: Describe the advances in the spinning process

TEXT BOOKS:

1. Kothari V. K., “Textile Fibres: Development and Innovations”, Vol. 2, Progress in Textiles, IAFL Publications, New Delhi, 2000
2. Vaidya A. A., “Production of Synthetic Fibres”, Prentice Hall of India Pvt. Ltd., New Delhi, 1988
3. Nakasjima (English edition, edited by Kajiwara K. and McIntyre J. E.), “Advanced Fibre Spinning Technology”, Wood head Publication Ltd., England, 1994.

REFERENCES:

1. Gupta V. B. and Kothari V. K. (Editors), “Manufactured Fibre Technology”, Kluwer Academic Publishers, 1997.
2. Cook J. G., “Handbook of Textile Fibres: Vol. 2: Man Made Fibres”, The Textile Inst., 5th Ed. 1984.
3. Srinivasa Murthy H. V., “Introduction to Textile Fibres”, Textile Association, India, 1987.
4. Cook J.G., “Handbook of Textile Fibres: Vol. 1: Natural Fibres” The Textile Inst., 2001

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	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	Recognize the cultivation and production of natural fibres	3	3	2	2	1	2	2	-	-	-	-	1	3	1	3
CO2	Explain the polymer rheology and polymer process parameters involved in melt spinning	3	3	2	2	1	2	2	-	-	-	-	1	3	1	3
CO3	Demonstrate the various spinning techniques of polymers parameter involved in spinning synthetic yarn	3	3	2	2	1	2	2	-	-	-	-	1	3	1	3
CO4	Infer the need of various post spinning operations	3	3	2	2	1	2	2	-	-	-	-	1	3	1	3
CO5	Describe the advances in the spinning process	3	3	2	2	1	2	2	-	-	-	-	1	3	1	3
Overall CO		3	3	2	2	1	2	2	-	-	-	-	1	3	1	3

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

PROGRESS THROUGH KNOWLEDGE

TT3361 PRE-SPINNING LABORATORY L T P C
0 0 3 1.5

OBJECTIVES:

- To enable the students to learn passage of materials for ginning, cleaning machines and carding.
- To enable the students to learn passage of materials for drawing and roving machines.
- To enable the students to learn bobbin building and process parameters roving bobbins.

LIST OF EXPERIMENTS:

1. Construction details of Ginning machine, material passage and ginning out turn calculations
2. Construction details of blowroom machines material passage and production calculations
3. Determine the process parameters of 100% cotton material, running of blowroom machines to produce lap and running of carding machines to produce sliver
4. Construction details of carding machine, material passage and production calculations
5. Wire point specifications and various settings in a carding machine
6. Construction details of drawing machine, material passage, draft and production calculations
7. Study of construction details of comber preparatory machines, draft, and production calculations of those machines
8. Study of construction details of comber machines, combing cycle and production calculations
9. Construction details of roving machine, material passage, draft and production calculations
10. Study of bobbin builder mechanism in roving machine.
11. Study of roving frame bobbin stretch variation and to determine the count variation within bobbin, between bobbin and between front and back row bobbins.
12. Determine process parameters of drawing and roving machines to produce roving bobbins.
13. Handling of accessories – Tachometer, top roller load measuring devices, pressure gauge, roller eccentricity measuring gauge, leaf gauge, vernier caliber for roller settings, shore hardness tester etc.,

TOTAL: 45 PERIODS

OUTCOMES:

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

CO1: Discuss the ginning, cleaning machine's material passage and production calculations.

CO2: Explain the carding, drawing and roving machine's material passage and production calculations.

CO3: Determine the process parameters of blowroom lap, carding sliver and drawing and simplex machines

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

Ginning machine – 1 No.
Blowroom line – 1 No.
Carding machine – 1 No.
Drawframe – 1 No.
Comber – 1 No. (including preparatory process)
Speedframe – 1 No.
(Note: Commercial or Miniature models of above machines can be installed)

Course Articulation Matrix:

