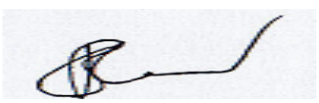
Department of Textile Technology

Vision

Department of Textile Technology aspires to be a ***centre of excellence*** in textile education, manifesting excellence, inspiring confidence, and engaging society.

Mission

- Develop industry relevant curriculum, infrastructure, innovative teaching methods and hands on training in textile education that enables students to be efficient professionals.
- Motivate Faculty to update their knowledge and skills through their higher education and providing opportunities to participate in short-term programme, workshops, conferences, seminars and specific industry based training.etc.,
- Provide holistic student development by creating opportunities to participate in Inter-Intra college events, soft skills trainings, competitive exams training etc., to develop their technical and team building competencies for lifelong learning and to develop entrepreneurship skills.
- Undertake inter-disciplinary research and development/Consultancy in the field of Textile Technology to support the industry and society.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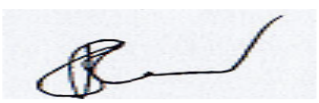
Programme Educational Objectives (PEO's)

PEO:1 Graduates of B.Tech Textile Technology programme will have increasing responsibilities/advancement in positions in Textile and related segments such as product development, production, technical services, quality assurance and marketing.

PEO:2 Graduates of B.Tech Textile Technology programme will become successful entrepreneur / business partners in Textile and related field, by starting new ventures/expansion of existing family business/product diversification, and contributing to societal, technological and industry development.

PEO:3 Graduates of B.Tech Textile Technology programme will be engaged in life-long learning and professional development through participation/ resource persons/publications in conferences ,workshops, seminars, or pursue specialized studies in engineering and business.



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Program Outcomes (PO's)

Engineering Graduates will be able to:

PO 1: Engineering knowledge: Apply the knowledge of mathematics, science, engineering fundamentals, and an engineering specialization to the solution of complex engineering problems.

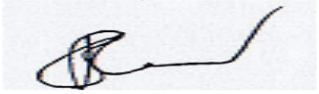
PO 2: Problem analysis: Identify, formulate, review research literature, and analyze complex engineering problems reaching substantiated conclusions using first principles of mathematics, natural sciences, and engineering sciences.

PO 3: Design/development of solutions: Design solutions for complex engineering problems and design system components or processes that meet the specified needs with appropriate consideration for the public health and safety, and the cultural, societal, and environmental considerations.

PO 4: Conduct investigations of complex problems: Use research-based knowledge and research methods including design of experiments, analysis and interpretation of data, and synthesis of the information to provide valid conclusions.

PO 5: Modern tool usage: Create, select, and apply appropriate techniques, resources, and modern engineering and IT tools including prediction and modeling to complex engineering activities with an understanding of the limitations.

PO 6: The engineer and society: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and



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cultural issues and the consequent responsibilities relevant to the professional engineering practice.

PO 7: Environment and sustainability: understand the impact of the professional engineering solutions in societal and environmental contexts, demonstrate the knowledge of, and need for sustainable development.

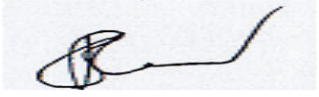
PO 8: Ethics: Apply ethical principles and commit to professional ethics, responsibilities, and norms of the engineering practice.

PO 9: Individual and teamwork: Function effectively as an individual, and as a member or leader in diverse teams, and in multidisciplinary settings.

PO 10: Communication: Communicate effectively on complex engineering activities with the engineering community and with society at large, such as, being able to comprehend and write effective reports and design documentation, make effective presentations, and give and receive clear instructions.

PO 11: Project management and finance: Demonstrate knowledge and understanding of the engineering and management principles and apply these to one's own work, as a member and leader in a team, to manage projects and in multidisciplinary environments.

PO 12: Life-long learning: Recognize the need for, and have the preparation and ability to engage in independent and life-long learning in the broadest context of technological change.



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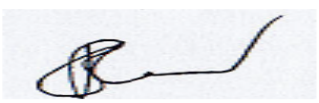
Program Specific Outcomes (PSO's)

Engineering Graduates will be able to:

PSO 1: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization for Process Optimization, Value analysis, Productivity improvement, Solutions to quality issues and Product development in textile and related fields.

PSO 2: Demonstrate learned techniques, experiments, modern engineering tools and software to estimate the optimum resources such as raw materials, machineries and manpower to predict the properties of fibre, yarn, fabric and garments as per the end uses.



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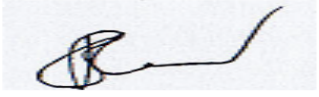
REGULATIONS 2015
CURRICULUM

Semester - 3								
	Course Code	**Course Title**	**Category**	**Contact Hours**	**Hrs/Week & Credits**			
					L	**T**	**P**	**C**
Theory								
1.	U15MA*T*306	Probability and Applied Statistics	BS	5	3	2	0	4
2.	U15EE*T*313	Electrical Engineering	ES	3	3	0	0	3
3.	U15ME*T*307	Basics of Applied Mechanics and Thermal Engineering	ES	5	3	2	0	4
4.	U15TX*T*301	Manufactured Fibre Technology	PC	3	3	0	0	3
5.	U15TX*T*302	Yarn Manufacturing Technology I	PC	3	3	0	0	3
6.	U15TX*T*303	Woven Fabric Manufacturing Technology	PC	3	3	0	0	3
. **Practical**								
7.	U15TX*P*301	Yarn Manufacturing Technology Laboratory I	PC	2	0	0	2	1
8.	U15TX*P*302	Woven Fabric Manufacturing Technology Laboratory	PC	2	0	0	2	1
9.	U15EEP311	Electrical Engineering Laboratory	ES	2	0	0	2	1
10.	U15GHP301	Family Values	HS	1	1	0	0	1
							Total credits:24	



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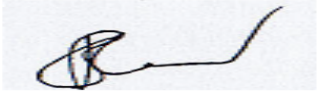
Semester -4								
	Course Code	**Course Title**	**Category**	**Contact Hours**	**Hrs/Week & Credits**			
					L	**T**	**P**	**C**
Theory								
1.	U15EST004	Environmental Science in Textile and Apparel Technology	HS	3	3	0	0	3
2.	U15MAT401	Numerical Methods	BS	5	3	2	0	4
3.	U15TXT401	Yarn Manufacturing Technology II	PC	3	3	0	0	3
4.	U15TXT402	Shuttleless Weaving Technology	PC	3	3	0	0	3
5.	U15TXT403	Textile Pretreatment and Dyeing Technology	PC	3	3	0	0	3
6.	U15TXT404	Physical properties of Textile Fibres	PC	3	3	0	0	3
. **Practical**								
7.	U15TXP401	Yarn Manufacturing Technology Laboratory II	PC	2	0	0	2	1
8.	U15TXP402	Textile Pretreatment and Dyeing Technology Laboratory	PC	2	0	0	2	1
9.	U15CSP202	Problem Solving Technique	ES	3	1	0	2	2
10.	U15GHP401	Professional Values	HS	1	1	0	0	1
Total credits:24								



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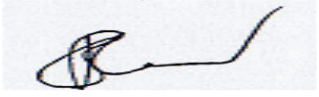
Semester -5

	Course Code	Course Title	Category	Contact Hours	Hrs/Week & Credits			
					L	T	P	C
Theory								
1.	U15GS*T*004	Operation Research	ES	3	3	0	0	3
2.	U15GST006	Product Design and Development	ES	3	3	0	0	3
3.	U15TX*T*501	Knitting Technology	PC	3	3	0	0	3
4.	U15TX*T*502	Woven Fabric Structure and Design	PC	3	3	0	0	3
5.	U15TX*T*503	Textile Printing and Finishing Technology	PC	3	3	0	0	3
6.		Open Elective 1	OE	3	3	0	0	3
. **Practical**								
7.	U15ENG501	Communication skill laboratory	EEC	2	0	0	2	1
8.	U15TX*P*501	Cloth Analysis Laboratory	PC	2	0	0	2	1
9.	U15TX*P*502	In-Plant Training / Internship	EEC	2	0	0	2	1
10.	U15GHP501	Social Values	HS	1	1	0	0	1
							Total credits:22	

Semester -6

	Course Code	Course Title	Category	Contact Hours	Hrs/Week & Credits			
					L	T	P	C
Theory								
1.	U15GS*T*005	Engineering Economics and Financial Management	ES	3	3	0	0	3
2.	U15TX*T*601	Textile Quality Evaluation	PC	3	3	0	0	3
3.	U15TX*T*602	Mechanics of Textile Machinery	PC	5	3	2	0	4
4.	U15TX*T*603	Garment Manufacturing Technology	PC	3	3	0	0	3
5.		Professional Elective 1	PE	3	3	0	0	3
6.		Open Elective 2	OE	3	3	0	0	3
. **Practical**								



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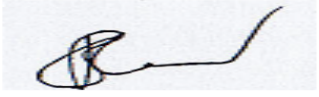
7.	U15TX*P*601	Textile Quality Evaluation Laboratory	PC	2	0	0	2	1
8.	U15TX*P*602	Knitting and Garment Laboratory	PC	2	0	0	2	1
9.	U15GHP601	National Values	HS	1	1	0	0	1
							Total credits:22	

Semester -7								
	Course Code	**Course Title**	**Category**	**Contact Hours**	**Hrs/Week & Credits**			
					L	**T**	**P**	**C**
Theory								
1.	U15TXT701	Process Control in Textile Industry	PC	5	3	2	0	4
2.	U15TX*T*702	Nonwoven Manufacturing Technology	PC	3	3	0	0	3
3.	U15TX*T*703	Technical Textiles	PC	3	3	0	0	3
4.		Professional Elective 2	PE	3	3	0	0	3
5.		Professional Elective 3	PE	3	3	0	0	3
6.		Open Elective 3	OE	3	3	0	0	3
. **Practical**								
7.	U15TX*P*701	Textile and Apparel CAD Laboratory	PC	2	0	0	2	1
8.	U15TX*P*702	Technical Textiles Laboratory	PC	2	0	0	2	1
9.	U15TX*P*703	Project work – Phase I	EEC	8	0	0	4	2
10.	U15GHP701	Global Values	HS	1	1	0	0	1
							Total credits:24	



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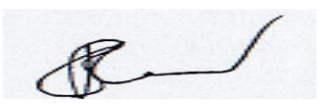
Semester – 8								
	Course Code	Course Title	Category	Contact Hours	Hrs/Week & Credits			
					L	T	P	C
Theory								
1.		Professional Elective 4	PE	3	3	0	0	3
2.		Professional Elective 5	PE	3	3	0	0	3
. **Practical**								
4.	U15TX*P*801	Project Work – Phase II	EEC	20	0	0	20	10
							Total credits:16	

Total Credit: 180

Professional Electives (PE)								
	Course Code	Course Title	Category	Contact Hours	Hrs/Week & Credits			
					L	T	P	C
1.	U15TXTE01	High Performance Fibres	PE	3	3	0	0	3
2.	U15TXTE02	Maintenance Management in Textile Mills	PE	3	3	0	0	3
3.	U15TXTE03	Pattern Making and Grading	PE	3	3	0	0	3
4.	U15TXTE04	Textile Project Management and Finance	PE	3	3	0	0	3
5.	U15TXTE05	Instrumental Analysis of Textiles fibres	PE	3	3	0	0	3
6.	U15TXTE06	Textile Composites	PE	3	3	0	0	3
7.	U15TXTE07	Garment Processing and Garment Care	PE	3	3	0	0	3
8.	U15TXTE08	Medical Textiles	PE	3	3	0	0	3
9.	U15TXTE09	Clothing Science	PE	3	3	0	0	3
10.	U15TXTE10	Marketing and Merchandising	PE	3	3	0	0	3
11.	U15TXTE11	Apparel Production Planning and Control	PE	3	3	0	0	3
12.	U15TXTE12	Quantitative Analysis in Textile Engineering	PE	3	3	0	0	3
13.	U15TXTE13	Industrial Engineering in Textile Industry	PE	3	3	0	0	3



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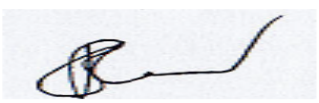
14.	U15TXTE14	Environmental Management in Textile Industry	PE	3	3	0	0	3
15.	U15TXTE15	Textile and Apparel Costing	PE	3	3	0	0	3
16.	U15TXTE16	Chemistry of Textile Auxiliaries	PE	3	3	0	0	3
17.	U15TXTE17	Computer Colour Matching of Textile	PE	3	3	0	0	3
18.	U15GST002	Total Quality Management	PE	3	3	0	0	3
19.	U15GST003	Principles of Management	PE	3	3	0	0	3
20.	U15GST007	Professional Ethics	PE	3	3	0	0	3



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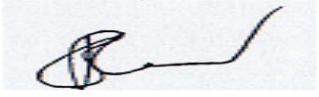
Open Electives (OE)								
	Course Code	**Course Title**	**Category**	**Contact Hours**	**Hrs/Week & Credits**			
					L	**T**	**P**	**C**
1.	U15TX0E01	Textile in Civil Engineering	OE	3	3	0	0	3
2.	U15TX0E02	Textile in Automobile	OE	3	3	0	0	3
3.	U15TX0E03	Textile Mechatronics	OE	3	3	0	0	3
4.	U15TX0E04	Functional Finishes in Textiles	OE	3	3	0	0	3
5.	U15TX0E05	Textile in Bio-Medical Application	OE	3	3	0	0	3

One Credit Course		
S. No.	**Course Code**	**Course Title**
1.	U15TXIN01	Work Study in Sewing Line
2.	U15TXIN02	Retail Management
3.	U15TXIN03	Fancy Yarns
4.	U15TXIN04	Erection and Commissioning of Textile Machines
5.	U15TXIN05	Workload and Work Assignments
6.	U15TXIN06	ERP in Textiles
7.	U15TXIN07	Export Documentation
8.	U15TXIN08	Globalisation of Indian Man Made Fiber Industry
9.	U15TXIN09	Techno Economic Projection of Current Textile Industry - Synthetic Fiber Spinning
10.	U15TXIN10	Present Scenario and Projected Market For Man Made Fiber & Synthetic Spinning Industry



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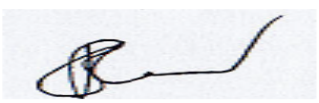
11.	U15TXIN11	Emerging Trends In Textile Industry - Man Made Fibers
12.	U15TXIN12	Product Innovation Through Value Addition - Using Man Made Fibers.
13.	U15TXIN13	Yarn Winding
14.	U15TXIN14	Rsls and other eco regulations governing use of chemicals in Textiles
15.	U15TXIN15	Colour management
16.	U15TXIN16	Shuttleless weaving
17.	U15TXIN17	Warp knitting
18.	U15TXIN18	Merchandising and Quality Control
19.	U15TXIN19	Home Textiles
20.	U15TXIN20	Sports textiles
21.	U15TXIN21	Entrepreneurship in medical textiles



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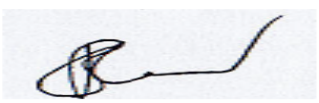
SEMESTER III



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U15MA*T*306 **Probability and Applied Statistics**

L	T	P	C
3	2	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Compute measures of central tendencies, dispersions and correlate the variables

CO2: Analyze random or unpredictable experiments and investigate important features of random experiments.

CO3: Construct probabilistic models for observed phenomena through distributions, which play an important role in many engineering applications.

CO4: Analyze sample data and interpret the same for population.

CO5: Analyze the experimental designs for one way and two way classification of data

CO6: Sketch the control charts and outline the process capability.

Pre-requisites :

1. U15MAT201/ Engineering Mathematics – II

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S											S	
CO2	S	S											S	
CO3	S	S			M								S	
CO4	S	S		S	M				M	S	M		S	
CO5	S	S		S					M	S	M		S	
CO6	S	S	S	S					M	S	M		S	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

STATISTICAL MEASURES **9+3 Hours**

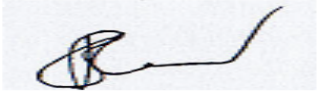
Measures of central tendency: Mean, Median and Mode – Measures of variation: Range, Mean deviation, standard deviation and coefficient of variation - Correlation - Karl Pearson's coefficient of correlation – Spearman's Rank Correlation – Regression lines.

PROBABILITY AND RANDOM VARIABLE **9+ 3Hours**

Axioms of probability - Conditional probability – Total probability – Baye's theorem - Random variable – Distribution function – properties – Probability mass function – Probability density function – moments.

STANDARD DISTRIBUTIONS **9+ 3Hours**

Binomial, Poisson and Normal distributions – Moments, Moment Generating functions and



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properties for the above distributions - Fitting of Binomial and Poisson distributions.

TESTING OF HYPOTHESIS **9+3 Hours**

Testing of hypothesis for large samples (single mean, difference of means, single proportion, difference of proportions) – Small samples tests based on t and F distributions (single mean, difference of means, paired *t*- test and variance ratio test) – Chi-square test for independence of attributes and goodness of fit.

DESIGN OF EXPERIMENTS **5+2 Hours**

Analysis of Variance (ANOVA) – Completely Randomized Design (CRD) – Randomized Block Design (RBD) – Latin Square Design (LSD).

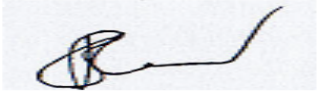
STATISTICAL QUALITY CONTROL **4+1 Hours**

Concept of process control - Control charts for variables – $\overline{X}$, R – charts – Control charts for attributes – p, np, c – charts – Tolerance limits.

Theory: 45 Hours **Tutorial: 15 Hours** **Total: 60 Hours**

REFERENCES

1. Veerarajan T., Probability, Statistics and Random Processes, Tata McGraw Hill,3rd edition, 2008.
2. Gupta S. P, "Statistical Methods", Sultan Chand & Sons Publishers, 2004.
3. Johnson R. A., Miller & Freund's "Probability and Statistics for Engineers", Sixth Edition, Pearson Education, Delhi, 2000.
4. Gupta.S.C and Kapoor.V.K, Fundamentals of Mathematical Statistics, 11th extensively revised edition, Sultan Chand & Sons, 2007.
5. Walpole R. E., Myers S.L. & Keying Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education Inc, 2002.
6. Gupta S.C, and KapurV.K "Fundamentals of Applied Statistics", Sultan Chand, New Delhi, 4th Edition, 2014.



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U15EET313 **ELECTRICAL ENGINEERING (Common to Textile Technology & Fashion Technology)**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Understand the basic laws of electricity and apply them to electrical circuits.

CO2: Calculate the power ratings of AC circuits

CO3: Describe the operation of DC machines and Induction motors

CO4: Understand the characteristics and applications of DC machines and Induction motors.

CO5: Select suitable motor for desired applications

CO6: Identify electronics components and use them to design circuits

Pre-requisites : NIL

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M												M	
CO2	M	W											M	
CO3	M												M	
CO4	M	W											M	
CO5	M												M	
CO6	M												M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

ELECTRIC CIRCUITS **9Hours**

Ohm's Law – Kirchoff's Laws – series, parallel DC circuits – Introduction to AC Circuits – Waveforms and RMS Value – Single Phase series RLC circuits- Power and Power factor-solving simple AC circuits.

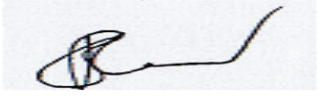
DC MOTORS **9 Hours**

Construction - Principle of Operation- types – back EMF– torque equation - speed torque characteristics – losses and efficiency – speed control of DC motor.

INDUCTION MOTORS **9Hours**

3 phase Induction Motor -construction– Principle of operation – types – torque equation - speed torque characteristics – 1 phase Induction Motor – Principle of operation- types. Electric braking of Induction Motor.

INDUSTRIAL APPLICATIONS **9Hours**



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Types of Drives - Motor Selection – factors to be considered – power rating – types of Duty cycle –Heating and cooling curves - selection of motors for cranes, centrifugal pumps, and Textile Mills.

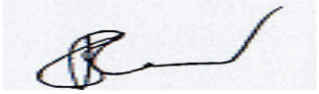
ELECTRONIC CIRCUITS **9Hours**

Characteristics of PN Junction Diode – Zener Effect – Zener Diode and its Characteristics – Half wave and Full wave Rectifiers – Voltage Regulation. Bipolar Junction Transistor – CB, CE, CC Configurations and Characteristics. Introduction to Binary Logic gates – AND, OR, NOT NAND, NOR, EX-OR & EX-NOR.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Mehta V K and Rohit Mehta, "Principles of Electrical Engineering and Electronics", S.Chand & Co. Ltd., New Delhi, 2006.
2. Muthusubramanian R, Salivahanan S and Muraleedharan K A, "Basic Electrical, Electronics and Computer Engineering", 2nd Edition, Tata McGraw Hill Publishers, New Delhi, 2009.
3. Pillai S K,"A first course on Electrical Drives", New Age International Publications Ltd,New Delhi, 2011.
4. Murugesh Kumar K, "Basic Electrical Science and Technology", Vikas Publishing Ltd, New Delhi, 2011.
5. Leach D P, Malvino A P and Goutam Saha, "Digital Principles and Applications", Tata Mc Graw- Hill, New Delhi, 2008.
6. Nagsarkar T K and Sukhija M S, "Basics of Electrical Engineering", Oxford press, 2005



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U15ME*T*307 **Basics of Applied Mechanics and Thermal Engineering**

L	T	P	C
3	2	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Apply the fundamental concepts in developing various mechanisms

CO2: Construct the cam profile for specific follower motion.

CO3: Identify appropriate gears and gear trains for particular application

CO4: Make use of different methods of Heat Engines internally and external.

CO5: Describe the working principle of refrigeration and air conditioning systems.

CO6: Make use of gear terminologies and fundamental law of toothed gearing.

Pre-requisites :

Nil

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S	W										S	
CO2	M	M					M						M	
CO3	S	S					M						S	
CO4						M		W						
CO5					W			W						
CO6		M			W				W				M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

BASICS OF MECHANISMS **9+3Hours**

Terminology and definitions- degree of freedom-Kutzbach criterion-Grashoff's law- Kinematic inversions of 4-bar chain and slider crank chains-Description of common mechanisms-single, double and offset slider mechanisms- Quick return mechanisms

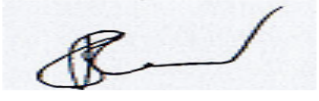
KINEMATICS OF CAM AND GEARS **9+3Hours**

Classification –Displacement diagrams-Uniform velocity, acceleration and simple harmonic motions-Layout of plate cam profiles.

Spur gear terminology and definitions –Fundamental law of toothed gearing and Involute gearing -Gear tooth action –Terminology

GEAR TRAINS **9+3Hours**

Classification of gear trains- simple gear train, compound gear train, Epicyclic gear train, velocity ratio of epicyclic gear train- Torques in Epicyclic Gear trains.



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HEAT ENGINES **9+3Hours**

IC ENGINES - Working principle of petrol and diesel engines – Components of four stroke and two stroke engines – comparison of four stroke and two stroke engines – Layout of Diesel power plant.

ECENGINES –External combustion engines for power plant- Layout of steam power plant- Basic steam Power plant cycle- Types of Boiler- Fire tube and water tube boilers, Boiler mountings – Types of steam Turbines.

REFRIGERATION AND AIR CONDITIONING SYSTEM **9+3Hours**

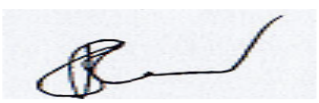
Terminologies of Refrigeration and air conditioning. Working principle of vapour compression and vapour absorption system.

Types of Air conditioning systems- window and split type room Air conditioner, Year round Air conditioning system

Theory:45 Hours **Tutorial : 15 Hours** **Total:60 Hours**

REFERENCES

1. Rattan S.S, “Theory of machines”, Tata MC Graw-Hill publishing company Ltd., New Delhi, 2005.
2. R.S Khurmi and J.K.Gupta, “Theory of machines”, S.Chand , 2008.
3. Venugopal K and Prahu Raja V, “Basic Mechanical engineering”, Anuradha publishers, Kumbakonam, 2000.
4. Shanthakumar S R J., “Basic Mechanical engineering ”, Hi- tech publications, Mayiladuthurai,2000.
5. Shigley J.E and Uicker J.J. “Theory of machines and mechanisms”, McGraw- Hill, Inc. 1995.
6. Thomas Bevan, “Theory of machines”, CBS publishers and distributors, 1984.
7. Ghosh A and A. K. Mallick, “Theory of mechanisms and machines”, Affiliated East – west Pvt. Ltd., New Delhi, 1988
8. MohanSen, “Basic mechanical engineering”, Lakshmi publications, New Delhi, 2006
9. Mahesh M Rathore., “Thermal Engineering”, Tata McGraw Hill, 2010



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U15TX*T*301 **Manufactured Fibre Technology**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss the fundamental concepts of polymerization techniques
CO2: Explain the manufacturing process of various regenerated fibres
CO3: Explain the manufacturing process of various synthetic fibres
CO4: Summarize various post spinning operations preferred in manmade fibres
CO5: Outline the characterization techniques of manmade fibres
CO6: Summarize the fibre structure modification technique

Pre-requisites :

1. U15TXT201 Textile Fibers

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	M	M										S	
CO2					S	M				M				
CO3				S	S					M				
CO4	M			S									M	
CO5	S	S											S	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION **9 Hours**

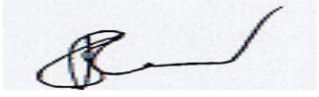
Molecular size and interaction-molecular orientation and crystallinity in fibres- fibre morphology- thermal transitions. Polymerization techniques. Basic principles of fluid flow during fibre spinning: viscous flow, Newtonian fluids. Components of spinning of process: extruder gear pump, filters, manifold, spinning head, quenching chamber and winder. Introduction to staple and filament yarn manufacturing.

REGENERATED FIBRE **9 Hours**

Manufacturing process of Viscose rayon fibre. Manufacture process Cellulose derivative fibre, Soya bean fibre and bicomponent fibre with different cross section and super absorbent fibre. Encapsulation technique in fibre formation.

SYNTHETIC FIBRES **9 Hours**

Manufacturing process of polyester, Nylon 6 and Nylon 66.Specialty polyamide and polyester fibres. Manufacturing process of Polyethylene and Polypropylene fibre.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Manufacturing process of Acrylic fibre. Manufacturing process of Elastomeric fibres.

POST SPINNING PROCESS **9 Hours**

Spin finish: Properties, components and application techniques. Additives used in fibre manufacturing. Introduction to delusturing. Drawing and Heat setting: mechanism, changes in structure and properties of fibre. Tow to top conversion. Texturising: False Twist, Air Texturising, stuffer-box, edge crimped and Draw texturising process.

CHARACTERIZATION OF FIBRES **9 Hours**

Characterization at molecular level: molecular weight averages, end group analysis, membrane osmometry, and viscometry–thermal characterization: differential thermal calorimetry analysis, thermogravimetry and thermomechanical analysis.

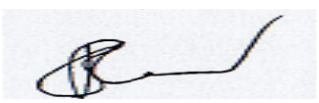
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Respiratory disease caused by synthetic fibres: a new occupational disease.
2. Synthetic Fibres in the Wool Industry.
3. Energy conservation in synthetic fibre plants.

REFERENCES

1. V.B. Gupta and V. K. Kothari, “Manufactured Fibre Technology”, Chapman and hall, First edition 1997.
2. A Vaidya, “Production of synthetic fibres”, Prentice Hall of India Pvt. Ltd., New Delhi, 1988.
3. H.G Mark, S. M Atlas and D. Certia. E. (Editors), “Man madefibres-science and Technology”, Vol. I III, Inter science publishers, New York, 1987.
4. Usenko, V., “Processing of Man-Made fibres”, MIR publishers, Moscow, 1985.
5. MenachemLewin and Eli M. Pearce (editors), “Handbook of fibre science and Technology: Vol. IV Fibre chemistry”, Marcel Decker Inc., New York, 1985.
6. R.W.Moncrief, “Man Made fibres”, 6th edition, London Newnes-Butterworths,1975
7. J. Gordon Cook, “Hand book of Textile fibres (Volume 2 – Manmade fibres)”, CBS Publishers and Distributors, 2005



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U15TX*T*302 **Yarn Manufacturing Technology – I**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Discuss the concepts and mechanism of opening and cleaning of blow room machines

CO 2: Explain the principle and mechanism of fibre individualization in carding

CO 3: Describe the concept of fibre parallelization in draw frame

CO 4: Discussion the concept & mechanism in comber process

CO 5: Explain the principle and working of speed frame

CO6 :Discuss the latest development in preparatory machines

Pre-requisites :

1. U15TXT201 Textile Fibers

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S												S	
CO2			S											
CO3				S										
CO4					S									
CO5				S										
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

GINNING AND BLOW ROOM **9 Hours**

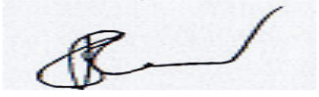
Process flow chart – short staple, long staple spinning. Study of different types of gins – Effect of ginning performance on yarn quality. Objectives of blow room –UNI Blending machine-Types of beaters in Blowroom, degree of blending- IBI, Opening of machine for coarse, fine& super fine machine, Concepts of opening intensity and cleaning efficiency. Contamination sorters, Chute feed system. Fire/metal detector in blow room, Automatic waste evacuation system (AWES). Use of air current, modern developments in blow room.

CARDING **9 Hours**

Objectives – passage of material of modern card, carding disposition and doffing disposition; Salient features of new generation cards-Integrated Drawframe. Selection of card clothing for cotton& synthetics blends. Draft distribution, Autolevellers-Waste levels in card for various materials. Principle, settings & production calculation.

DRAWFRAME **9 Hours**

Objectives - Principle of doubling and drafting. Drafting system - draft theory - drafting wave - actual and perfect draft. Cots – Types &Specification. Rollers slip & rollers eccentricity. Autolevellers-Principle, modern developments in Draw frame, Process parameters and



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production calculation.

COMBING **9 Hours**

Objectives of Comber-comber preparatory, working of combing machine-Circular comb and Top comb; Types of feed; combing settings and their importance, timing diagram, cycle of combing. Production calculation and fractionating efficiency for a comber, Modern developments in comber-Automatic piecing and lap transport system.

SPEED FRAME **9 Hours**

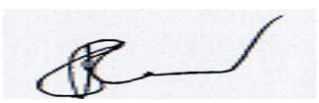
Objectives - Principle and working, Winding principles in fly frame, Bobbin lead & flyer lead winding, Mechanism of winding and bobbin building. Draft, twist and production calculations, Modern developments in speed frame-Bobbin transport system

Theory: 45 Hours **Total: 45 Hours**

1. Polyester cotton blends (P/C) process in spinning mill
2. Contamination found in the yarn –After Contamination Clearing Process in Blow Room
3. Effect of beating point & settings in blow room on cleaning efficiency.
4. Steps to adjust noil percentage in combers.
5. Wastage study - department wise
6. Fly generation and NRE

REFERENCES

1. Chattopadhyay R., Technology of Carding, NCUTE, IIT Delhi, 2003.
2. Chattopadhyay R. (Ed), Advances in Technology of Yarn Production, NCUTE, IIT Delhi, 2002 .
3. Oxtoby E "Spun Yarn Technology" butter worth's, London, New Edition 2002.
4. Salhotra K. R. &Chattopadhyay R., Book of papers on "Blowroom and Carding",IIT Delhi 1998.
5. Duraiswamy I, Chellamani P &Pavendhan A., "Cotton Ginning" Textile Progress, The Textile Institute, Manchester, U.K., 1993.
6. Lord P. R., Yarn Production: Science, Technology and Economics", The Textile Institute, Manchester, U.K., 1999.
7. ArkadyCherakassky, Two dimensional mathematical model of the carding process, Textile research journal P. 169 – 175, March 1994.



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U15TX*T*303 **Woven Fabric Manufacturing Technology**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss the concept and mechanism of winding process in woven fabric manufacturing

CO2: Explain the concept and mechanism of warping and sizing process in woven fabric manufacturing

CO3: Describe the functioning of weaving machine and its important motions

CO4: Select and control the process variables at loom

CO5: Calculate the speed and production rate of weaving machine

CO6: Create the new designs in woven fabric manufacturing

Pre-requisites :

1. U15TXT201 Textile Fibers

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M												M	
CO2	S	S											S	
CO3	M	M	S										M	
CO4	S	M		S									S	
CO5	S	M											S	
CO6	S	S	S	M	M								S	

Course Assessment methods

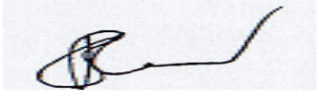
Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

WINDING **9 Hours**

Objectives of winding, Geometry of cone winding. Classification of winders. Working principles of automatic winders-Electronics yarn clearer and splicers. Package defects, causes and remedies. Types and working principles of spindleless pirn winding machines. Pirn types and dimensions. Pirn bunching. Pirn winding defects causes and remedies. Production calculations of cone and pirn winders.

WARPING & SIZING **9 Hours**

Types of creels. Working principles of beam and sectional warpers. Warping beam defects causes and remedies. Objectives of sizing - Working principles of multi-cylinder and single end sizing machines. Size ingredients, Size preparation. Sizing faults, causes and remedies. Production calculation in warping and sizing.



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WEAVING – INTRODUCTION **9 Hours**

Drawing-in and gaiting operations. Types of weaving motions - primary, secondary and auxiliary motions. Classification of looms. Loom timing diagram for different motions. Weaving accessories- Types and selection of heald wires, heald frames, reeds, shuttle, picker, Temples.

PRIMARY MOTIONS **9 Hours**

Shedding- Negative and positive tappet, Negative and positive dobby, single lift single cylinder jacquard and double lift single cylinder jacquard. Picking - Classification - Cone over pick, side lever under pick–swell checking devices. Beat-up- 4 bar linkage beat up mechanism. Speed and production calculations in power loom.

SECONDARY AND TERTIARY MOTIONS **9 Hours**

Negative let-off and positive let-off, five and seven wheel take-up motions. Loose reed and fast reed mechanisms. Warp and weft stop motion. Weft feelers-different types. Pirn changing mechanism. 4 x 1 Drop box motions.

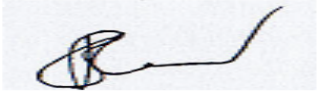
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Energy conservation in weaving industry
2. Collection of samples and photos of yarn fault, package fault and fabric fault and study their causes & remedies
3. Develop the fabric with small designs
4. Analyze the classimat fault report in winding machine
5. Occurrences of shuttle fly out and remedial measures

REFERENCES

1. Lord P.R. and Mohammed M.H., “Weaving – Conversion of Yarn to Fabric”, Merrow Publication, 2001.
2. Adanur S., “Handbook of Weaving”, Woodhead Publishing Limited, 2001.
3. Prabir Kumar Banerjee., “Principles of Fabric Formation”, CRC Press, 2014.
4. Sriramlu P.K., Ajgaonkar D.B. &Talukdar M.K., “Weaving Machines: Mechanisms, Management”, Mahajan Publishers, Ahmedabad, 1998.
5. “Woven fabric production – I”, Quality CBT & course material from NCUTE, 2002.
6. “Woven fabric production – II”, Quality CBT & course material from NCUTE, 2002.



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U15TX*P*301	**Yarn Manufacturing Technology Laboratory I**	**L**	**T**	**P**	**C**
		0	**0**	**2**	**1**

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Prepare gearing diagram for various spinning preparatory machines

CO2: Calculate the speed of revolving parts of spinning preparatory machines

CO 3: Calculate the production of various spinning machine

CO 4: Calculate the draft and draft distribution

CO 5: Calculate the production, twist and draft constants

CO6: Know about the settings between various zones of spinning preparatory machines

Pre-requisites :

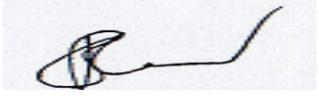
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	S													S
CO2			S											S
CO3			S											S
CO4		M	S											S
CO5		M	S											S
CO6	M	M	M				M							M

Course Assessment methods

Direct	**Indirect**
1. Observation 2. Lab Exercises 3. Model Practical Examination 4. End Semester Practical Examination	1. Course end survey



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List of Experiment(s)

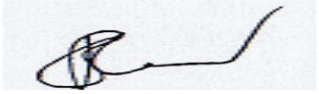
(Experiment beyond the syllabus should be taken)

1. Determination of speed & settings in ginning machine.
2. Determination of speeds of beaters in mono cylinder and ERM cleaner along with belt slippage %.
3. Determination of speeds of various rotating elements in bale opener and calculation of belt slippage % at beater.
4. Working of chute feed system and calculation of speed of rotating elements
5. An analysis of Working mechanism and calculation of draft distribution & production calculation in carding machine.
6. Setting between various zone of carding zone & find out the nep content in the web.
7. Determination of speed, draft distribution & setting in draw frame.
8. Determination of speed, draft, production & combing cycle of comber.
9. Estimation of head-to-head variation in noil level.
10. Determination of speed, draft distribution, twist & production calculation in speed frame.
11. Determination of bobbin speed at various belt positions on cone drums & plot the graph.
12. Analysis of speed frame builder motion & calculation of coils / inch.

Practical: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Identification of key components of each machine & their importance
2. Analysis of nep level in carding
3. Determination of cleaning efficiency in Blow Room and Card
4. Comparison of noil % with respect to type of feeds.
5. Production of different hanks of sliver by varying the draft keeping the number of feedings constant.
6. Production of different hanks of sliver in draw frame.
7. Production of different hanks of roving's in speed frame
8. Estimation of A% level in autoleveller drawframe.



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U15TX*P*302 **Woven Fabric Manufacturing Technology Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Operate the winding machine by altering the process variables

CO2: Carryout the hands-on-training of various mechanisms involved in woven fabric manufacturing

CO3: Alter the settings of various mechanisms involved in weaving preparatory and weaving machines

CO4: Assemble the dismantled parts of the mechanisms in weaving machine

CO5: Specify the importance of each part in weaving preparatory and weaving machines

CO6: Create miniature model in woven fabric manufacturing

Pre-requisites : NIL

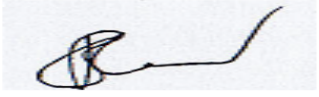
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M				S		S							S
CO2	M	M			S		S							S
CO3	M	M	M		S		S							S
CO4	M	M			S		S							S
CO5	M	M			S		S							S
CO6	M	M			S		S							M

Course Assessment methods

Direct	Indirect
1. Observation 2. Lab Exercises 3. Model Practical Examination 4. End Semester Practical Examination	1. Course end survey



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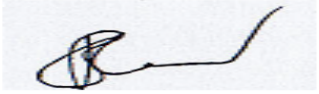
List of Experiment(s)
(Experiment beyond the syllabus should be taken)

1. Determination of package density, winding angle, wind and traverse ratio in conventional and automatic cone winders and production calculation.
2. Mechanisms for regulating pirn dimensions and characteristics.
3. Preparation of single end sized warp beam for given fabric particulars and determination of size pick-up % and tensile properties.
4. Dismantling and assembling of negative Tappet shedding.
5. Dismantling and assembling of over picking mechanisms.
6. Dismantling and assembling of under picking mechanisms.
7. Study of positive let-off motion.
8. Dismantling and assembling of seven wheel take-up motion and dividend calculation.
9. Dismantling and assembling of warp stop motions.
10. Dismantling and assembling of weft stop motions.
11. Study of loose reed and fast reed mechanisms.
12. Preparation of card for 4x1 drop box mechanism and study of 4 x 1 drop box motion.
13. Study of automatic pirn changing mechanism and weft feeler mechanism.