Course Outcomes	Statement	Program Outcome														
		PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1.	Discuss the ginning, cleaning machine's material passage and production calculations.	3	3	3	3	2	-	1	-	2	2	2	1	3	1	2
CO2.	Explain the carding, drawing and roving machine's material passage and production calculations.	3	3	3	3	2	-	1	-	2	2	2	1	3	1	2
CO3.	Determine the process parameters of blowroom lap, carding sliver and drawing and simplex machines	3	3	3	3	2	-	1	-	2	2	2	1	3	1	2
Overall CO		3	3	3	3	2	-	1	-	2	2	2	1	3	1	2

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

TT3454 TECHNOLOGY OF YARN SPINNING L T P C
3 0 2 4

OBJECTIVES:

- To enable the students to learn ring spinning and condensed spinning process.
- To enable the students to understand the yarn plying, twisting, types fancy yarn and method of production.
- To enable the students to learn rotor, friction, air jet, vortex, core and wrap spun yarn production methods.
- To enable the students to learn material passage, draft and production calculation of ring and rotor spinning.
- To enable the students to learn process parameters and production of ring and rotor spun yarn

UNIT I RING SPINNING 13

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

UNIT II CONDENSED YARN SPINNING 5

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

UNIT III YARN PLYING 9

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

UNIT IV ROTOR SPINNING 9

Principle of open-end spinning; principle of yarn production by rotor spinning system; design features of important elements used in rotor spinning; structure and properties of rotor yarn

UNIT V OTHER SPINNING SYSTEMS 9

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

TOTAL: 75 PERIODS (45L + 30P)

LIST OF EXPERIMENTS:

1. Construction details of Ring spinning machine, material passage, draft and production calculations
2. Study of bobbin builder mechanism in ring spinning machine
3. Study of ring spinning machine and to calculate draft and twist. To determine yarn twist variation when the yarn wind at minimum and maximum diameter as bobbin
3. Construction details of rotor spinning machine, material passage, draft and production calculations.
4. Production of yarn in ring spinning machine
5. Production of yarn in rotor spinning machine
6. Study and analysis of MIS report of spinning Mill.
7. Study and analysis of spectrogram, V-L curve.

OUTCOMES:

Upon the completion of this course, the student will be able to
CO1: Discuss the yarn formation, draft, twist and production calculation in ring spinning.
CO2: Explain the principle, properties and different methods of condensed yarn spinning.
CO3: Describe the yarn plying and production methods of fancy yarn.
CO4: Explain the principle, properties and different methods of rotor spinning.
CO5: Explain the spinning methods of rotor, friction, air jet, vortex, core and wrap spun yarn production methods.
CO6: Describe the material passage, draft and production calculation of ring and rotor spinning.
CO7: Determine the process parameters of ring and rotor spinning machines.

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS
Ring frame – 1 No.
Rotor spinning machine – 1 No.

(Note: Commercial or Miniature models of above machines can be installed)

TEXT BOOKS:

1. Klein W., Vol. 1-3, “The Technology of Short Staple Spinning”, “A Practical Guide to Opening & Carding” and “A Practical Guide to Combing, Drawing, and Roving frame”, The Textile Institute, Manchester, U.K., 1998.
2. Chattopadhyay R. (Ed), Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002.
3. Klein W., Vol.4 - 5, “A Practical Guide to Ring Spinning", 1987, and “New Spinning Systems", 1993, The Textile Institute, Manchester, 1987.
4. Gowda R.V.M, “New Spinning Systems”, NCUTE, IIT Delhi, 2003.

REFERENCES:

1. Oxtoby E., “Spun Yarn Technology “, Butterworth Publications, London, 1987
2. Lord P.R., “Yarn Production: Science, Technology and Economics”, The Textile Institute, Manchester, 1999
3. Shaw J., “Short-staple Ring Spinning, Textile Progress”, The Textile Institute, Manchester, 982
4. Iredale J., “Yarn Preparation: A Handbook “, Intermediate Technology, 1992.