Practical: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Design and development of shedding tappet for plain weave using wooden block
2. Design and development of shedding tappet for twill weave using wooden block
3. Preparation of pegging pattern for a given design for dobby loom
4. Preparation of pattern card for a given design for jacquard loom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U15EE*P*311 **Electrical Engineering Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Understand the performance characteristics of DC Motors
CO2: Understand the performance characteristics of AC Motors
CO3: Understand the characteristics of semiconductor devices.
CO4: Verify the universal gates.
CO5: Verify the waveforms of rectifier circuits.
CO6: Understand the input and output characteristics of CE transistor.

Pre-requisites :

Nil

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

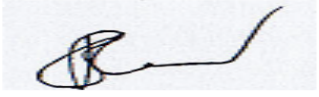
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M													S
CO2	M													S
CO3	M													S
CO4	M													S
CO5	M													S
CO6	M													M

Course Assessment methods

Direct	Indirect
1. Lab Exercise 2. Model Exam 3. End Semester Exam	1. Course end survey

LIST OF EXPERIMENTS (Experiments beyond the syllabus should be conducted)

1. Load Test on DC Shunt Motor
2. Load Test on DC Series Motor
3. Speed Control of DC Shunt Motor
4. Load Test on three phase Induction Motor
5. Load Test on single phase Induction Motor
6. Half wave and full wave rectifier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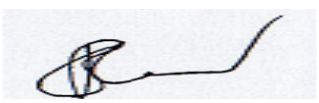
7. Characteristics of CE transistor configuration
8. Characteristics of PN diode
9. Zener diode as voltage regulator.
10. Verification of truth table of logic gates

Practical: 45 Hours **Total: 45 Hours**



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U15GHP 301 FAMILY VALUES

(Common to all branches of Engineering and Technology)

L	T	P	C
1	0	0	1

Objectives

1. To understand the importance of family and to contribute to it
2. To lead spiritual development through good family life.
3. To respect womanhood
4. To lead a healthy and disease free life

Course outcomes

1. The students shall understand the importance of a family
2. The students shall acquire skills in simplified Kundalini yoga for sound health.
3. The students shall learn about greatness of womanhood
4. The students shall learn about the importance of Blessings and relationship
5. The students shall know about simplified Kundalini yoga, its methodology and its benefits

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

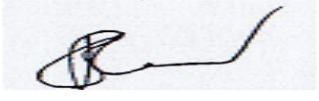
COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1						M		M	S	W		M		
CO2						S	M		W			S		
CO3						W						M		
CO4						M			M			S		
CO5						M						M		

Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioural Assessment

Introduction to Family Life – An Overall Perspective	1 Periods
Personal & Spiritual development through good Family life	1 Periods
Importance of Relationships & Blessings	3 Periods
Food as Medicine – Quantum Healing	3 Periods
Greatness of womanhood	2 Periods
Simplified Physical Exercises (Kundalini Exercises)	5 Periods

Total Periods: 15



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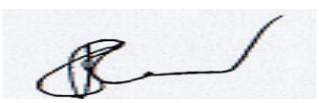

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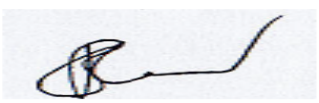
SEMESTER IV



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U15ES*T*004 Environmental Science in Textile and Apparel Technology
(Common to Textile Technology & Fashion Technology)

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Analyze the impact of engineering solutions in a global and societal context

CO2: Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems

CO3: Highlight the importance of ecosystem and biodiversity

CO4: Ability to consider issues of environment and sustainable development in his personal and professional undertakings

CO5: Paraphrase the importance of conservation of resources.

CO6: Play a important role in transferring a healthy environment

Pre-requisites : NIL

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

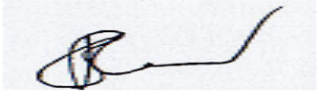
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PS0 2
CO1						S	S						M	
CO2						S	S						M	
CO3							M						M	
CO4						W	M	W					M	
CO5	M						M						M	
CO6						M	W						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES **14 Hours**

Definition, scope and importance – Need for public awareness – Forest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resources: Use and over-exploitation, deforestation, case studies. Timber extraction, mining, dams and their effects on forests and tribal people
Water resources: Use and overutilization of surface and ground water, conflicts over water, dams benefits and problems - Water conservation, rain water harvesting, watershed management
Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies
Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, case studies
Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies
Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification, Wasteland reclamation – Role of an individual in conservation of natural resources

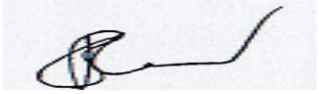
ECOSYSTEMS AND BIODIVERSITY **9 Hours**

ECOSYSTEM : Concept of an ecosystem – Structure and function of an ecosystem: Producers, consumers and decomposers, Food chain, Food web, Energy flow in the ecosystem and Ecological pyramids - Ecological succession – Introduction, types, characteristic features, structure and function of the (a) Forest ecosystem (b) Grassland ecosystem (c) Desert ecosystem (d) Aquatic ecosystems (ponds, streams, lakes, rivers, oceans, estuaries)

BIODIVERSITY : Introduction to Biodiversity – Definition: genetic, species and ecosystem diversity – Biogeographical classification of India – Value of biodiversity: consumptive use, productive use, social, ethical, aesthetic values – India as a mega-diversity nation – Hot-spots of biodiversity – Threats to biodiversity: habitat loss, poaching of wildlife, man-wildlife conflicts – Endangered and endemic species of India – Conservation of biodiversity: In-situ and Ex-situ conservation of biodiversity.

ENVIRONMENTAL POLLUTION DUE TO TEXTILE AND APPAREL INDUSTRIES **10 Hours**

Pollutants associated with dyeing, printing and finishing, intermediates, auxiliaries Causes – effects - preventive measures: Air pollution, Water pollution **(**from yarn, fabric, Wet processing and garment manufacturing processes), Noise pollution in various textile departments-Spinning,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Weaving, Sewing line, Wet processing and finishing machineries.
Solid Waste Management**:** Fibre, lint, Trash, Yarn, Fabric waste, packaging waste, accessories wastages their disposals and reuse - waste minimization – Disaster management: floods, earthquake, cyclone and landslides.

SOCIAL ISSUES AND THE ENVIRONMENT 7 Hours

From Unsustainable to Sustainable development – Urban problems related to energy – Resettlement and rehabilitation of people; its problems and concerns, case studies – Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion – Environment Protection Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Human Rights

HUMAN POPULATION AND THE ENVIRONMENT 5 Hours

Population growth, variation among nations – Population explosion – Environment and human health – communicable disease - Women and Child Welfare – Role of Information Technology in Environment and human health – Case studies.

Field Work

Visit to local area to document environmental assets- river / grassland / hill / mountain, visit to local polluted site- urban / rural / industrial / agricultural, study of common plants, insects, birds, study of simple ecosystems-pond, river, hill slopes etc.,

Theory: 45 Hours Total: 45 Hours

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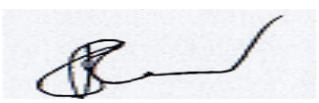

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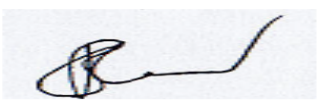

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U15MA*T*401 **Numerical Methods**

L	T	P	C
3	2	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Solve a set of algebraic equations representing steady state models formed in engineering problems

CO 2: Fit smooth curves for the discrete data connected to each other or to use interpolation methods over these data tables

CO 3: Find the trend information from discrete data set through numerical differentiation and summary information through numerical integration

CO 4: Predict the system dynamic behaviour through solution of ODEs modeling the system

CO 5: Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.

CO 6: Have the necessary proficiency of using MATLAB for obtaining the above solutions.

Pre-requisites :

1. U15MAT306/ Engineering Mathematics – II

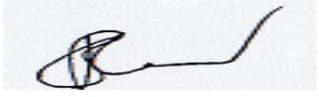
CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S											S	
CO2	S	S											S	
CO3	S	S											S	
CO4	S	S	M										S	
CO5	S	S	M										S	
CO6	S	S		S									S	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey



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INTRODUCTION **3 Hours**

Simple mathematical modeling and engineering problem solving – Algorithm Design – Flow charting and pseudocode - Accuracy and precision – round off errors

NUMERICAL SOLUTION OF ALGEBRAIC EQUATIONS **7+3 Hours**

Solution of nonlinear equations - False position method – Fixed point iteration – Newton Raphson method for a single equation and a set of non-linear equationsSolution of linear system of equations by Gaussian elimination, Gauss Jordan method - Gauss Seidel method.

CURVE FITTING AND INTERPOLATION **7+3 Hours**

Curve fitting – Method of least squares - Newton's forward and backward difference formulas – Divided differences – Newton's divided difference formula - Lagrange's interpolation – Inverse interpolation.

NUMERICAL DIFFERENTIATION AND INTEGRATION **7+3 Hours**

Numerical differentiation by using Newton's forward, backward and divided differences – Numerical integration by Trapezoidal and Simpson's 1/3 and 3/8 rules – Numerical double integration.

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS **10+3 Hours**

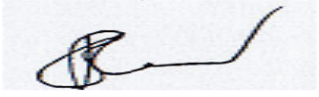
Initial value problems - Single step methods: Taylor's series method – Truncation error – Euler and Improved Euler methods – Fourth order Runge – Kutta method – Multistep methods: Milne's predictor - corrector method.

NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS (PDEs) **11+3 Hours**

PDEs and Engineering Practice – Laplace Equation derivation for steady heat conduction – Numerical solution of the above problem by finite difference schemes – Parabolic Equations from Fourier`s Law of Transient Heat Conduction and their solution through implicit schemes – Method of Lines – Wave propagation through hyperbolic equations and solution by explicit method.

Use of MATLAB Programs to workout solutions for all the problems of interest in the above topics.

Theory: 45 Hours **Tutorial: 15 Hours** **Total: 60 Hours**



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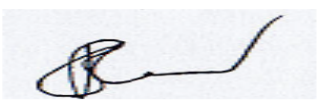

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U15TX*T*401 **Yarn Manufacturing Technology II**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Explain the basic principles of different spinning system

CO2: Compare the basis principle of different spinning system

CO3: Plan the outline spinning system based on end use applications

CO4: Calculate the production as well as draft of all the spinning systems

CO5: Modern development in all spinning system

CO6: Production of different type of yarns with different spinning system

Pre-requisites :

1. U15TXT302 Yarn Manufacturing Technology I

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S												S	
CO2			S											
CO3					S									
CO4				S										
CO5														
CO6				S			S							

Course Assessment methods

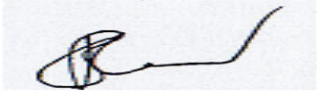
Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

RING FRAME **9 Hours**

Principle and operation- drafting system, Creels, Types of flutes, separators, builder motion Profile of ring & traveler - Speed, settings, break draft, main draft. Top roller cots & aprons specifications - Ideal yarn geometry, tension in yarn. Balloon mechanism, Traveler- lag, Yarn structure and properties. Production Calculation. Modern developments in ring frame-Auto doffer-Ecorised-Link Coner-Pin bar spacer-working concept of longer length ring frame.

COMPACT SPINNING **9 Hours**

Introduction - spinning triangle- working principles of different compact



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spinning systems-Elitwist-Comfortwin, structure and properties of compact yarns, applications of compact yarn - Techno economics of compact spinning.

ROTOR SPINNING **9 Hours**

Rotor Spinning - Operating principle, Advantages and limitations of Rotor Spinning. Raw material requirements. Machine design features- opening roller, rotor diameter, rotor speed, groove design, profile of doffing tube. Yarn characteristics, Comparison of characteristics of yarn from different spinning systems. Rotor spinning machine and its selection-Fully automatic and semi automatic.

OTHER SPINNING SYSTEMS **9 Hours**

Friction Spinning - Operating principle, Classification, Advantages and limitations of friction spinning. Air-jet spinning - operating principle, Raw material requirements-Automation in air jet spinning- Advantages and limitations. Cover Spinning - Operating principle - air vortex spinning.

DOUBLING AND FANCY YARN PRODUCTION **9 Hours**

Ring doubling machine – Working, up twister and down twister. Working of Two For One twister, principles of various fancy yarn producing methods. SIRO Spinning, Bob Tex spinning, self twist spinning: Yarn properties and applications, Advantages and limitations of these spinning systems.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Evaluation of modern spinning systems
2. Imperfection control measurers
3. Study on report preparation
4. Spinning system Comparison study
5. Effect of opening roller speed, wire angle on yarn strength.
6. Effect of different types of rotor groove on yarn quality.

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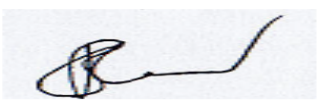

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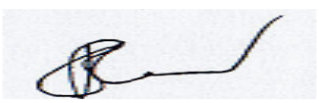
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U15TX*T*402 **Shuttleless Weaving Technology**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Generalize the functions of machine elements in unconventional weaving machines

CO2: Discuss the concept and mechanism of projectile weaving machine

CO3: Summarize the working of each elements in rapier weaving machine

CO4: Generalized the weft insertion cycle of fluid jet weaving machines

CO5: Explain the mechanism of multiphase weaving and 3-D weaving

CO6: Summarize the application of weaving in Technical Textiles

Pre-requisites :

U14TXT303 / Woven Fabric Manufacturing Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

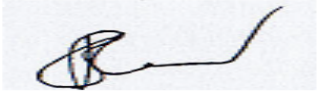
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	P O 12	PSO 1	PSO 2
CO1	S	S		M									S	
CO2	S	S		M									S	
CO3	S	S		M									S	
CO4	S	S		M									S	
CO5	S	S		M									S	
CO6	M	M		M									M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION **9 Hours**

Limitation of shuttle looms-parameters affecting productivity- Classification of shuttleless looms- Comparison of shuttle and shuttleless looms - warp and weft yarn requirement for shuttleless weaving. Weft accumulators – types- Formation of unconventional selvedges – tuck-in, leno, chain, fused and adhesive. Techno economics of shuttleless weaving.



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PROJECTILE LOOMS **9 Hours**

Gripper projectile machines: Working elements and weft insertion cycle in projectile loom-Torsion bar picking mechanism-Weft selection device-Salient features of projectile machine, Loom timing diagram. Modifications required in the machine for filament yarns. Fabric defects and remedies. Weft insertion rate and production calculation.

RAPIER LOOMS **9 Hours**

Rapier Machines: - Classification of rapier weaving machines: Flexible, Rigid rapiers- Principles of tip and loop transfer-Weft insertion cycle-Rapier drives-Salient features. Modifications required in the machine for filament yarns. Fabric defects and remedies. Weft insertion rate and production calculation.

JET LOOMS **9 Hours**

Air jet weaving Machine - Principle of air jet weaving, types of nozzles, profile reed. Air requirements. Loom timing diagram. Modifications required in the machine for filament yarns. Fabric defects and remedies. Weft insertion rate and production calculation. Principle of water jet weaving – Weft insertion system – Nozzles - Water requirements – Loom timing diagram. Modifications required in the machine for filament yarns. Fabric defects and remedies. Weft insertion rate and production calculation.

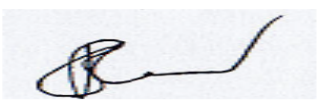
MULTIPHASE LOOMS **9 Hours**

Multiphase weaving machine – Warp and weft direction shed wave principle. Principle and operation of circular weaving machines – sectional weaving machine. 3 D Weaving – Principle of Dual directional shedding: Linear-Linear, Linear-angular method. Modifications required in the machine for filament yarns. Fabric defects and remedies in multiphase looms. Special jacquards.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Fluid transport phenomenon in jet looms
2. Energy conservation in shuttleless weaving industry
3. Production of technical fabrics using shuttleless weaving machines
4. Latest machine ranges in current manufacturer and their futures



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5. Maintenance management in weaving industry

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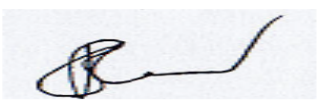

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U15TX*T*403 **Textile Pretreatment and Dyeing Technology**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss the principle and mechanism of singeing, desizing, scouring of grey fabric processing

CO2: Explain the various methods of bleaching and mercerizing of grey fabric processing

CO3: Prepare the dye recipe for colouring the various fibre/ fabric

CO4: Examine the colour fastness of the dyed fibre/ fabric

CO5: Explain the working principles of various dyeing machines

CO6: Summarize the pollution and ISO-14000 in dyeing industry

Pre-requisites :

1. U15CHT101 Engineering Chemistry
2. U15CHT204 Chemistry for Textiles
3. U15TXT201 Textile Fibers
4. U15TXT303 Woven Fabric Manufacturing Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

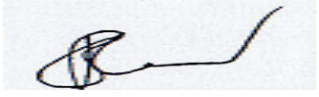
Cos	Programme Outcomes(Pos)												PSO	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S	S	W	W	W					M		S	
CO2	S												S	
CO3		M			W									
CO4				M			W							
CO5	S										W		S	
CO6	M			M									M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

SINGEING, DESIZING AND SCOURING **9 Hours**

Wet process sequences for cotton fabrics -Singeing: Objective of the



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process, types, various singeing methods, drawbacks and advantages. Desizing: Objectives, classification and mechanism of removal of starch in various methods. Efficiency of desizing. Scouring: Objectives, mechanism. Scouring of natural, manmade and blended textiles. Evaluation of scouring efficiency. Wet processing sequence for wool - Wool carbonizing. Wet processing sequence for silk- Degumming of silk.

BLEACHING AND MERCERIZATION **9 Hours**

Bleaching: Objectives of bleaching. Hypochlorite, peroxide, chlorite and per acetic acid bleaching methods and their effectiveness on various textiles. Efficiency of bleaching.

Mercerization: Objectives, physical and chemical changes in cotton. Methods; Yarn mercerization, Fabric Mercerization-Chain and Chainless mercerization, Cold and Hot mercerization. Assessment of efficiency of mercerization.

DYEING OF CELLULOSE AND PROTEIN FIBRES **9 Hours**

Colorants: Classification of Colorants, Theory of dyeing: free volume theory. Dye uptake on textiles. Properties and principle of Dye-fibre interaction and application of Direct, Reactive, Vat, Sulphur, Azoic dyes on cellulose fibres.

DYEING OF PROTEIN FIBRES, SYNTHETIC FIBRES AND BLENDS **9 Hours**

Application of Acid, Basic and Reactive dyes on wool and silk. Dyeing of polyester: Carrier, High Temperature High Pressure (HTHP), Thermosol methods. Mass coloration-Dyeing of polypropylene and nylon. Blends Dyeing: Polyester/cotton, Polyester/ Wool. Assessment of fastness properties of dyed material. Eco friendly chemicals and banned dyes.

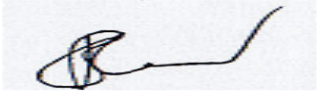
DYEING MACHINERIES **9 Hours**

Dyeing machines: Fibre dyeing machines: Loose stock, bale. Yarn dyeing machines: Hank dyeing machine, Package dyeing machine; Cone, Beam. Fabric dyeing machines: Jigger, Winch, Jet, Soft flow, Infra Red dyeing, Padding mangles. Garment dyeing machines: Paddle and Drum.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Process Control and Safety in Chemical Processing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2. Pollution Prevention Studies in the Textile Wet Processing Industry
3. Good Practice of water and Chemical use in the Textile Dyeing and Finishing industry

REFERENCES

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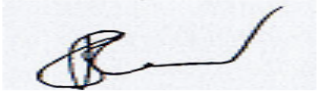

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U15TX*T*404 **Physical Properties of Textile Fibres**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Outline the fundamentals of fibre structures and various properties of polymer system.

CO2: Interpret the relationship between various parameters and the moisture properties of fibres

CO3: Explain about the concepts of mechanical properties of fibres

CO4: Describe the optical and frictional parameters related with fibre properties

CO5: Discuss about the fundamentals and measurement of electrical and thermal properties of fibre

CO6: Summarize the tensile properties of various textile fibres

Pre-requisites :

1. U15TX*T*301/Manufactured Fibre Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

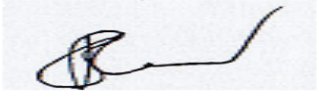
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	P O 12	PSO 1	PSO 2
CO1	S												S	
CO2		M											M	
CO3		M											M	
CO4				M										
CO5		S											S	
CO6				M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

STRUCTURE OF FIBRES **9 Hours**

Basic requirements for fiber formation: Intra- and inter-molecular forces, degree of order, degree of orientation of molecular chains, crystalline and



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amorphous regions – Influence of molecular structure on crystallization. Models of fibre structure. Similarities and differences amongst the structural features of natural and man-made fibres. Analysis of charts from X-ray diffraction methods.

MOISTURE ABSORPTION PROPERTIES OF FIBRES 9 Hours

Absolute humidity and relative humidity- moisture content and regain of different fibres- Moisture regains curves, Hygroscopic nature of fibres. Hysteresis in moisture absorption. Equilibrium absorption - Effect of fibre structure – hydrophilic groups and non-crystalline regions on Moisture absorption. Conditioning of fibers –Conditioning process, factors influencing rate of conditioning, effect of conditioning on fibre properties.

MECHANICAL PROPERTIES OF FIBRES 9 Hours

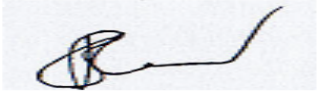
Definitions –Load elongation, breaking strength, breaking extension, tensile Stress, tensile strain, mass specific stress, yield point, initial modulus, work of rupture and work factor. Stress-strain curves for various textile fibres and their significance. Mechanical development of large strain. Elastic properties – elasticity, elastic recovery and its relation to stress and strain, work recovery, typical values of elastic recovery and work recovery for various textile fibres. Ways of studying relaxation phenomenon. Mechanical conditioning of fibres – advantages. Time effects – stress relaxation and creep phenomena. Torsional rigidity – its relation to other fibre properties, measurement techniques. Flexural rigidity – its relation to other fibre properties, measurement techniques.

OPTICAL AND FRICTIONAL PROPERTIES 9 Hours

Refractive index of fibres Birefringence – measurement techniques, effect of factors like fibre orientation, density and regain. Optical orientation factor, its relation with refractive index and birefringence. Reflection of light – specular and diffused reflection, lustre, lustre index, factors influencing lustre. Absorption of light – dichroism, dichroic ratio. Theories of fibre friction-Amonton's law; Measurement: Bowden' smodel, Capsten's methods; Lindberg's inter fibre friction Yarn to yarn abrasion and friction; friction of wool.

ELECTRICAL AND THERMAL PROPERTIES 9 Hours

Static electricity – generation of static charge and measurement, problems encountered during Processing, elimination techniques. Electrical resistance of fibres, measurement of resistance in fibres, factors influencing electrical resistance. Dielectric properties, factors influencing di-electricity. Thermal properties – specific heat, thermal conductivity,



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thermal expansion and contraction, structural changes in fibres on heating, heat setting of various synthetic fibres.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Study about moisture content and moisture regain of natural fibres.
2. Study about Tm and Tg of various thermoplastic fibres.
3. Study on density of various natural and man-made fibres.

REFERENCES

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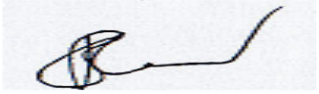

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U15TX*P*401 **Yarn Manufacturing Technology Laboratory II**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Calculate the production and speed of ring frame

CO2: Outline the main gearing diagram of ring frame, open-end spinning machine, fancy doublers and TFO

CO3: assess the effect of key components on yarn quality

CO 4: calculate the draft and draft distribution

CO 5: calculate the production, twist and draft constants

CO 6: know about the settings between various zones of spinning preparatory machines

Pre-requisites :

1. U15TXP301Yarn Manufacturing Technology Laboratory I

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1				S										S
CO2					S									S
CO3					S									S
CO4					S									S
CO5					S									S
CO6					S									M

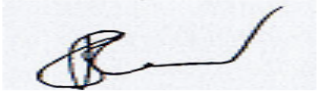
Course Assessment methods

Direct	Indirect
1. Observation 2. Lab Exercises 3. Model Practical Examination 4. End Semester Practical Examination	1. Course end survey

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. Determination of draft distribution & production calculation in ring



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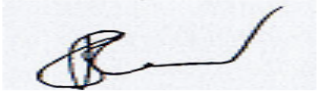
frame

2. Production of yarn with given specification.
3. Analysis of ring frame builder motion and calculation of winding length & chase height.
4. Effect of spacer on yarn strength in ring frame.
5. Effect of twist on yarn strength in ring frame
6. Production of yarn using compact spinning.
7. Determination of yarn TPI with given specification.
8. Calculate of production & twist calculation in rotor spinning.
9. Production of yarn using rotor spinning with given specification.
10. Production of different types of double yarns using ring doubler and calculate of resultant count.
11. Production of different types fancy yarn using fancy doubler and calculation of resultant count.
12. Production & twist calculation in TFO with 3 positions and its effect on yarn strength.

Practical: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Production of different counts of yarns by varying the draft keeping the hank of roving constant.
2. Full doff study in ring frame.
3. Design and development of ring frame builder motion cam using wooden block.
4. Production of different types of fancy yarns in fancy doubler.



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U15TX*P*402 **Textile Pretreatment and Dyeing Technology Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Perform the pretreatment of grey fabric processing
CO2: Prepare the dye recipe for colouring the various fibre/ fabric
CO3: Perform the dyeing of pretreated fabric
CO4: Examine the effect of chemical auxiliary on dyeing
CO5: Examine the colour fastness of the dyed fibre/ fabric
CO6: Summarize the textile effluent treatment in dyeing industry

Pre-requisites :

U15CHT204 Chemistry for Textiles
U15CHP101 Chemistry Laboratory
U15TXT201 Textile Fibers
U15TXP201 Fiber Analytical Laboratory

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

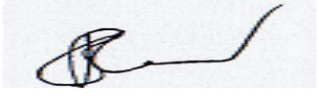
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S				S		S			W				S
CO2	S				S		S							S
CO3	M	M			M		M							M
CO4	M	M			M		M							M
CO5				W	S		S							S
CO6	M	M			M		M							M

Course Assessment methods

Direct	Indirect
1. Observation 2. Lab Exercises 3. Model Practical Examination 4. End Semester Practical 5. Examination	1. Course end survey

List of Experiment(s)

(Experiment beyond the syllabus should be taken)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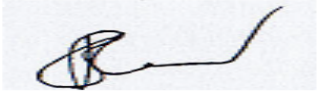
1. Desizing of grey fabric with enzyme and determine the desizing efficiency / Tagawa method
2. Scouring of desized cotton fabric and determine the scouring loss%, drop absorbency and degree of impurities.
3. Bleaching of cotton fabric with hypochlorite agent and measurement of the whiteness index, and change in mechanical properties.
4. Bleaching of cotton fabric with hydrogen peroxide agent and measurement of the whiteness index, and change in mechanical properties.
5. Cold and Hot mercerization of cotton yarn and measurement of the BAN, and change in mechanical properties.
6. Dyeing of cotton using direct dyes and studying the influence of Temperature, Time and Electrolyte on dye adsorption.
7. Dyeing of cotton using vat dyes and assessment of fastness properties of dyed material.
8. Dyeing of cotton using hot and cold brand reactive dyes and determine dye exhaustion % on dye bath.
9. Dyeing of cotton using naphthol dyes and assessment of fastness properties of dyed material.
10. Dyeing of polyester using disperse dye with carrier and assessment of fastness properties of dyed material.
11. Dyeing of silk using acid dyes and assessment of fastness properties of dyed material.
12. Dyeing of cotton/polyester blended material with reactive/disperse dye and assessment of fastness properties of dyed material.

Practical: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Carbonization of P/C blends.
2. Shade card preparation for Cotton, Polyester and Silk with varying dye shade%, temperature and auxiliary chemicals.
3. Dyeing of cellulosic material with tie & dye method.
4. Dyeing of Cotton/ Silk/ Wool with natural dye



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U15CSP202 **PROBLEM SOLVING TECHNIQUES**

L	T	P	C
1	0	2	2

Course Objectives:

To introduce students to the foundations of computing, programming and problem-solving.

To develop basic programming skills necessary for engineering education.

Course Outcomes (CO):

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

CO1	Write a pseudo code for the identified problem	S
CO2	Translate the pseudo code into an executable program	S
CO3	Validate the program for all the possible inputs.	S
CO4	Identify an appropriate approach to solve the problem	S
CO5	Use different data structures	S

Pre-requisite: Nil

CO/PO Mapping
(S/M/L indicates strength of correlation) S-Strong, M-Medium, L- Low

COs	PO												PSO		
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2	PSO3
CO1	S	M		M					L						
CO2	S	M		M	S				L						
CO3	S	M		M					L						
CO4	S	M		M					L						
CO5	S	M		M					L						

Course Assessment Methods:

Direct	Indirect
• Model Lab Exam • End Semester Practical Exam	• Course Exit Survey

Course Content:

Problem solving

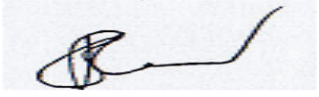
General problem solving concepts, approaches and challenges, problem solving with computers, data structures

Approaches

Solve by analogy, Decompose the task into smaller subtasks, Building block approach, merging solutions, Algorithmic thinking, Choice of appropriate data structures, Implementation of the Pseudo-code, implementing the code, testing the solution

Introduction to program structure

Variables and constants, local and global variables, expressions, control structures, selection structures, arithmetic, relational and logical operators, Conditional and looping statements,



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programming in manageable pieces: program modules, subprograms, functions and recursion

Problem to code approach

Problem statement, problem analysis, program design, program code, program test

Sorting (Numbers and Strings)

Bubble sort, Insertion sort, Selection Sort

Searching (Numbers and Strings)

Binary search, Random search, Search for Max-Min

References:

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List of Experiments:

I **Problems based on Numbers:**

1) Write a program to compute the factorial of a given number.

Test Case	**1**	**2**	**3**	**4**
Input	8	1	0	-5
Output	40320	1	1	Invalid

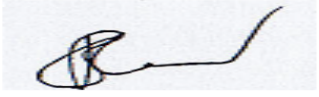
2) Write a program to find all numbers between 2000 and 3000 (both inclusive) which are divisible by 7 but not a multiple of 5. All such numbers are to be printed in a comma separated sequence on a single line.
Output: 2002, 2009, 2016, … 3199

II **Problems based on Data Processing:**

1) Write a program that takes an IP address of the form P.Q.R.S as input, where P, Q, R and S are decimal numbers in the range 0 to 255, and prints the class of the address as indicated in the table below.

Value of P	**Class**
1 – 126	A
128 – 191	B
192 – 223	C
224 – 239	D
240 – 254	E

Test Case	**1**	**2**	**3**	**4**	**5**
Input	224.220.206.91	126.220.206.91	127.0.0.1	0.100.100.100	255.255.255.255
Output	Class D	Class A	Invalid	Invalid	Invalid



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2) Write a program to check if a given number is a stepping number or not.
Note: A number is called a stepping number if every adjacent digit, except those separated by commas, differs by 1. A stepping number can't be a 1-digit number; it must be at least a 2-digit number. For example 45 and 43,545 are valid stepping numbers, but 890,098 is not a stepping number because the difference between numbers 9 and 0 cannot be considered as 1.

Test Case	1	2	3	4	5
Input	567	89,432	780,023	7	49
Output	Valid	Valid	Invalid	Invalid	Invalid

3) Write a program that takes a large English text file as input and counts the number of occurrences of each alphabet in the text.
(i) Display the alphabet with maximum and minimum number of occurrences.
(ii) Swap the alphabets with maximum and minimum occurrences to obtain a modified text file.
(iii) Take the output of (ii) as input and get back the original text file.

Test case:
Input: A text file with 3000 characters - in which 500 are e and 5 are z.
Output: (i) Maximum occurrence – e and Minimum occurrence – z
(ii) The characters e and z in the text file are swapped to get a modified text
(iii) The original text file

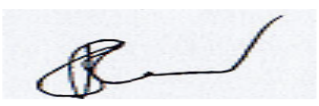
4) The property of Exclusive OR operation (i) Any X ⊕ X is 0 (ii) Any X ⊕ 0 is X. An Encryption and Decryption scheme using this property is given below:
Encryption Algorithm: Cipher Text (C) = Plain Text (P) ⊕ Key (K)
Decryption Algorithm: Plaint Text (P) = Cipher Text (C) ⊕ Key (K)
Answer the following questions:
(i) For any given P and the corresponding C, find K [K = P ⊕ C]
(ii) For any given C and the corresponding key K, find P [P = C ⊕ K]

Test Case		1	2	3
Input	P	1 1 0 0 1 1 0 0	0 0 1 1 1 1 0 0	1 1 1 1 1 1 1 1
	C	0 0 1 1 0 0 1 1	1 0 1 0 1 0 1 1	1 1 1 1 1 1 1 1
Outp ut	Key	1 1 1 1 1 1 1 1	1 0 0 1 0 1 1 1	0 0 0 0 0 0 0 0
	New cipher text	0 0 0 0 0 0 0 0	1 1 0 0 1 1 1 1	11 11 1 1 1 1
	Plaintext (New cipher text ⊕Key)	1 1 1 1 1 1 1	0 1 0 1 1 0 0 0	1 1 1 1 1 1 1 1

5) Write a function num_atoms( ) that takes the weight of the element in grams and its atomic weight as parameters and calculates the number of atoms in n grams of an element.
Note: Atomic weight of gold (Au) 196.97 with units in grams/mole.
Atomic weight of carbon=12.001, Atomic weight of hydrogen=1.008
Avogadro's number is a constant, 6.022×10^{23}
Test Case 1:
Amount of gold =4.5grams, n = 0.45/197 = 2.28×10^{-3} , 1 mol = 6.022×10^{23} atoms
Total number of atoms =$6.022 \times 10^{23} \times 2.28 \times 10^{-3} = 13.756 \times 10^{20}$

6) Define a procedure histogram() that takes a list of integers and prints a histogram to the screen.

Test Case	1	2	3
Input	histogram([4])	histogram([-3, 6, 12])	histogram([2, 0, 3])
Output	****	****** **********	** ***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7) Write a program to solve this classic ancient Chinese puzzle: We count 35 heads and 94 legs among the chickens and rabbits in a farm. How many rabbits and how many chickens do we have?

8) In cryptography, a Caesar Cipher is a very simple encryption technique in which each letter in the plain text is replaced by a letter some fixed number of positions down the alphabet. For example, with a shift of 3, A would be replaced by D, B would become E, and so on. ROT-13 ("rotate by 13 places") is a widely used example of a Caesar cipher where the shift is 13. Write a program to implement an encoder/decoder of ROT-13.

Test Case	**1**	**2**
Input	Roy eats	Deer stays back
Output	Ebl rngf	Qrre fgnlf onpx

9) Newton's Second Law of motion is expressed as $F = m \times a$, where F is force, m is mass and a is acceleration. Write a program to calculate the acceleration if mass of an object and the force on that object are given as input. Display the result to the user.

Test Case	**1**	**2**
Input	Mass=5, Force =1050	Mass =3, Force=564
Output	210	188

III **Problems based on Strings and Functions:**

1) Write a program (using functions) that takes a long sentence with multiple words as input and rearranges the words in the sentence in the reverse order.

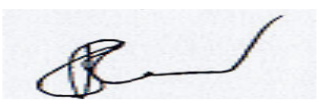
Test Case	**1**	**2**	**3**
Input	My name is python	Kumaraguru College of Technology	Problem based on Strings
Output	python is name My	Technology of College Kumaraguru	Strings on based Problem

2) Write a program that accepts a sequence of 4 digit binary numbers as its input, which are comma separated and prints as output, only the binary numbers that are divisible by 5 in the same format.

Test Case	**1**	**2**	**3**
Input	0100,0011,1010,1001,1100,1001,0101	0010, 1111, 1100	1110, 1000, 1110
Output	1010, 0101	1111	Not divisible by 5

3) Write a program that accepts a sentence as input and calculates the number of letters, digits and special characters.

Test Case		**1**	**2**
Input sentence		hello world! @$ 123	There is a laptop with #CS123…
Output	Letters	10	20



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	Digits	3	3
	Special Characters	3	4

4) Write a String tokenizer program that accepts a file as input and counts the number of lines and words and prints the same as output. (Note: You can use wc command also)

Test Case	Input Sentences	No. of lines	No. of words
1	Correctness and efficiency issues in programming, time and space measures Basics of imperative style programming Assertions and loop invariants	3	19
2	greedy algorithms are not always the optimal process, even after adjusting the order of their processing	2	16

5) Write a "space_correction()" function that takes a string (sentence) as input and examines it for space characters. If there are two or more continuous space characters in the sentence then they are deleted, so as to have only one space character between words. It also examines the end of sentences; if the period (full stop) is directly then followed by a letter it inserts a space after the period.

Test case I	Input	space_correction("This is very funny and cool.Indeed!")
	Output	"This is very funny and cool. Indeed!"
Test case II	Input	space_correction("A flow chart provides appropriate steps to be followed.it is a program design tool")
	Output	A flow chart provides appropriate steps to be followed. it is a program design tool

6) Write a function printValue() that can accept two strings as input and prints the longer of the two. If two strings have the same length, then the function should print both the strings.