PROGRESS THROUGH KNOWLEDGE

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	Discuss the yarn formation, draft, twist and production calculation in ring spinning.	3	3	3	2	2	-	-	-	-	-	-	1	3	1	1
CO2	Explain the principle, properties and different methods of condensed yarn spinning.	3	3	3	2	2	-	-	-	-	-	-	1	3	1	1
CO3	Describe the yarn plying and production methods of fancy yarn.	3	3	3	2	2	-	-	-	-	-	-	1	3	1	1
CO4	Explain the principle, properties and different methods of rotor spinning.	3	3	3	2	2	-	-	-	-	-	-	1	3	1	1
CO5	Explain the spinning methods of rotor, friction, air jet, vortex, core and wrap spun yarn production methods.	3	3	3	2	2	-	-	-	-	-	-	1	3	1	1
CO6	Describe the material passage, draft and production calculation of ring and rotor spinning.	3	3	3	3	2	-	1	-	2	2	2	1	3	1	2
CO7	Determine the process parameters of ring and rotor spinning machines.	3	3	3	3	2	-	1	-	2	2	2	1	3	1	2
Overall CO		3	3	3	2.28	2	-	1	-	2	2	2	1	3	1	1.28

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

TT3453 TECHNOLOGY OF WOVEN FABRIC MANUFACTURE L T P C
3 0 0 3

OBJECTIVE:

- To enable the students to understand the preparation for weaving and various functions of weaving machine

UNIT I INTRODUCTION TO WEAVING 6

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

UNIT II SHEDDING MOTIONS 9

Shed geometry and shedding requirement. Types of shed. Shedding mechanisms - positive and negative. Principles of tappet, dobby and jacquard shedding mechanisms, reversing mechanisms-limitations of various shedding mechanisms; Conventional and modern dobby and jacquard mechanism.

UNIT III WEFT INSERTION AND BEAT UP 9

Shuttle picking and checking mechanisms, shuttle flight and timing; Weft feeder – types, Principles of weft insertions in shuttle less looms; mechanism of weft insertion by projectile, rapier loom and jet – air and water. Multi-Phase weaving systems; Kinematics of sley, sley eccentricity; beat up mechanism in modern looms;

UNIT IV SECONDARY AND AUXILARY MOTIONS 12

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

UNIT V PROCESS CONTROL & SPECIAL WEAVING PROCESSES 9

Techno economics of shuttle less loom weft insertion systems; loom monitoring and control Loom stoppages and efficiency; fabric defects and value loss; fabric shrinkage in the loom - causes and control; fabric engineering. Filament weaving – Silk & Texturised yarns. Principles and mechanisms in weaving Pile fabrics, tapes and triaxial fabrics

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of this course the student will be,
CO1: Explain the primary, secondary and auxiliary motions
CO2: Discuss the types of shedding mechanism
CO3: Explain the types of weft insertion and beat up mechanism
CO4: Describe the let – off, take – up and shuttle changing mechanism
CO5: Discuss the process control and special weaving processes

TEXT BOOKS:

1. Talukdar, M.K., “An Introduction to Winding and Warping”, Textile Trade Press, Mumbai.
2. Talukdar M.K., Sriramulu P.K. and Ajgaonkar D.B., “Weaving: Machines, Mechanisms, Management”, Mahajan Publishers, Ahmedabad, 1998, ISBN: 81-85401-16-0
3. Marks R. and Robinson T.C., “Principles of Weaving”, The Textile Institute, Manchester, 1989, ISBN: 0 900739 258

REFERENCES:

1. Ajgaonkar, D.B., “Sizing, Materials, Methods and Machines”, Textile Trade Press, Mumbai, 1982.
2. “Weaving: The knowledge in Technology”, Papers Presented at the Textile Institute Weaving Conference 1998, Textile Institute, ISBN: 18770372182
3. Booth J.E., “Textile Mathematics Volume 3”, The Textile Institute, Manchester, 1977, ISBN: 090073924X
4. Lord P.R. and Mohamed M.H., “Weaving: Conversion of Yarn to Fabric”, Merrow, 1992, ISBN: 090409538X
5. Ormerod A. and Sondhelm W.S., “Weaving: Technology and operations”, Textile Institute, 1995, ISBN: 187081276X
6. Sabit Adanur, “Handbook of Weaving”, Technomic Publishing Co. Inc., 2001

ANNA UNIVERSITY
PROGRESS THROUGH KNOWLEDGE

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	PO11	PO12	PSO 1	PSO 2	PSO3
CO1	Explain the primary, secondary and auxiliary motions	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
CO2	Discuss the types of shedding mechanism	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
CO3	Explain the types of weft insertion and beat up mechanism	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
CO4	Describe the let – off, take – up and shuttle changing mechanism	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
CO5	Discuss the process control and special weaving processes	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
Overall CO		3	3	3	2	2	-	-	-	-	-	-	1	3	1	2

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

PROGRESS THROUGH KNOWLEDGE

TT3452 KNITTING TECHNOLOGY L T P C
3 0 0 3

OBJECTIVES:

- To make the students to understand fundamentals of knitting, types of knitting processes in detail, the functioning of components of knitting machine and knitted fabric structures.