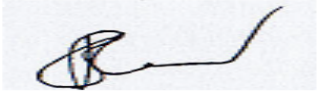
Test case	1	2	3
Input	printValue("one","three")	printValue("laptop","laptop")	printValue("ten","so")
Output	three	laptop laptop	ten

7) An anagram is a type of word play, the result of rearranging the letters of a word, using all the letters in the original word exactly once; e.g., uleb = blue. Write a program that accepts the jumbled characters from user and choose the correct word from the given list by rearranging the characters in the word. Display the word, if it is available in the given list of word. Assume that the list of words is set of colors like {brown, blue, green etc}

Test case	1	2	3
Input	onwbr	reegn	etihw
Output	brown	green	white

8) Assuming that we have some email address of the form "username@companyname.com". Write a program to print the user name of a given email address. Both user names and company names consists of letters only.

Test case	1	2
Input	inboxcse@gmail.com	csedeptgroups#yahoomail.com



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Output	inboxcse	Invalid email address

9) Write a program that takes a string as input and prints the number of occurrences of each character in the string.

Test case	**1**	**2**
Input	abbaca	icici
No. of occurrences	a=3,b=2,c=1	i-3 , c-2

10) Write a recursive function and an iterative function to compute the Fibonacci sequence. Compare the performance of both functions.

11) Write a version of a palindrome recognizer that also accepts phrase palindromes such as "Go hang a salami I'm a lasagna hog.". (Note: punctuation, capitalization and spacing are ignored)

Test case	**1**	**2**
Input	i am tired	was it a rat i saw
Output	Not a palindrome	Palindrome

12) In English, a sentence using present continuous is formed by adding the suffix *-ing* to the verb.(example: go→ going).

A simple set of heuristic rules can be given as follows:

1. If the verb ends in *e*, drop the *e* and add *ing* (if not exception: be, see, knee, etc.)
2. If the verb ends in *ie*, change *ie* to *y* and add *ing*
3. For words consisting of consonant-vowel-consonant, double the final letter before adding *ing*
4. By default, just add *ing*

Write a function "make_ing_form()" which converts a given verb to present continuous form. Test your function with words such as lie, see, move and hug.

Test case	**1**	**2**	**3**	**4**
Input	believe	tie	sit	walk
Output	believing	tying	sitting	walking

13) A pangram is a sentence that contains all the letters of the English alphabet at least once. Write a function to check if a given sentence is a pangram or not. If the given sentence is not a pangram print the missing letters.

Test case	**1**	**2**
Input	*The quick brown fox jumps over the lazy dog*	*The quick brown rat jumps over the lazy cat*
Output	Pangram	Not a Pangram Missing letters*:f,x,d,g*

14) Write a function "calc_weight_ on_ planet()" that takes two arguments - weight on Earth and the surface gravity of the other planet and calculates the equivalent weight on the other planet. (Note: The surface gravity of Jupiter is 23.1 m/s^2 (approx) and that of Earth is 9.8 m/s^2(approx), Weight = Mass x Surface gravity)

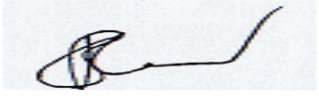
Test case	**1**	**2**
Weight on Earth(lb)	*127.2*	*-100*
Weight on Jupiter	297.6	*Invalid*

15) Write a program to check the validity of passwords entered by users.

Following are the criteria for a valid password:

1. At least 1 letter between [a-z]
2. At least 1 letter between [A-Z]
3. At least 1 number between [0-9]
4. At least 1 character from [$#@]
5. Minimum length of password: 6
6. Maximum length of password: 12

Your program should accept a sequence of passwords that are comma separated and check them for validity based on the criteria given above and print the valid passwords only in the comma separated form.



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Test case	1	2	3
Input	ABd1234@1, a F1#,2w3E*,2We3345	HFd1244@1, a F1#,2w3E*,2We334#5	ABd12342, a F1#,2w2B*,2We3345
Output	ABd1234@1	HFd1244@1, 2We334#5	Invalid

V **Problems based on Data Structures:**

1) Write a program that maps a list of words to a list of integers (representing the lengths of the corresponding words). Write it in three different ways: 1) using a for-loop, 2) using the higher order function map (), and 3) using list comprehensions
2) Write a program that prompts the user to enter the name of the fruit and its weight. The program should then display the information in the same form but in the alphabetical order.

Test case	1	2	3
Input	Kiwi, 4 kg, Apple, 6 kg, Banana, 11 kg	Gowva, 4 kg, Apple, 6 kg, Banana, 11 kg	Carrot, 4 kg, Kiwi, 6 kg, Banana, 11 kg
Output	Apple, 6 kg, Banana, 11 kg, Kiwi, 4 kg	Apple, 6 kg, Banana, 11 kg, Gowva, 4 kg	Banana, 11 kg, Carrot, 4 kg, Kiwi, 6 kg

3) Write a program that prompts the user to enter a list of words and stores them in a list. Create a new list that retrieves words from the first list such that first letter occurs again within the word. The program should display the resulting list.

Test case	1	2
Input	Baboon, List, Duplicate	Frog, Snake, Lizard
Output	Baboon	No Such word exist in list

4) List Overlap Solution:
Consider the following lists, A = [1,1,2,3,5,8,13,21,34,55,89] &
B = [1,2,3,4,5,6,7,8,9,10,11,12,13]
Write a program that returns a list that contains only the elements that are common between the lists (without duplicates). Make sure your program works on two lists of different sizes.
Hint: (A intersection B)

Test cases:
Input the following lists,
A = [1,1,2,3,5,8,13,21,34,55,89] B = [1,2,3,4,5,6,7,8,9,10,11,12,13]
Output: A ∩ B= [1,2,3,5,8,13]

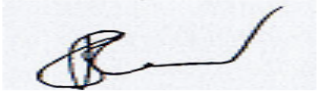
VI **Problems based on Sorting:**

1) Write a program to sort the (name, age, score) tuples in ascending order where name is string, age and score are numbers. The tuples are input using the console. The sort criteria are:
   a. Sort based on name
   b. Then sort based on age;
   c. Then sort by score
   d.

Test case	1	2
Input	Tom,19,80 John,20,90 Jony,17,91	Jony,17,91 Jony,17,93 Json,21,85
Output	[('John', '20', '90'), ('Jony', '17', '91'), ('Jony', '17', '93'),('Tom', '19', '80')]	[('Jony', '17', '91'), ('Jony', '17', '93'), ('Json', '21', '85')]

2) Write a program that accepts a sequence of words that are hyphen separated as input and prints the words in a hyphen-separated sequence after sorting them alphabetically.

Test case	1	2	3
Input	green-red-yellow-black-white	red-yellow-black	green-yellow-white
Output	black-green-red-white-yellow	black -red-yellow	green-white-yellow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VII **Problems based on Divide and Conquer:**

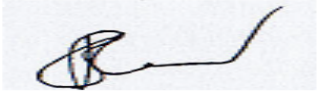
1) Write a program for binary search using arrays

Test case	**1**	**2**
Input	4, 7,8,11,21	4, 7,8,11,21
Enter the number to be search	11	18
Output	The number is present	The number is not present

VIII **Problem Solving by Backtracking:**

1) Write a program to solve the 4-Queen's Problem.

Total Hours:24



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U15GHP 401- PROFESSIONAL VALUES

(Common to all branches of Engineering and Technology)

L	T	P	C
1	0	0	1

Objectives

1. To sensitize students about being professional
2. To sensitize about the importance of being ethical in one's profession
3. To understand various leadership theories
4. To understand the concept of karma yoga (Self less Work)
5. To be aware of the current strengths and weakness and how to develop on strengths

Course outcomes:

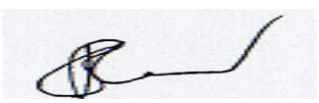
After successful completion of the course, the student would be able to:

1. The Students shall acquire knowledge on the Clarity, courage, confidence, commitment, compassion this required for a good professional
2. The Students shall understand the concept of Karma Yoga and lead his/her life accordingly
3. The Students shall understand the importance of ethics in ones profession and practice it
4. The Students shall get acquainted with leadership theories and use them in his/her profession appropriately
5. The Student shall learn how to be an empowered professional and how to empower colleagues

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO10	PO11	PO12	PSO 1	PSO 2
CO1		M	W			W	M	M	M			M		
CO2		W				M	S	M	M			S		
CO3					M		S	S	W	W		M		
CO4		W				M	M	M	S	W		M		
CO5		W				M	M	W	M			M		



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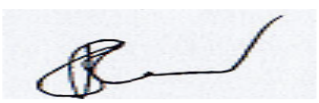
Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioural Assessment

Introduction to Professional Values	1 Period
Concept of Integral Karma Yoga	3 Periods
Professional Ethics	3 Periods
Eastern and Western Leadership Theories	2 Periods
Empowerment of a Professional	4 Periods
Advanced Contemplative Practices with Demonstrations	2 Periods
	Total Periods: 15

References Books:

1. Rishabhchand, ***"Integral Yoga of Sri Aurobindo"*,** Sri Aurobindo Ashram Publication Department, Pondicherry, Published 2001.
2. Charles E Harris, **"*Engineering Ethics: Concepts and Cases*",** 4th edition, Western Michigan University, Published 2009.
3. Devdas Menon, **"*Spirituality at Work*",** professor of structural engineering at IIT Madras.
4. Ameeta Mehra, **"*Karma Yoga: Perfection in Work*",** The Gnostic Centre, New Delhi, Published 2000.
5. Winthrop Sargeant,"***The Bhagavad Gita"***, State University of New York, Published 1994.
6. D.R Kiran, ***"Professional Ethics& Human Values"***, The Mc Graw Hill/BSP Books, Published 2013.
7. S. Bhaskar, ***"Professional Ethics& Human Values"***, The Aunradha Agencies, Chennai, Published 2005.
8. Keith Ward & Cliff Bowman, ***"Extraordinary performance from ordinary people",*** Routledge, Published 2007.
9. Stephen Robbins, "Organization Behavior", The Prentice Hall; 15 editions, 2012.



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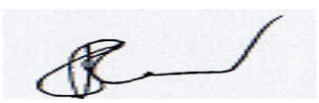
SEMESTER V



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U15GS*T*004 **OPERATIONS RESEARCH**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Apply linear programming model and assignment model to domain specific situations

CO2: Analyze the various methods under transportation model and apply the model for testing the closeness of their results to optimal results

CO3: Apply the concepts of PERT and CPM for decision making and optimally managing projects

CO4: Analyze the various replacement and sequencing models and apply them for arriving at optimal decisions

CO5: Analyze and apply appropriate inventory techniques in domain specific situations.

CO6: Analyze and apply appropriate queuing theories in domain specific situations

Pre-requisite:

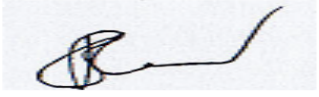
NIL

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S		S									S	
CO2	S	S		S									S	
CO3	S	S		S							S		S	
CO4	S	S		S									S	
CO5	S	S		S									S	
CO6	S	S		S									S	

Course Assessment methods:

Direct		Indirect
1.	Assignment	1. Course End Survey
2.	Internal Test	
3.	Group presentation	
4.	End Semester Examination	



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LINEAR MODEL **9 Hours**

The phases of OR study – formation of an L.P model – graphical solution – simplex algorithm – artificial variables technique (Big M method, two phase method), duality in simplex

TRANSPORTATION AND ASSIGNMENT PROBLEM **9 Hours**

Transportation model – Initial solution by North West corner method – least Cost method – VAM. Optimality test – MODI method and stepping stone method. Assignment model – formulation – balanced and unbalanced assignment problems

PROJECT MANAGEMENT BY PERT & CPM **9 Hours**

Basic terminologies – Constructing a project network – Scheduling computations – PERT - CPM – Resource smoothening, Resource leveling, PERT Cost

REPLACEMENT AND SEQUENCING MODELS **9 Hours**

Replacement policies - Replacement of items that deteriorate with time (value of money not changing with time) – Replacement of items that deteriorate with time (Value of money changing with time) – Replacement of items that fail suddenly (individual and group replacement policies).

Sequencing models- n job on 2 machines – n jobs on 3 machines – n jobs on m machines, Traveling salesman problem

INVENTORY AND QUEUING THEORY **9 Hours**

Variables in inventory problems, EOQ, deterministic inventory models, order quantity with price break, techniques in inventory management.
Queuing system and its structure – Kendall's notation – Common queuing models - M/M/1: FCFS/∞/∞ - M/M/1: FCFS/n/∞ - M/M/C: FCFS/∞/∞ - M/M/1: FCFS/n/m

Theory :45 Hours **Total Hours: 45**

References

1. Taha H.A., "Operation Research", Pearson Education
2. Hira and Gupta "Introduction to Operations Research", S.Chand and Co.2002
3. Hira and Gupta "Problems in Operations Research", S.Chand and Co.2008
4. Wagner, "Operations Research", Prentice Hall of India, 2000
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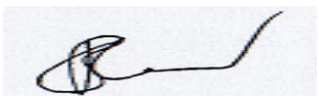

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U15GST006 **Product design and development**
(Common to all branches)

L	T	P	C
3	0	0	3

OBJECTIVES:

- Understand the basic concepts of product design and development.
- Know the implications in product architecture and the importance of industrial design.
- Understand prototyping basics and influence of diverse factors on project success.

COURSE OUTCOMES:

CO1: Apply concepts of product development and outline product planning process

CO2: Apply relative importance of customer needs in establishing product specifications

CO3: Identify concept generation activities and summarize the methodology involved in concept selection and testing

CO4: Outline supply chain considerations in product architecture and understand the industrial design process

CO5: Apply design for manufacturing concepts in estimating manufacturing costs

CO6: Apply principles of prototyping in product development economics and highlight importance of managing projects

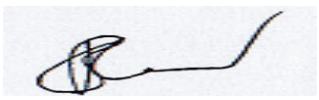
Pre-requisite: Nil

CO/PO Mapping
S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	M		M		M					W			M	
CO2			M										M	
CO3	M		M										M	
CO4			S			W				M	M		S	
CO5			S		M	M							S	
CO6					M				M		S		M	

Course Assessment methods:

Direct		Indirect	
1	Assignment	1	Course End Survey
2	Internal Test		
3	Group presentation		
4	End Semester Examination		



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Course Content

INTRODUCTION - DEVELOPMENT PROCESSES AND ORGANIZATIONS – PRODUCT PLANNING 9 Hours

Characteristics of successful product development to Design and develop products, duration and cost of product development, the challenges of product development.

A generic development process, concept development: the front-end process, adapting the generic product development process, the AMF development process, product development organizations, the AMF organization. The product planning process, identify opportunities. Evaluate and prioritize projects, allocate resources and plan timing, complete pre project planning, reflect all the results and the process.

IDENTIFYING CUSTOMER NEEDS - PRODUCT SPECIFICATIONS 9 Hours

Gathering raw data from customers, interpreting raw data in terms of customer needs, organizing the needs into a hierarchy, establishing the relative importance of the needs and reflecting on the results and the process. Specifications, establish specifications, establishing target specifications setting the final specifications.

CONCEPT GENERATION - CONCEPT SELECTION - CONCEPT TESTING 9 Hours

The activity of concept generation clarify the problem search externally, search internally, explore systematically, reflect on the results and the process, Overview of methodology, concept screening, concept scoring, caveats. Purpose of concept test, choosing a survey population and a survey format, communicate the concept, measuring customer response, interpreting the result, reflecting on the results and the process.

PRODUCT ARCHITECTURE - INDUSTRIAL DESIGN - DESIGN FOR MANUFACTURING 9 Hours

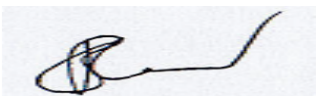
Meaning of product architecture, implications of the architecture, establishing the architecture, variety and supply chain considerations, platform planning, related system level design issues.

Assessing the need for industrial design, the impact of industrial design, industrial design process, managing the industrial design process, is assessing the quality of industrial design. Definition, estimation of manufacturing cost, reducing the cost of components, assembly, supporting production, impact of DFM on other factors.

PROTOTYPING - PRODUCT DEVELOPMENT ECONOMICS - MANAGING PROJECTS 9 Hours

Prototyping basics, principles of prototyping, technologies, planning for prototypes, Elements of economic analysis, base case financial mode,. Sensitive analysis, project trade-offs, influence of qualitative factors on project success, qualitative analysis. Understanding and representing task, baseline project planning, accelerating projects, project execution, postmortem project evaluation.

Theory: 45 hours **Total hours: 45**



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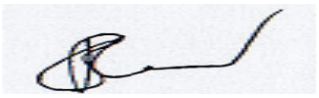
1. Karl Ulrich,T, Steven Eppinger, D, “Product Design and Development”, McGrawHill, 2015.
2. Chitale, AK, Gupta, RC, “Product Design and Manufacturing” PHI, 2013.
3. Timjones, “New Product Development:An Introduction to a multifunctional process”, Butterworth-Heinemann, 1997.
4. Geoffery Boothroyd, Peter Dewhurst and Winston Knight,A, “Product Design for Manufacture and Assembly”, CRC Press, 2011.



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U15TX*T*501 **KNITTING TECHNOLOGY**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Describe the concept of knitting

CO2: Summarize the working Principle of plain, rib and interlock knitting machine

CO3: Examine the Weft knitted structures

CO4: Describe the fundamentals and working of warp knitting machine

CO5: Examine the basic warp knitted structures

CO6: Summarize the concept of seamless knitting machine

Pre-requisites :

1. U15TXT401 Yarn Manufacturing Technology II

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

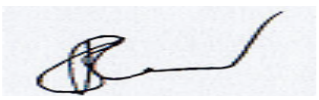
Cos	Programme Outcomes(Pos)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	M												M	
CO2	S		M										S	
CO3			M	S						M				
CO4		S			M									
CO5	S		M										S	
CO6	S		M										S	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Internal test III 4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	1. Course end survey

INTRODUCTION **9 Hours**

Concept of knitting – Weft knitting, warp knitting - Comparison between woven and knitted fabric. Comparison of warp and weft knitting -Knitting needles: spring beard, latch, compound needles, Knitting cycle of latch, spring bearded and compound needle- Classification of knitting machines. - Yarn quality requirements for weft knitting.



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WEFT KNITTING **9 Hours**

Knitting Elements: Cylinder, knitting cam, sinker, feeder, stop motions. Working of plain, rib and interlock knitting machine. Pattern wheel, pattern drum, punched steel tape needle selection mechanism - Electronic Jacquard knitting machines. Basic principles and elements of flat knitting machines- Different types of flat knitting machines; mechanical and computerized knitting machines.

WEFT KNITTED STRUCTURES **9 Hours**

Weft knit structures-Technical terms and symbolic representation of weft knit structures-Characteristics of plain, rib, Interlock, purl knit structures- Fundamentals of formation of knit, tuck and float stitches- Derivatives of weft knit structures: lacoste, accordion and check effect -Faults in knitted fabrics and their causes and remedies - dimensional parameters such as stitch length, WPI, CPI, stitch density, GSM, Tightness factor-spirality-Production calculations of weft knitting.

WARP KNITTING **9 Hours**

Warp knitting machines: needle bar, sinker bar, guide bar –pattern wheel –chain link-Warp knitting fundamentals- Knitting cycle for warp knitting- closed lap and open lap stitches – Raschel, compound needle and Tricot knitting machines- Comparison of raschel and tricot knitting machines. Materials for warp knitting-direct warping and indirect warping for warp knitting. Rack, run-in, quality,production calculations of warp knitting.

WARP KNITTED STRUCTURES **9 Hours**

Representation of warp knit structures – chain link notation – basic warp knitted structures- single for fabrics; Chain or pillar stitch and atlas lap - Two bar structures; Full tricot-Locknit-Reverse locknit-Satin.Application of weft and warp knit fabric in Technical Textiles. Seamless knitting; working and advantages.

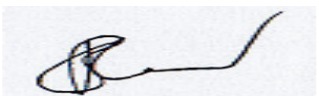
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. The Effect of Yarn Friction on Yam Tensions in Knitting and Loop Formation
2. The Effect of Input Tension and Cam Setting on Loop Formation
3. Application of knitted structure in auto motive.

REFERENCES

1. D. B Ajgaonkar., “Knitting technology” Universal publication corporation, Mumbai, 1998.
2. Dr.N.Anbumani., “Knitting Fundamentals, Machines, Structures and Developments”, New Age International, 2006.
3. Chandrasekhar Iyer, Bernd Mammel and Wolfgang Schach, “Circular knitting”, Meisenbach Gmbh, Bamberg, 1995.
4. D.J. Spencer., “Knitting technology”, Textile Institute Manchester, 2005.
5. Samuel Raz., “Warp knitting production”, Melliand Textilberichte Gmbh, 1987.



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6. Samuel Raz., “Flat Knitting Technology”, C. F. Rees GmbH, 1993
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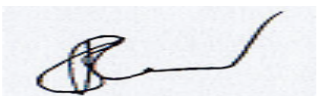

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U15TX*T*502 **Woven Fabric Structure and Design**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Design various weave structures
CO2: Analyze colour and weave effects
CO3: Draw pile and corded structures
CO4: Illustrate special weaves
CO5: Summarize the working of special jacquard machines
CO6: Learn to create new structures

Pre-requisites :

1. U15TXT402 Shuttleless Weaving Technology

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

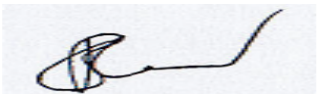
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S			S		S						S	
CO2	S		M										S	
CO3		M												
CO4	M	S											M	
CO5					S									
CO6	M	M											M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

BASIC WEAVES **9 Hours**

Cloth Geometry – Cover Factor – Use of Point Paper – Elementary weaves – plain and its derivatives. Twill and derivatives, Satin – Sateen and derivatives; Ordinary and Brighten Honey Comb, Huck-a-Back and modification. Mock Leno – Distorted Mock leno – Crepe weaves.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CORD EFFECTS **9 Hours**

Bedford cords: Plain and Twill faced, Wadded welts and piques – Wadded piques – Loose and fast back welts and piques – Spot figuring – Arrangement of figures – Drop Designs Half drop bases – Sateen system of distribution.

COLOUR AND WEAVE EFFECTS **9 Hours**

Colour theory – Light and Pigment Theory – Modification of colour – Application of colours – colour and weave effects. Extra warp and Extra weft figuring – with two colours. Backed fabrics: Warp and Weft backed – Reversible and Non-reversible.

PILE AND DOUBLE CLOTH **9 Hours**

Pile fabrics – Warp pile, Fast wire pile – Terry weaves – Terry stripe and checks. Weft pile – Plain back and Twill back velveteen. Lashed pile, corduroy. Double cloth: Classification – types of stitches-wadded double cloth – warp and weft wadded double cloth – centre warp and weft stitched double cloth.

SPECIAL WEAVES **9 Hours**

Gauze and Leno weaves. Russian cord – Net Leno – Madras Muslin structures. Damasks – Ply fabrics – Brocades – Tapestry – Swivel – Lappet – Designs for ornamentation of Fabrics. Self Twilling – Sectional – Inverted hook – Border jacquards.

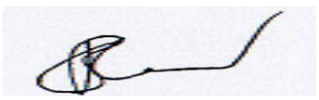
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Study on the effect of twill angle on cloth properties
2. Study on Properties of Bed linens made from satin and sateen stripes
3. Study on Properties of Terry fabrics

REFERENCES

1. Grosicki Z.J., "Watson's Textile Design and Colour" – Butterworths London, 1988.
2. Grosicki Z J, "Advanced Textile Design and Color" – Butterworths London, 2004.



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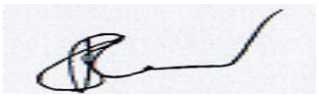
3. Goerner D, “Woven Structure and Design”, Part – I – WIRA, 1986
4. Jacquire Wilson, “ Hand Book of Textile Design, Woodhead Publishing Ltd, 2001.
5. Robert Beameront, “Colour in Woven Design” Whittaker & Co, 1972.
6. B.K.Behra and P.K.Hari, “Woven Textile Structure (Theory and Application), Woodhead Publishing Limited, 2010.
7. J Herbert Cooke, “Velvet and Corduroy”, Sir issac pitman & Sons Ltd, London



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U15TX*T*503 **Textile Printing and Finishing Technology**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss the style and methods of printing

CO2: Explain the working principle of various printing machines

CO3: Contrast the mechanism of various finishes

CO4: Explain the mechanism of functional finishes

CO5: Summarize the pollution control measures in textile processing industry

CO6: Summarize the energy conservation in textile processing industry

Pre-requisites :

1. U15TXT403 Textile Pretreatment and Colouration Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

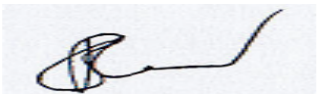
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	S		M			W							S	
CO2	S												S	
CO3				M										
CO4		S		S	W									
CO5	S		W		M	M							S	
CO6	M	M											M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey
5.	2.

CHEMICAL CONCEPTS OF PRINTING **9 Hours**

Sequence of printing process. Styles of printing: Direct, Discharge, Resist. Printing Methods- block, roller, screen printing. Essential ingredients of print paste and their functions. Mechanism of color transfer in printing of cotton,



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wool, silk and polyester material with direct, reactive, vat, metal complex, acid dye and pigments for different styles.

PRINTING MACHINES **9 Hours**

Printing machines- Roller printing, Screen printing: flat bed, rotary screen printing machines. Preparation of screens for flat bed and rotary printing. Transfer printing: Principle, machines, sublimation transfer printing. Digital Printing: Digital Color management systems- principle of charged drop printer and drop on demand printers. Flock printing: Beater Bar Method and Electrostatic method. Working principle of batch and continuous steamer. Fixation and after treatments.

FINISHING **9 Hours**

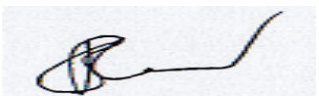
Classification of finishing: Wet and Dry /Chemical and Mechanical finishing. Calendaring: Swissing, chasing, friction, Schreinering, embossing. Anti-shrinking finishing: Principle of controlled compressive shrinkage/zero-zero finish, compacting, decatising and anti-felting. Raising and shearing techniques**.** Softeners: Mechanisms, Types- Anionic, cationic, Nonionic and Reactive softeners. Silicone softeners. Effect of softeners. Crease resistant finish: Cross linking agents-Nitrogenous and Non nitrogenous resins-Mechanisms of easy-care and durable press finishing. Application methods.

FUNCTIONAL FINISHES **9 Hours**

Water proof and repellent finishes: Mechanisms of repellency**,** Paraffin repellents, Stearic acid–melamine repellents, Silicone water repellents, Fluorocarbon-based repellents. Flame resistance finishes: Theory and Mechanisms of flame retardancy, Flame retardants for cellulose, polyester and its blends, application methods. Soil release finish: Mechanisms of soil release. Antimicrobial finishes: Mechanisms of antimicrobial finishes. Bio-polishing for cellulose material. Anti-static finishes: Mechanism, durable and nondurable antistatic finish. UV Protection finish. Assessment techniques for UV Finishes.

WASTE MINIMIZATION AND TEXTILE EFFLUENTS **9 Hours**

Waste minimization and its opportunities – need for waste minimization – chemical and auxiliary's conservation, water conservation, energy conservation. Textile waste water problems. Textile effluent - techniques of



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effluent treatments – Flow chart of primary, secondary and tertiary treatment.

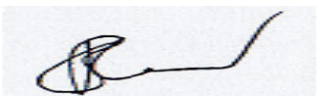
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Process Control and Safety in printing and finishing
2. Textile Effluent Treatment: a case study in home Textile Zone
3. Increased plant productivity and hence increased production efficiency

REFERENCES

1. Shenai, V.A., "Technology of Printing", Sevak Publications, Bombay, 1996.
2. Shenai, V.A., "Technology of Textile Finishing", Sevak Publications, Bombay, 1995.
3. Marsh, J.T., "An Introduction to Textile Finishing", Chapman and Hall Ltd., London, 1979.
4. W.D.Schindler and P.J.Hauser, Chemical finishing of Textiles, CRC Pr LIC Publication, 2004.
5. Charles Tomasino, Chemistry and Technology of Fabric Preparation and Finishing, Department of Textile Engineering, Chemistry and Science College of Textiles, North Carolina State University, 1992
6. Heywood, "Textile Finishing", Woodhead Publishing Limited, 2003.
7. LWC Miles, "Textile Printing", Society of Dyers and Colorists, Woodhead Publishing Limited, 2003.
8. From waste to profits, technical manual series III, National productivity council, new Delhi, 1998
9. Padmavankar, Textile Effluent NCUTE, IIT Publication, 2002.



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U15ENP501 **Communication Skills Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Imparting the role of communicative ability as one of the softskills needed for placement

CO2: Developing communicative ability and softskills needed for placement

CO3: Making students Industry-Ready through inculcating team-playing capacity

Pre-requisites :

1. U15ENT101 / Technical English – I
2. U15ENT201 / Business Communication and Presentation skill

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

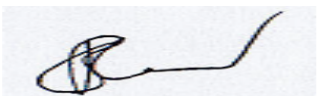
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1				M				M	S					
CO2				W				S	S	M				
CO3				S				S	S	W				
CO4														
CO5														
CO6														

Course Assessment methods

Direct	Indirect
1. Presentation 2. Role Play 3. Mock interview 4. Group Discussion	1. Course end survey

GRAMMAR IN COMMUNICATION **9 Hours**

Grammar and Usage – Building Blocks, Homonyms, Subject and Verb Agreement, Error Correction – Grammar Application, Framing Questions



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– Question words, Verbal Questions, Tags, Giving Replies – Types of Sentences, Listening Comprehension – Listening and Ear training.

ASSERTIVE COMMUNICATION **9 Hours**

Listening Comprehension in Cross-Cultural Ambience, Telephonic Conversations/Etiquette, Role Play Activities, Dramatizing Situations – Extempore – Idioms and Phrases.

CORPORATE COMMUNICATION **9 Hours**

Video Sensitizing, Communicative Courtesy – Interactions – Situational Conversations, Time Management, Stress Management Techniques, Verbal Reasoning, Current Affairs – E-Mail Communication / Etiquette.

PUBLIC SPEAKING **9 Hours**

Giving Seminars and Presentations, Nuances of Addressing a Gathering – One to One/One to a Few/One to Many, Communication Process, Visual Aids and their Preparation, Accent Neutralization, Analyzing the Audience, Nonverbal Communication.

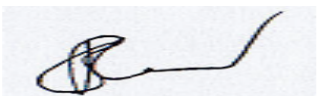
INTERVIEW AND GROUP DISCUSSION TECHNIQUES **9 Hours**

Importance of Body Language – Gestures and Postures and Proxemics, Extempore, Facing the Interview Panel, Interview FAQs, Psychometric Tests and Stress Interviews, Introduction to Group Discussion (GD), Mock GD Practices.

Practical: 45 Hours **Total: 45 Hours**

REFERENCES

1. Bhatnagar R.P. and Rahul Bhargava, ‘English for Competitive Examinations’, Macmillan Publishers, India, 1989.
2. Devadoss K. and Malathy P., ‘Career Skills for Engineers’, National Book Publishers, Chennai, 2013.
3. Aggarwal R.S., ‘A Modern Approach to Verbal and Non-Verbal Reasoning’, S. Chand Publishers, India, 2012.



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U15TX*P*501 **Cloth Analysis Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Analyze of Plain / Twill / Satin / Sateen fabric

CO2: Analyze of Honey comb fabric.

CO3: Analyze of Huck-a-Back fabric

CO4: Analyze of Extra Warp / Extra Weft fabric

CO5: Analyze of Pile Fabrics (Warp & Weft)

CO6: Create new fabric design

Pre-requisites :

1. U15TXT402 Shuttleless Weaving Technology

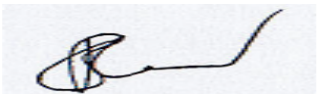
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	S	S	S	M	S	S	M							S
CO2	S	S	S	M	S	S	M							S
CO3	S	S	S	M	S	S	M							S
CO4	S	S	S	M	S	S	M							S
CO5	S	S	S	M	S	S	M							S
CO6	M	M	M		M	M								M

Course Assessment methods

Direct	Indirect
1. Observation 2. Lab Exercises 3. Model Practical Examination 4. End Semester Practical Examination	1. Course end survey



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List of Experiment(s)

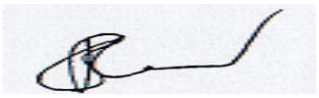
(Experiment beyond the syllabus should be taken)

1. Analysis of Plain / Twill / Satin / Sateen fabric.
2. Analysis of Honey comb fabric.
3. Analysis of Huck-a-Back fabric.
4. Analysis of Extra Warp / Extra Weft fabric.
5. Analysis of Pile Fabrics (Warp & Weft)
6. Analysis of Welts and Pique fabric.
7. Analysis of Backed Fabrics.
8. Analysis of Double cloth.
9. Analysis of Crepe fabric.
10. Analysis of Mock Leno fabric.
11. Analysis of Single jersey knitted fabric.
12. Analysis of Double jersey knitted fabric.
13. Production of cloth using desk loom for the given cloth particulars.

Practical: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Collection of different variety of fabric samples & making an album
2. Making prototype model of weave structure
3. Developing a jacquard design for ornamental fabrics
4. Making prototype model for colour and weave effects
5. Calculation of yarn requirement based on the given cloth particulars



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U15TX*P*502 **In-Plant Training / Internship**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Demonstrate the working of the factory

CO2: Categorize the machines, products and work force

CO3: Compare the performance of machines, quality and description of products and efficiency of work force.

CO4: Compile the data on machine, material men and relevant parameters

CO5: Discuss the working of machines, product quality, general mill particulars and layout of factory

CO6: Summarize and analyze the industrial report

Pre-requisites :

1. U15TXT401/Yarn Manufacturing Technology II
2. U15TXP401/Yarn Manufacturing Technology LAB II
3. U15TXT303/ Woven Fabric Manufacturing Technology
4. U15TXP302/Woven Fabric Manufacturing Technology Lab

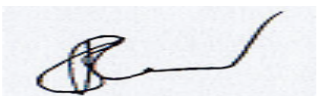
CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	M					M							S
CO2	S	M												S
CO3	S	M												S
CO4	S	M					M							S
CO5	S	M												S
CO6	S	M												S

Course Assessment methods

Direct	Indirect
1. Industry Observation 2. Seminar 3. End Semester Practical Examination	1. Industry feed back



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The wish list of 4th semester students will be collected by the Co-ordinator for In plant Training before few weeks end of the semester. The factory of In plant training should be according to the Profiling (Interested Domain Area) of the respective student. The students should submit the Undertaking Letter from their Parents before the end of the semester. The permission from factory will be requested and the students will be undergoing training for 2 to 4 weeks after the end semester exams. They will be monitored by respective domain internal experts. The report format and request letter from the Department should be collected by the students from the Department before the start of the IPT.

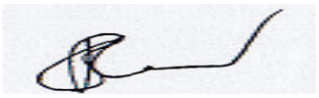
The students should submit the In Plant Training Report and IPT letter from the factory in the first week of the starting of the next semester. The students will be assessed based on their IPT report, Viva-Voce examination and the PPT presentation by the Internal Domain Experts and an external expert in the second week of the semester.

The Evaluation Pattern as Follows:

S.No.	Particulars	Maximum Weightage (%)
1	Report	30
2	Presentation (PPT Preparation and Oral Presentation Skill)	20
3	Viva- Voce Examination	50
Total		100
Minimum Marks		50

The students those fail to score minimum marks should undergo training in succeeding winter or summer vacation and subsequent assessment system as mentioned above.

Practical: 45 Hours **Total: 45 Hours**



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U15GHP501 -SOCIAL VALUES

(Common to all branches of Engineering and Technology)

L	T	P	C
1	0	0	1

Objectives

1. To understand the genesis of society and social values
2. To understand the various sources of disparity among human beings
3. To empathize social issues and offer solutions wherever possible
4. To learn about social welfare organizations

Course outcomes:

After successful completion of the course, the student would be able to:

1. The students shall acquire knowledge about how societies are formed and social values are created
2. The students shall understand and empathize various social issues and contribute towards finding a solution
3. To understand the causes of disparity among human beings
4. To know about social welfare organizations and to use social media effectively
5. To understand various social parameters that influences individual and society at large

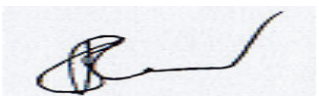
CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	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
CO1		W				M	W	M	W			M		
CO2		W	W			W	M	M		W		M		
CO3		W				M	W	S				M		
CO4		W				S		M	W	M		S		
CO5			W		W	M	W			W		M		

Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment	1.Attendance and Behavioural Assessment



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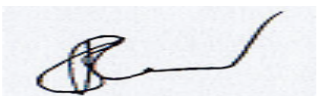
3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	

Introduction to Social Values – Society	2 Periods
Development of Science, Education, Politics & Economics	3 Periods
Disparity among human beings	3 Periods
Social Issues & Welfare	3 Periods
Social Welfare Organizations	2 Periods
Yogasanas & Meditation	2 Periods

Total Periods: 15

References Books:

1. Swami Vivekananda, "***Prosperous India"*** 1st edition, The Ramakirshna Mission Institute of Culture, 1937.
2. Fritz Schumacher, ***"Small is Beautiful",*** The Blond & Briggs, Published 1973.
3. Vethathiri Maharishi***, "Logical Solutions for the Problems of Humanity",*** The World Community Service Centre, Vethathiri Publications, 1999.
4. Sarvepalli Radhakrishnan, ***"The Source Book on Indian Philosophy"***, Princeton, N.J. : Princeton University Press, 1957.
5. Sarvepalli Radhakrishnan, ***"Religion, Science and Culture",*** The Orient Paperbacks, India, Published 1994.
6. Vethathiri's Maharishi's, ***"Vethathirian Principles of Life"*** The World Community Service Centre, Vethathiri Publications, 2003.



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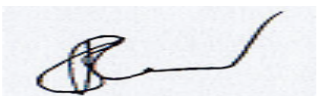
SEMESTER VI



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U15GS*T*005

ENGINEERING ECONOMICS AND FINANCIAL MANAGEMENT

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Evaluate the economic theories, Cost concepts and pricing olicies

CO2: Analyze the market structures and integration concepts

CO3: Apply the concepts of national income and understand the functions of banks and concepts of globalization

CO4: Apply the concepts of financial management for project appraisal and working capital management

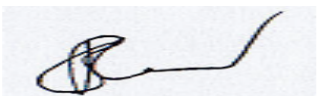
CO5: Understand accounting systems

CO6: Analyze financial statements using ratio analysis

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		M				M					M		M	
CO2				M		M					M		M	
CO3						M					M		M	
CO4				M							S		M	
CO5											S		M	
CO6		M		M							S		M	



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Course Assessment methods:

Direct		Indirect
1.	Assignment	1. Course End Survey
2.	Internal Test	
3.	Group presentation	
4.	End Semester Examination	

ECONOMICS, COST AND PRICING CONCEPTS 9 Hours

Economic theories – Demand analysis – Determinants of demand – Demand forecasting – Supply – Actual Cost and opportunity Cost – Incremental Cost and sunk Cost – Fixed and variable Cost – Marginal Costing – Total Cost – Elements of Cost – Cost curves – Breakeven point and breakeven chart – Limitations of break even chart – Interpretation of break even

chart – Contribution – P/V-ratio, profit-volume ratio or relationship – Price fixation – Pricing policies – Pricing methods.