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 will be able to

CO1: Classify the knitting process
CO2: Explain the types of knitting needle and elements of knitting
CO3: Discuss the weft knit structures
CO4: Explain the working of weft knitting and its types
CO5: Discuss the principle, elements and types of warp knitting machine

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.

ANNA UNIVERSITY
PROGRESS THROUGH KNOWLEDGE

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	Classify the knitting process	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
CO2	Explain the types of knitting needle and elements of knitting	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
CO3	Discuss the weft knit structures	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
CO4	Explain the working of weft knitting and its types	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
CO5	Discuss the principle, elements and types of warp knitting machine	3	3	3	2	2	-	-	-	-	-	-	1	3	1	2
Overall CO		3	3	3	2	2	-	-	-	-	-	-	1	3	1	2

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

PROGRESS THROUGH KNOWLEDGE

TT3451 CHEMICAL PROCESSING OF TEXTILE MATERIALS I **L T P C**
3 0 0 3

OBJECTIVE:

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

UNIT I PREPARATORY PROCESS 9

Pretreatments-process Sequences; singeing and desizing of natural and synthetic fibres and its blends; heat setting; Scouring, bleaching and mercerization of cotton, bio-scouring of cotton; carbonization, scouring and bleaching of wool; degumming and bleaching of silk

UNIT II PROCESSING MACHINERIES 9

Loose stock machine; hank and package processing machines; singeing machines; stretching devices; shearing and raising machines; kiers; mangles; jigger; winch; jet and soft flow machines J – Box ; yarn mercerizer, chain and chainless mercerizes; washing ranges, hydro extractors; detwisters; dryers; stenters

UNIT III THEORY OF DYEING 9

Dyeing equilibrium; dye-fibre interaction; adsorption isotherm; dye affinity; heat of dyeing; half dyeing time. Basic characteristics of dyes and pigments; classification of dyes and principle of application of dyes.

UNIT IV DYEING 9

Technology of application of direct, reactive, vat, disperse, acid and basic dyes.

UNIT V COLOUR SCIENCE 9

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

TOTAL: 45 PERIODS

OUTCOMES:

Upon completion of the course the student will be able to
CO1: Demonstrate the scouring and bleaching of textile fabrics
CO2: Describe the functions of chemical processing machineries
CO3: Explain the theory, classification and application of dyes
CO4: Differentiate the application of dyeing for various fibre
CO5: Identify the theory and measurement of color concepts

TEXT BOOKS

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. Menachem Lewin and Eli M. Pearce, "Handbook of Fibre Chemistry: Second Edition, Revised and Expanded, Marcel Dekker, Inc., 1998.
3. 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.
4. Karmakar S. R., "Chemical Technology in the Pre-treatment Process of Textiles", Elsevier sciences B.V., 1999.
5. Shenai V.A., "Chemistry of Dyes and Principles of Dyeing", Sevak Publications, Mumbai, 1995.

REFERENCES

1. Choudhury A. K. R., "Textile Preparation and Dyeing", SDC India Region,2011.

2. Bhagwat R. S., “Handbook of Textile Processing”, Colour Publication, Mumbai. 1999.
3. Cavaco-Paulo A. and Gubitz G. M., “Textile Processing with enzymes”, Woodhead Publication Ltd., 2003.
4. Chakraborty J.N., "Fundamentals and practice in Colouration of Textiles", Wood head Publishing India Pvt Ltd, India, 2010, ISBN: 184569788X | ISBN-13: 9781845697884.
5. Mittal R.M., and Trivedi S.S., “Chemical Processing of Polyester/Cellulosic Blends”, 2nd ed., Tata McGraw Hill, 2000.
6. Burkinshaw S. M., “Chemical Principles of Synthetic Fibre Dyeing", Springer-Science + Business Media, B.V., 2012, ISBN: 9401042632 | ISBN-13: 9789401042635.