CONCEPTS ON FIRMS AND MANUFACTURING PRACTICES 9 Hours

Firm – Industry – Market – Market structure – Diversification – Vertical integration – Merger – Horizontal integration.

NATIONAL INCOME, MONEY AND BANKING, ECONOMIC ENVIRONMENT 9 Hours

National income concepts – GNP – NNP – Methods of measuring national income – Inflation - Deflation – Kinds of money – Value of money – Functions of bank – Types of bank – Economic liberalization – Privatization – Globalization

CONCEPTS OF FINANCIAL MANAGEMENT 9 Hours

Financial management – Scope – Objectives – Time value of money – Methods of appraising project profitability – Sources of finance – Working capital and management of working capital

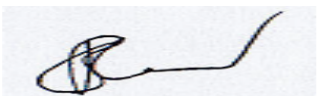
ACCOUNTING SYSTEM, STATEMENT AND FINANCIAL ANALYSIS 9 Hours

Accounting system – Systems of book-keeping – Journal – Ledger – Trail balance – Financial statements – Ratio analysis – Types of ratios – Significance – Limitations

Theory :45 Hours Total Hours: 45

References:

1. Prasanna Chandra, " Financial Management (Theory & Practice) ,"TMH
2. Weston & Brigham, " Essentials of Managerial Finance"
3. Pandey, I. M., "Financial Management"
4. Fundamentals of Financial Management- James C. Van Horne.
5. Bhaskar S. "Engineering Economics and Financial Accounting", (2003) Anuradha Agencies, Chennai



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6 Financial Management & Policy -James C. Van Horne

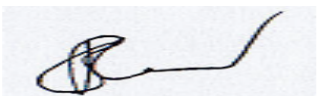
7. Management Accounting & Financial Management- M. Y. Khan & P. K. Jain

8. Management Accounting Principles & Practice -P. Saravanavel

9. Ramachandra Aryasri.A., and Ramana Murthy V.V.,"Engineering Economics & Financial Accounting"-Tata McGraw Hill, New Delhi, 2006.

10. Varshney R.L., and Maheswari K.L.,"Managerial Economics" – Sultan Chand & Sons, New Delhi, 2001

11. Samvelson and Nordhaus,"Economics"-Tata McGraw Hill, New Delhi, 2002



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U15TX*T*601 **Textile Quality Evaluation**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Describe the concepts of quality and statistical application in textiles

CO2: Explain the measurement of fibre properties

CO3: Explain the measurement of yarn properties

CO4: Generalize the advanced testing instruments

CO5: Summarize the working Principle of fabric testing instruments

CO6: Interpret and analyse the tested values

Pre-requisites :

1. U15TXT401 Yarn Manufacturing Technology II
2. U15TX*T*303 / Woven Fabric Manufacturing Technology

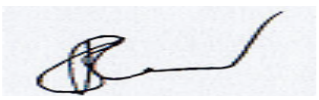
CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

Cos	Programme Outcomes(Pos)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S		S									S	
CO2	S	S	S	M	S								S	
CO3	S	S	M	S	S								S	
CO4	S	S	S	S									S	
CO5	S	S	S	S	S								S	
CO6	M	M		S	S								M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey



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INTRODUCTION TO QUALITY **9 Hours**

Definition of Quality, Quality Concepts: Quality of Design, Quality of Conformance, Quality of Performance; Types of quality – Manufactured based, User based, Value based, and Transcendent based; Factors influencing quality, Quality control and Quality assurance. Quality control tools and its application-concepts of six sigma. Objectives of textile testing. Standard test conditions: Accuracy, precision and calibration. Statistical Applications in Textiles: Sampling methods, Determination of sample size,'t', 'F', 'χ^2' test, ANOVA, Control charts.

FIBRE TESTING **9 Hours**

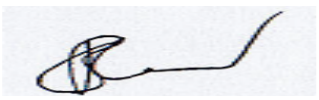
Fibre properties - Fibre length: Staple length Span length – Hand stapling method , Baer sorter, Fibro graph. Fibre trash analyzer. Fibre strength – Stelometer, Pressley tester. Fibre fineness: Airflow principle, Micronaire testers, calculations. Maturity – testing methods of maturity, calculations. Measurement of Cotton Stickiness. Moisture regain, moisture content and RH % determination, calculations. Measurement of fibre crimp- Factors influencing for cotton fibre testing.

YARN TESTING **9 Hours**

Yarn numbering systems: Direct system, indirect system and count conversion calculations - Count Determination, Measurement of yarn and thread diameter. Twist and its measurement- Twist construction, principle of twist measurement for single-Ring and OE, Ply and corded yarns. Tensile testing of yarn: Constant Rate of Elongation, Constant Rate of Loading and Constant Rate of Traverse, Lea strength tester, Instron - Factors influencing tensile testing of yarns, Tenacity, elongation% & CSP, Norms. Hairiness – Principle of measurement, Hairiness Index, S-3 value. Classimat faults -Yarn appearance assessment (ASTM Grading, Electronic Inspection Board). Measurement of Yarn Crimp and shrinkage.

ADVANCED FIBRE AND YARN TESTING **9 Hours**

Fibre: High Volume Instruments (HVI): length, strength, maturity, trash & color modules- analysis and interpretation of results. Advanced Fibre Information System (AFIS): length, nep and trash modules - analysis and interpretation of results. Spinning consistency index (SCI)-meaning and its siginificance. Yarn: Evenness – principle of measurement, Uster standards, Imperfections, irregularity charts, Periodic Variation and Spectrogram



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calculations. Tensorapid and Tensojet tensile tester. Dynamic Yarn Tester: Constant Tension Transport (CTT): Vibroscope, Vibrodyn and Vibrotex. Scatter plot diagram and its interpretation.

FABRIC TESTING **9 Hours**

Testing of crimp. Testing of Tensile strength, Tearing strength, Impact strength and bursting strength. Testing of dimensional stability- Hygral expansion, relaxation shrinkage, and felting shrinkage. Testing of air permeability, water vapour permeability and water repellency. Testing of thermal resistance of fabric. Testing of abrasion resistance and pilling. Testing of stiffness, crease recovery and drape-calculations. Objective evaluation of fabric handle –KES and FAST systems. Fabric thickness and GSM Measurements.

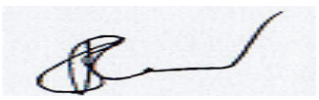
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. To discuss any alternative approach to the objective measurement of fabrics.
2. To discuss the testing method for Cold weather comfort clothing.
3. To analyze the problems of occurring more yarn breaks during spinning process and remedies for these problems.

REFERENCES

1. Booth J. E., “Principles of Textile Testing” Butterworths, 1996.
2. V.K.Kothari, “Testing and Quality Management” IAFL Publications, 1999.
3. GAV Leaf., “Practical Statistics For The Textile Industry: Part I”, The Textile Institute, 1984.
4. Saville B.P., “Physical Testing of Textiles”, Woodhead publishing - UK, 2004.
5. Jinlian H U, “Fabric Testing”, Woodhead Publishing, 2008.
6. Arindam Basu., “Textile Testing (Fibre, Yarn and Fabric)”, SITRA, Coimbatore, 2001.
7. Somasundar S., “Application of Statistical Methods in Textile Industry”, SITRA, Coimbatore, 1998.



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U15TX*T*602 **Mechanics of Textile Machinery**

L	T	P	C
3	2	0	4

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Define the importance of gear and belt drives and to express the relationship between tensions in belt drives and also the condition for maximum power transmission

CO2: Design the profiles of cone drums used in speed frames as well as scutcher, plain and twill tappets and ring frame builder motion cams

CO3: Calculate the picking force, shuttle velocity and acceleration in weaving machines and to use the equations of motions in textile applications

CO4: Justify the use of kinetic energy, potential energy and principle of moments in textile industry

CO5: Explain the importance of friction in textile applications and to point out the applications of brakes and clutches in textile industry and to derive the expressions for the torque transmitting capacity of various types of clutches

CO6: Summarize the automations in textile industry

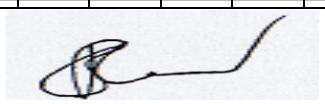
Pre-requisites :

1. U15TX*T*401 / Yarn Manufacturing Technology II
2. U15TX*T*303 / Woven Fabric Manufacturing Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M		M										M	
CO2					M								M	
CO3			M										M	
CO4				M									M	
CO5	M			M									M	
CO6	M		M										M	



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Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

DRIVES **9 +3 Hours**

Belts and Ropes- Drive Speed Ratio – Centrifugal tension - Condition for maximum power transmission and speed – PIV drives – Electro Magnetic Drives. Gears Nomenclature - Velocity ratio-Speed calculations - Epicyclic gear trains – speed ratio of differential motion.

CAMS & CONE DRUMS **9 +3 Hours**

Scutcher cone drum profile design and construction. Fly frame cone drum profile design and construction. Cams used in Textile machines – Design of Ring frame builder motion cam. Plain and Twill cams for tappet looms.

MOTION **9 +3 Hours**

Equation of motion – Linear – Rotary - Reciprocation – Oscillation movements, Equation of force – Mass – Momentum – Work – Power – Shuttle Velocity – Picking force and power – ring frame traveler velocity and power consumption.

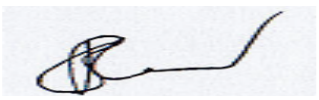
PRINCIPLE OF MOMENTS **9 +3 Hours**

Kinetic and potential energy calculation for textile application – Principles of moments- Scutcher calendar roller – Ring frame Top arm loading – Forces in heald reversing system.

FRICTION, BRAKES AND CLUTCHES **9 +3 Hours**

Friction: Static, Dynamic and Coil friction – Coefficient of friction – Frictional force and power – Warp tension calculation. Clutches: Single plate – Multiple plate – Cone Clutches - Centrifugal clutch - jaw clutch – Saw toothed clutch. Band and block Brakes – Internal expanding shoe Brakes – Sley displacement – eccentricity relation with crank radius and connecting arm length – velocity – Acceleration – Beat-up force.

Theory: 45 Hours **Tutorial: 15 Hours** **Total: 60 Hours**



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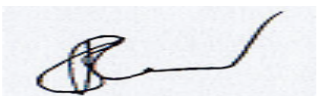
CASE STUDY (any two)

1. Importance of differential gearing mechanism in speed frame and comparison with PLC system in latest speed frame
2. Applications of P.E & K.E in Textile Industry
3. Usage of cams in Textile Industry.

REFERENCES

1. Slater K., "Textile Mechanics, Vol. I & II", Textile Institute, Manchester, UK, 1987.
2. Booth J E., "Textile Mathematics, Vol. I, II & III", Textile Institute, Manchester, UK, 1977.
3. Rengasamy R.S, "Mechanics of Spinning Machines", NCUTE, Ministry of Textiles, Govt. of India, 2000.
4. Faires V.M., "Design of Machine Elements", Macmillan & Co, London, 1967.
5. Grosberg P, "Introduction to Textile Mechanics", Ernest Benn Ltd, London, 1968.
6. W.A. Hanton, "Mechanics for Textile Students", Butterworths, 1960.
7. Victor Wowk, "Machinery Vibration", McGraw-Hill, Inc, Newyork, 1995.



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U15TX*T*603 **Garment Manufacturing Technology**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Develop the pattern making, grading and marker making for Kids, Baby's, Men's and Women's wear

CO2: Discuss the Requirements and Methods of Marker planning and Cutting

CO3: Describe different types of Stitches & Seams and sewing machine

CO4: Compare different production systems used in garment industry

CO5: Explain different types of pressing and packing methods

CO6: Elaborate on pattern/cutting by CAD and Plant layouts/Flexible manufacturing system.

Pre-requisites :

1. U15TXT303-Woven fabric Manufacturing Technology
2. U15TXT502-Knitting Technology

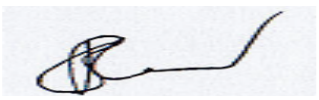
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S	S		M								S	
CO2	M	S	S		S								M	
CO3	M												M	
CO4	M												M	
CO5	S	S	S							M			S	
CO6	M	W			M								M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey



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PATTERN MAKING **9 Hours**

Introduction to garment manufacturing-Pattern making: Definition- Head theory- Measuring of sizes and Size chart-Seam allowances- Drafting, Grading and Draping- Grain lines- Dart. Development of patterns: Kids wear: Baby's frock- Men's wear: Shirt and Trouser- Women's wear: Plain skirt. Pattern making using CAD.

CUTTING **9 Hours**

Marker planning: Requirements and Methods-Marker efficiency-Advantages of computer aided marker planning. Spreading: Requirements and Methods-Types spreading and lay. Cutting: Objectives-methods- cutting machines-Straight knife-Round knife-Band knife- Die cutting-computer controlled cutting-Lectra-Gerber-Tuka-Reach CAD.

SEWING **9 Hours**

Sewing: Definition of Stitch and Seam- Types Stitch and Seam- Needles: Parts, sizes and classification- Threads: quality requirements, fiber types, construction, finishes, packages and ticket number –Stitch and seam defects. Sewing machinery: Basic sewing Machines-Single needle lock stitch machine-Feed system: Drop feed system-Unison feed-Differential feed-Compound feed.

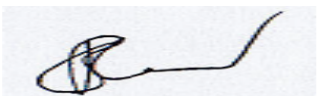
PRODUCTION SYSTEMS **9 Hours**

Basic production systems: Plant layouts (process/product)-Progressive bundle system (PBS)-Unit production system (UPS)-Modular production system (MPS)-Flexible manufacturing- Garment breakdown with machine and attachment details, - development of production flowchart – men's full sleeve shirt – trousers – five-pocket jeans – ladies night dress – shorts – T-shirt

FUSING, PRESSING AND PACKING **9Hours**

Fusing: Means-equipment and Methods-Requirements- Pressing: Purpose - Categories - Means- Equipments and methods-Pleating- Permanent press. Packing-Method-Components of packing-Trims and accessories-buttons-Zippers-Velcro-Hook and eye-Hook and Bar-Fasteners-Closures-Lining-Interlining-Wadding-Tapes-Elastic- Popular brands.

Theory: 45 Hours **Total: 45 Hours**



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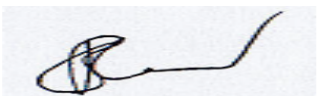
CASE STUDY (any two)

1. Catalogue on threads and its ticket for different types of fabrics with needle number.
2. Consumption reduction in marker making with different width of fabrics.
3. Comparative study of PBS and Other production system.

REFERENCES

1. Harold Carr and Barbara Latham, "The Technology of clothing manufacture", 4th Edition Wiley-Blackwell, 2008.
2. K.R.Zarapkar, " System of cutting", Navneet Publications, Mumbai,2005.
3. Jacob Solinger, "Apparel Manufacturing Handbook", Van Nostrand Reinhold Company, 1988.
4. Hayden Peggal, "The Complete Dress Maker", Marshal Cavendish, London, 1984.
5. Laing R.M. and Webster J,"Fundamentals of stitches and Seams", Textile Institute, 1998.
6. Gerry Cooklin, Steven George Hayes and John McLoughlin, "Introduction to Clothing Manufacture", Wiley-Blackwell, 2006.
7. Gerry Cooklin " Master Patterns and Grading for Men's Outsize", Blackwell Scientific Publications,1992



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U15TX*P*601 **Textile Quality Evaluation Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Calculation of maturity, fineness, crimp, yarn numbering system, evenness, hairiness.

CO2: Summarize the working Principle of all testing instruments of fibre, yarn & fabric.

CO3: Analyze and interpret the results of testing of fibre, yarn & fabric properties with statistical analysis.

CO4: Examine the material with testing results.

CO5: Evaluate the results with various types of materials.

CO6: Prepare and calibrate the instrument for testing the material

Pre-requisites :

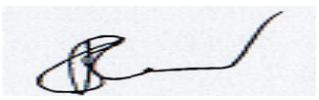
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S		S	M									S
CO2	M	S	S		M									S
CO3	S	S	S	S	S									S
CO4	S	S	S	S										S
CO5	S	S	S	S	S									S
CO6	S			S			S							M

Course Assessment methods

Direct	Indirect
1. Observation 2. Lab Exercises 3. Model Practical Examination 4. End Semester Practical Examination	1. Course end survey



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List of Experiment(s)

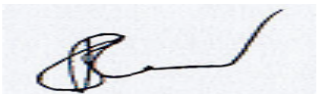
(Experiment beyond the syllabus should be taken)

1. Determination of the percentage of Trash, Lint, Micro dust, Invisible loss using Trash analyzer and Determination of fineness & its C.V% of the two different cotton fibre samples using Micronaire tester.
2. Determination of the Effective length, Mean length and Short fibre % of the given cotton fibre sample using Baer Sorter.
3. Determination of Hank and Hank C.V % (within & between) of the given blow room/comber lap.
4. Determination of the Hank and Hank C.V% of the given sliver / Determination of the within bobbin and between bobbin hank C.V % of the given roving.
5. Determination of the Single yarn strength of the given yarn sample using Instron.
6. Determination of Single yarn and Ply yarn twist of the given yarn.
7. Determination of the Yarn count, Lea Strength and CSP of the given yarn sample.
8. Determination of the Air permeability and Fabric Impact Strength of the given fabric.
9. Determination of the Fabric thickness, Stiffness and Crease recovery for the given fabric
10. Determination of the Fabric Drape and Bursting strength of the fabric.
11. Determination of the Fabric Abrasion Resistance and Fabric Pilling for the given fabric.
12. Determination of the Fabric Tensile strength of the given fabric sample using tensile tester.

Practical: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Collection of the HVI quality particulars (Report) of any three cotton varieties (coarse, medium & fine) from the spinning mill.
2. Evaluation of the quality of any fancy yarn and analyze the particulars.
3. Evaluate and analyze the quality particulars of any one Technical textile fabric structure.
4. Evaluation of the quality of the yarn strength testing for coarse, medium and finer counts.



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U15TX*P*602 **Knitting and Garment Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Construct Stitches using SNLS, Overlock and Flat lock machines

CO2: Construct different types of Seams

CO3: Demonstrate threading, SPI and Tension setting of SNLS, Overlock and Flat lock machines

CO4: Develop patterns for Ladies wear, Men's shirt , T-Shirt and Trousers using pattern sheet

CO5: Calculate the Production of double track knitting machine.

CO6: Develop manual and machine embroidery designs.