ANNA UNIVERSITY
PROGRESS THROUGH KNOWLEDGE

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	Demonstrate the scouring and bleaching of textile fabrics	3	2	2	2	2	-	2	-	-	-	-	1	3	1	2
CO2	Describe the functions of chemical processing machineries	3	2	2	2	2	-	2	-	-	-	-	1	3	1	2
CO3	Explain the theory, classification and application of dyes	3	2	2	2	2	-	2	-	-	-	-	1	3	1	2
CO4	Differentiate the application of dyeing for various fibre	3	2	2	2	2	-	2	-	-	-	-	1	3	1	2
CO5	Identify the theory and measurement of color concepts	3	2	2	2	2	-	2	-	-	-	-	1	3	1	2
Overall CO		3	2	2	2	2	-	2	-	-	-	-	1	3	1	2

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

PROGRESS THROUGH KNOWLEDGE

TT3401 WOVEN FABRIC STRUCTURE AND DESIGN L T P C
3 0 0 3

OBJECTIVES:

- To enable the students to learn about different structures of woven fabric and design the structure for differentapplications

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, lashedpile, corduroy, and weft plush — loom requirements

UNIT V 9

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

TOTAL: 45 PERIODS

OUTCOMES:

Upon the completion of this course the student will be able to construct design, draft and peg plan and loomrequirements 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: 185573 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

PROGRESS THROUGH KNOWLEDGE

GE3451 ENVIRONMENTAL SCIENCES AND SUSTAINABILITY L T P C
2 0 0 2

UNIT - I : ENVIRONMENT AND BIODIVERSITY 6

Definition, scope and importance of environment – need for public awareness. Eco-system and Energy flow– ecological succession. Types of biodiversity: genetic, species and ecosystem diversity– values of biodiversity, 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.

UNIT – II: ENVIRONMENTAL POLLUTION 6

Causes, Effects and Preventive measures of Water, Soil, Air and Noise Pollutions. Solid, Hazardous and E-Waste management. Case studies on Occupational Health and Safety Management system (OHASMS). Environmental protection, Environmental protection acts.

UNIT – III: RENEWABLE SOURCES OF ENERGY 6

Energy management and conservation, New Energy Sources: Need of new sources. Different types new energy sources. Applications of- Hydrogen energy, Ocean energy resources, Tidal energy conversion. Concept, origin and power plants of geothermal energy.

UNIT - IV: SUSTAINABILITY AND MANAGEMENT 6

Development , GDP ,Sustainability- concept, needs and challenges-economic, social and aspects of sustainability-from unsustainability to sustainability-millennium development goals, and protocols-Sustainable Development Goals-targets, indicators and intervention areas Climate change- Global, Regional and local environmental issues and possible solutions-case studies. Concept of Carbon Credit, Carbon Footprint. Environmental management in industry-A case study.

UNIT - V: SUSTAINABILITY PRACTICES 6

Zero waste and R concept, Circular economy, ISO 14000 Series, Material Life cycle assessment, Environmental Impact Assessment. Sustainable habitat: Green buildings, Green materials, Energy efficiency, Sustainable transports. Sustainable energy: Non-conventional Sources, Energy Cycles-carbon cycle, emission and sequestration, Green Engineering: Sustainable urbanization-Socio-economic and technological change.

TOTAL: 30 PERIODS

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.
4. Allen, D. T. and Shonnard, D. R., Sustainability Engineering: Concepts, Design and Case Studies, Prentice Hall.
5. Bradley. A.S; Adebayo, A.O., Maria, P. Engineering applications in sustainable design and development, Cengage learning.
6. Environment Impact Assessment Guidelines, Notification of Government of India, 2006.
7. Mackenthun, K.M., Basic Concepts in Environmental Management, Lewis Publication, London, 1998.

REFERENCE BOOKS:

1. R.K. Trivedi, 'Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards', Vol. I and II, Enviro Media. 38 .
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.

TT3461 FABRIC MANUFACTURE LABORATORY L T P C
0 0 3 1.5

OBJECTIVE:
To train the students on different mechanisms of plain loom

LIST OF EXPERIMENTS
1. Determination of depth of shed and heald shaft movements in tappet shedding mechanism
2. Preparation of pattern card for dobby shedding mechanism and way in which adjust the depth of shed
3. Study of dobby shedding mechanism
4. Study of jacquard shedding mechanism
5. Study of picking mechanisms in looms
6. Determination of sley eccentricity in shuttle loom
7. Study of let-off mechanisms
8. Determination of pick space through 5 and 7 wheel take-up mechanisms
9. Study of weft replenishment mechanism in shuttle looms
10. Method of achieving the required colour patterns in 4 X 1 drop box motion
11. Study of warp protector mechanism
12. Understanding of the loom requirements from the given sample

TOTAL: 45 PERIODS

OUTCOMES:
Upon completion of this course, the students will be able to
CO1: Discuss the shedding and picking mechanism
CO2: Explain the let- off and take – up mechanism
CO3: Achieve the colour pattern in weaving machine

LIST OF EQUIPMENT FOR BATCH OF 30 STUDENTS
- Loom with tappet shedding – 1 No.
- Loom with dobby shedding – 1 No.
- Loom with jacquard – 1 No.
- Loom with dropbox – 1 No.

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	PO11	PO12	PSO 1	PSO 2	PSO 3
CO1	Discuss the shedding and picking mechanism	3	3	3	3	2	-	1	-	2	2	2	1	3	2	3
CO2	Explain the let- off and take – up mechanism	3	3	3	3	2	-	1	-	2	2	2	1	3	2	3
CO3	Achieve the colour pattern in weaving machine	3	3	3	3	2	-	1	-	2	2	2	1	3	2	3
Overall CO		3	3	3	3	2	-	1	-	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

PROGRESS THROUGH KNOWLEDGE

TT3462 FABRIC STRUCTURE ANALYSIS LABORATORY L T P C
0 0 3 1.5

OBJECTIVES:

- To enable the student to analyse the construction details of plain, rib and twill weave and its derivatives fabrics.
- To enable the student to analyse the construction details of satin, sateen, crepe, honey comb and huck a back weaves.
- To enable the student to analyse the construction details of double cloth, terry weave and Bedford cord weaves.
- To enable the students to determine the cost of woven fabrics.

LIST OF EXPERIMENTS

1. Analysis of weave and construction details of fabrics with plain weave
2. Analysis of weave and construction details of fabrics with rib/mat weaves
3. Analysis of weave and construction details of fabrics with twill/wavy twill weaves
4. Analysis of weave and construction details of fabrics with herringbone/diamond/diaper
5. Analysis of weave and construction details of fabrics with sateen and satin weaves
6. Analysis of weave and construction details of fabrics with crepe weaves
7. Analysis of weave and construction details of fabrics with honeycomb, huck-a-back and mock-leno weaves
8. Analysis of weave and construction details of fabrics with double cloth
9. Analysis of weave and construction details of fabrics with terry weaves
10. Analysis of weave and construction details of fabrics with bedford cord weaves
11. Determination of weave plan for manufacturing 100 meter of different woven fabrics

TOTAL: 45 PERIODS

OUTCOMES:

Upon the completion of this course the student will be able to
CO1: Draw the structure of woven fabrics with different weaves.
CO2 Extract the weave from the given sample and draw the weave, draft and peg- plan for re-production.
CO3: Develop the weave plan for production of woven fabrics

LIST OF EQUIPMENT FOR A BATCH OF 30 STUDENTS

1. Lab Desks - 20 Nos.
2. Beesley's balance - 5 Nos.
3. Crimp tester - 5 Nos.
4. Electronic balance - 2 Nos.
5. GSM Cutter - 2 Nos.

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	Draw the structure of woven fabrics with different weaves	3	3	3	1	-	-	-	-	2	2	2	2	3	3	3
CO2	Extract the weave from the given sample and draw the weave, draft and peg- plan for re-production	3	3	3	1	-	-	-	-	2	2	2	2	3	3	3
CO3	Develop the weave plan for production of woven fabrics	3	3	3	1	-	-	-	-	2	2	2	2	3	3	3
	Overall CO	3	3	3	1	-	-	-	-	2	2	2	2	3	3	3

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

PROGRESS THROUGH KNOWLEDGE