Pre-requisites :

U15TXT502-Knitting Technology

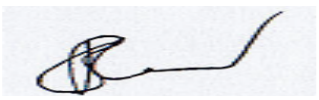
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1			M		S									S
CO2			M		S									S
CO3			M		S									S
CO4		M	M	M	S									S
CO5		M		M	S					M				S
CO6				M	M		M							S

Course Assessment methods

Direct	Indirect
1. Observation 2. Lab Exercises 3. Model Practical Examination 4. End Semester Practical Examination	1. Course end survey



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List of Experiment(s)

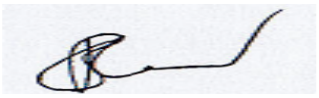
(Experiment beyond the syllabus should be taken)

1. Production calculation and study of single jersey circular weft knitting machine-yarn supply arrangements, loop forming mechanism, takedown motion.
2. Analysis of single jersey knitted fabrics
3. Demonstrate sewing operation in Single Needle Lock Stitch Machine, Machine adjustments-Threading-SPI and Tension setting and stitches and seams
4. Demonstrate Sewing operations in Overlock and Flat lock machines and Machine adjustments-Threading-SPI and Tension setting
5. Developing pattern for Ladies wear
6. Developing pattern for Men's shirt
7. Developing pattern for T-Shirt
8. Developing pattern for Trousers.
9. Construct sleeve plackets (pointed and square)
10. Construct neckline and collars
11. Developing embroidery stitches and designs.
12. Construction of simple garment

Practical: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Identification of various types of seams and stitches in a Sewn Garment
2. Create a Trim Card with all the accessories and Trims used in the Garment
3. Design collection of various Knitted Fabrics
4. Design Collection of Various Embroidery, Printed, and Appliqué samples
5. Preparation of Technical File for a Garment.



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U15GHP601 -NATIONAL VALUES

(Common to all branches of Engineering and Technology)

L	T	P	C
1	0	0	1

Objectives

1. To enlighten students about responsible citizenship and polity
2. To sensitize the greatness of India and Indian Culture and to encourage students to uphold them
3. To be aware of the India's messages to world and propagate them as when possible
4. To understand about the uniqueness of India
5. To know about famous Indian personalities and their characteristics and to know about their contributions

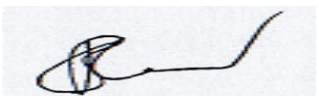
Course outcomes:

After successful completion of the course, the student would be able to:

1. The Students shall acquire knowledge on the Enlightened Citizenship.
2. The Students shall know skills the greatness of India and Indian Culture.
3. The students shall be aware of the messages of India to the world
4. The Students shall be aware of the uniqueness of India
5. The students shall know about the inspiring Indian personalities and emulate them

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		W				M		M				M		
CO2		W				S	W	S	M	M		M		
CO3		W	W		W	M	W	M	M	M		M		
CO4		W				M	W	M	W	W		M		
CO5						W	M	W	W	W		S		



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Course Assessment methods:

Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioural Assessment

Enlightened Citizenship	2 Periods
Greatness of India & Indian Culture	2 Periods
Uniqueness of India	2 Periods
Famous Indian Personalities	2 Periods
India's messages to the world	3 Periods
Meditation & Yogasanas	4 Periods

Total Periods: 15

References Books:

1. Gurcharan Das, "***India Grows at Night***", Penguin **Books** India, Published September 2012.
2. Swami Vivekananda, "***Prosperous India"*** 1st edition, The Ramakirshna Mission Institute of Culture, 1937.
3. Sarvepalli Radhakrishnan, ***"The Source Book on Indian Philosophy"***, Princeton, N.J. : Princeton University Press, 1957.
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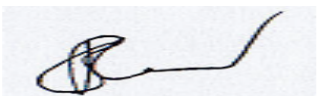

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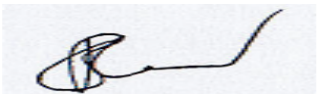
SEMESTER VII



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Process Control in Textile Industry

L	T	P	C
3	0	0	3

U15TX*T*701

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Outline the various fibre quality characteristics and fibre quality indices

CO2: Analyze and interpret the defects occur in the spinning process

CO3: Evaluate yarn realization, waste%, Invisible loss and cleaning efficiency

CO4: Solve the productivity calculations

CO5: Explain and interpret the problems relevant to process control in the spinning and weaving process.

CO6: Summarize the standards for machine maintenance and productivity

Pre-requisites :

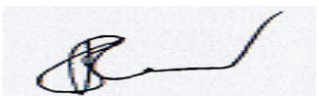
U15TXT401 / Yarn Manufactuing Technology II

U15TXT402 / Shuttleless Weaving Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	S	S		S	M								S	
CO2	S	S	S	S	S	M							S	
CO3	S	S	S	S	S								S	
CO4	S	S	S	S	M								S	
CO5	S	S	S	S	M								S	
CO6	M			M			M						M	



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Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

CONTROL OF FIBRE QUALITY **9 Hours**

Quality control of mixing through fibre quality characteristics –Linear programming in optimizing mixing-- Fibre Quality Index – Blending Irregularity – Fibre Rupture Analysis – Causes of nep generation – nep removal in carding and combing machines – On line nep monitoring, hooks & hooks removal. Levelling in Blow room, carding and drawing, - Contamination & its control-Online monitoring of contamination – Stickiness: causes, effect & control strategies. Process control strategies for organic cotton processing.

CONTROL OF YARN REALIZATION & WASTE **9 Hours**

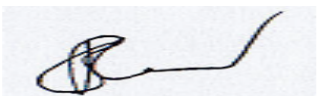
Yarn realization: Definition -calculation for carded and combed process - Recording procedures - Norms - Invisible loss and its impact. Control of waste in blow room, carding and comber: Methods – Calculations – Norms. Control of soft waste – Soft waste addition in mixing. Control of hard waste in ring frame and cone winding - Methods , Norms.

CLEANING EFFICIENCY AND PRODUCTIVITY **9 Hours**

Cleaning efficiency in blow room & carding: Definition – Importance - Cleaning efficiency of the various beaters - various factors are influencing cleaning efficiency – Norms. RH% and its importance- Productivity calculations: HOK, OHS, Spindle Utilization & Productivity Index (PI).Units per Kilogram (UKG) calculations and its importance.

YARN QUALITY CONTROL **9 Hours**

Within bobbin & between bobbin count variations: Causes, effects and remedies. Unevenness: causes, effects& control measures, Hairiness: Causes, effects and control strategies. Effect of roller setting, spacer, top arm pressure and top roller cots on yarn quality. Cots and aprons: selection for coarse, fine and synthetic yarn processing. Traveller selection for various counts. Yarn Faults: Classification-Causes - methods to reduce faults. Strength C.V% and its control. End breakage: causes – snap study – measures to control end



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breakage - norms. Process control in slub yarn manufacturing: slub particulars – quality checking.

PROCESS CONTROL IN WEAVING **9 Hours**

Process control in Winding: Quality of Knots and Splices- quality of package –package density - control of hard waste. Process Control in Warping - warping and Sectional Warping – Performance, Process Parameters - minimizing end breaks - Quality of warper's beam - control of hard waste. Process control in sizing - control of size pick up, Size encapsulation, optimum size add-on, control of yarn stretch and moisture-Quality of sized beam- control of hard waste. Process control in drawing-in and warp tyeing. Process and quality control in loom shed: Loom efficiency, Factors influencing loom efficiency, hard waste. Ambient Conditions.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Do a case study on higher CV% draw frame sliver
2. Do a case study for higher Lap C.V% in blow room
3. Do a case study on Efficiency of removing of small contaminant contamination clearer in blowroom.
4. Production planning in spinning

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2. R. Senthil Kumar, "Process Management in Spinning" CRC Press, USA, September 2014
3. Garde. A. R. & Subramaniam T. A., "Process Control in Spinning", ATIRA, Ahmadabad 1987.
4. M.C.Paliwal & P.D. Kimothi., "Process Control in Weaving", ATIRA, Ahmedabad, 1974.
5. Van der Sluijs M and Hunter L., "Neps in Cotton Lint", Textile Progress Volume: 2 Number:4, The Textile Institute, Manchester, U.K., 1999.
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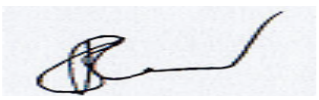

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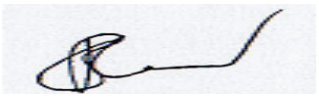
8. “Warping and Sizing”, BTRA Publication, Mumbai, 1983.
9. “Winding”, BTRA Publication, Mumbai, 1986.



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U15TX*T*702 **NONWOVEN MANUFACTURING TECHNOLOGY**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discover the nonwoven technology

CO2: Describe the various nonwoven web laying and web bonding systems

CO3: Explain the principle of working of various web laying and web bonding systems.

CO4: Review the various finishing process on nonwoven fabrics

CO5: Summarize the various nonwoven fabric characterization techniques.

CO6: Summarize the application of nonwoven in technical textiles

Pre-requisites :

U15TXT201 Textile Fibres

U15TXT402 Shuttleless Weaving Technology

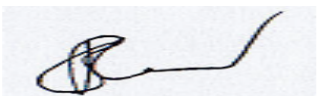
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	S	M	M		S					M			S	
CO2	S	M	M		S								S	
CO3	M		M		S					M			M	
CO4	S	S	S		S					S			S	
CO5			M		S					M				
CO6	M	M			S								M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey



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INTRODUCTION TO NONWOVEN **9 Hours**

Nonwovens: Introduction, Definition as per INDA and EDANA, Market structure and development, key companies, Fibres used in nonwovens, Production rate of Nonwovens and other Fabric manufacturing systems, Classification of web laying and web bonding systems, Comparison of woven, knitted and nonwoven structures. Nonwoven properties including environmental considerations. Nonwoven applications in technical textiles sector.

WEB FORMATION SYSTEMS **9 Hours**

Dry laid web Formation: Raw material - Fibre Opening – Carding – Cross lapping - perpendicular-laid web formation - Airlaid web formation: Air laying technology - bonding systems & finishing - properties & applications. Wet-laid web formation: theoretical basis of wet forming – raw materials – fibre preparation – web forming technology – bonding systems – finishing- properties & applications. Polymer laid web formation: Spun bonding and Melt blown process: raw material - production technology – operating variables – bonding techniques – structure and properties – application.

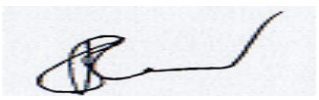
WEB BONDING SYSTEMS **9 Hours**

Mechanical Bonding: Stitch bonding, Needle Punching: Needle design and selection – various factors influencing needle punching process – needle punching technology – properties and applications – Hydroentanglement: Principle – fibre selection – process technology – properties and applications. Thermal Bonding: principle – raw materials – technologies such as calender bonding, thorough air bonding, ultrasonic & IR bonding – structure and properties – applications.

Chemical Bonding: Chemical binders – mechanism of chemical bonding – methods of binder application – drying – Limitations and applications.

FINISHING OF NONWOVENS **9 Hours**

Wet Finishing: Washing, coloration – dyes, dyeing machines; printing. Application of Chemical Finishes- antistatic agents, antimicrobial finishes, softening, flameproof, waterproof, stiffeners, UV stabilizers; Methods for applying chemical finishes-padding, coating, lamination. Mechanical Finishing-splitting and winding, perforating, drying, compressive finishes,



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calendaring; Surface finishing- singeing, shearing, flocking, raising, polishing, softening. Developing technologies – Plasma, microencapsulation, laser etching, biomimetic finishes and electrochemical finishes.

CHARACTERISATION AND TESTING OF NONWOVEN FABRICS **9 Hours**

Characterization of fabric bond structure – needle punched fabrics, spun laced fabrics, stitch bonded fabrics, thermal bonded fabrics and chemical bonded fabrics. Testing of Nonwoven fabrics: weight, thickness, fibre orientation, fabric porosity, pore size & pore size distribution, dry sieving, wet sieving, hydrodynamic sieving, bubble point test method, measuring tensile properties, measuring gas and liquid permeability, measuring water vapour transmission, measuring wetting and liquid absorption, measuring thermal conductivity and insulation.

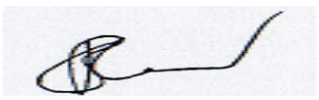
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Nonwoven processes are economical fabric manufacturing process.
2. Fibre cross section has significant influence on needle punched fabric strength.
3. Usage of bi-component fibres produces good bonding than separate binder application in thermal bonding process.
   Analysis of structure, thickness, type of bonding, finishing and application significance-baby diapers, wound pad, filter cloth, geo textiles, air bag.

REFERENCES

1. Hand Book of Nonwovens – Edited by S.J.Russell, Wood head publications Ltd., ISBN- 13: 978-1-85573-603-0, 2007.
2. Nonwoven Fabrics: Raw Materials, Manufacture, Applications, Characteristics, Testing Processes, Edited by Wilhelm Albrecht , Hilmar Fuchs and Walter Kittelmann, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim,, ISBN: 3-527-30406-1, 2003.
3. The Nonwovens by Govianni Tanchis, ACIMIT,2006
4. Hand Book of Technical Textiles – Edited by S.C.Anand & A.R.Horrocks, Wood head publications Ltd., ISBN 1 85573 385 4, 2000.



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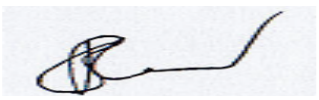
5. Applications of Nonwovens in Technical textiles, Edited by R.A.Chapman, CRC press, 2010.



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U15TX*T*703 **Technical Textiles**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Describe the scope and classification of technical textiles

CO2: Outline the fibres, yarns and fabric types used in technical textiles

CO3: Classify the properties required for fabric constituent to use in Agro textiles, Geo textiles and filtration textiles

CO4: Deduce role of textile materials in the medical textiles product development

CO5: Outline the functions and various requirements of protective textiles, sports textiles and transportation textiles.

CO6: Identify purpose and performance of technical textile products.

Pre-requisites :

1. U15TXT501 / Physical properties of Textile fibres

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

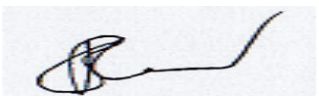
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1		M			S								M	
CO2	M	M	S		S								M	
CO3	M	M	M		S								S	
CO4	S	M	S		S					M	M		M	
CO5	M	M	S		S					M			M	
CO6	M	S	M		S					M			M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION **9 Hours**

Technical Textiles: Definition and scope of technical textiles, Global and Indian Scenario, Classification of technical textiles. Fibres used in Technical



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textiles, Technical yarns: staple yarns, monofilament, multifilament yarns. Technical fabrics: knitted, woven, nonwoven and braided structures.

AGRO TEXTILES AND FILTRATION TEXTILES **9 Hours**

Agro textiles**:** Fibres, Fabric Construction details – Properties and applications. Textiles in Filtration**:** Dust collection, Fabric construction, finishing treatments. Solid-Liquid Filtration: Yarn types and fabric constructions, Production equipment, finishing treatments, fabric test procedure.

GEOTEXTILES AND MEDICAL TEXTILES **9 Hours**

Textiles in Civil Engineering**:** Geosynthetics, Geotextiles, Essential properties of geotextiles, engineering properties of geotextiles, Frictional resistance of geotextiles. Medical Textiles: Non-implantable materials, Extra-corporeal devices, Implantable materials, and Healthcare / hygiene products.

PROTECTIVE TEXTILES **9 Hours**

Overview of protective clothing, Selection of protective clothing materials, fibres and fabrics for Protective Textiles. Textiles for environmental protection, Thermal insulation materials, Water vapour permeable and waterproof materials, Military combat clothing systems, Camouflage concealment and deception, Flame-retardant, heat protective textiles, Ballistic protective materials, Biological and chemical warfare protection.

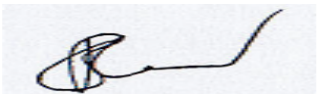
TRANSPORTATION AND SPORTS TEXTILES **9 Hours**

Textiles in Transportation**:** Textiles in road vehicles: car seat, air bag, seat belt, filters, carpets Belts, Tyre cords, hoses. Textiles in Rail applications, Textiles in aircraft and marine applications. Sports Textiles: Innovation in fibres & textile materials for sportswear – design consideration of sportswear – comfort – sports foot wear: functional design, materials. Textile composites in sports products. sailing fabrics.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Filter fabrics for hot air filtration application
2. Textiles in building reinforcement
3. Blast Resistant Textiles



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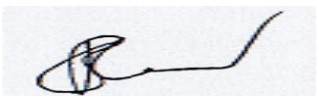

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U14TX*P*701 **Textile and Apparel CAD Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Practice weave design using software tools

CO2: Develop 2D fabric simulation with different weaves for dobby and jacquard design

CO3: Create various types of motifs for printing with repeat designs

CO4: Develop garment patterns for children's wear using CAD software

CO5: Develop garment patterns for men's and women's wear using CAD software

CO6: Calculate the Marker efficiency fot T-Shirt, Ladies top,skirt using CAD softeware

Pre-requisites : Nil

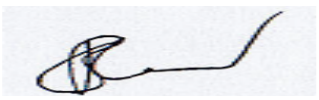
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M	M			S									S
CO2	M	M			S									S
CO3	M	M			S									S
CO4	M	M			S									S
CO5	M	M		M	S									S
CO6	M			M			M							S

Course Assessment methods

Direct	Indirect
1. Observation 2. Lab Exercises 3. Model Practical Examination 4. End Semester Practical Examination	1. Course end survey



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List of Experiment(s)

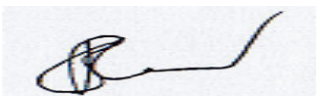
(Experiment beyond the syllabus should be taken)

1. Development of various motifs using software tools.
2. Sketch and design a garment including accessories.
3. Development of a dobby design for checked fabric & preparation of 2D simulation.
4. Development of a Jacquard design & preparation of 2D simulation.
5. Development of a Print design and making screen for individual colours.
6. Development of a repeats for Home Textiles.
7. Developing design, pattern and marker plan for baby frock. Calculation of marker efficiency.
8. Developing design, pattern and marker plan for romper. Calculation of marker efficiency.
9. Developing design, pattern and marker plan for "T" shirt. Calculation of marker efficiency.
10. Developing design, pattern and marker plan for a ladies top. Calculation of marker efficiency and development of a lay plan.
11. Developing design, pattern and marker plan for a ladies skirt. Calculation of marker efficiency.
12. Developing design, pattern and marker plan for men's formal trouser. Calculation of marker efficiency.

Practical: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Logo/label designing of various brands.
2. Development of jacquard design for saree.
3. Sketch and design garments based on various themes.



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U15TX*P*702	Technical Textiles Laboratory	L	T	P	C
		0	0	2	1

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Construct composite material and determining its mechanical properties

CO2: Manipulate the permeability characteristics of filter textiles and sport textiles

CO3: Acquire details about mechanical properties of geo textiles, packing textiles and medical textiles

CO4: Demonstrate waterproof/wound care/felts, textile material behavior related to water management

CO5: Specify flame characteristics of flame retardant textiles and abrasive nature of coated textiles

CO6: Summarize the technical textile products testing standards and procedures

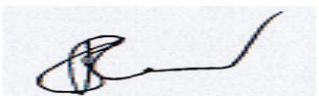
Pre-requisites :

1. U15TX*P*601/ Textile Quality Evaluation Laboratory

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1				S			M							S
CO2					S		M							S
CO3	S					M								S
CO4			S											S
CO5					S									S
CO6	M			M			M							S



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Course Assessment methods

Direct	Indirect
1. Observation 2. Lab Exercises 3. Model Practical Examination 4. End Semester Practical Examination	1. Course end survey

List of Experiment(s)

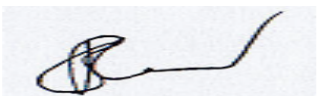
(Experiment beyond the syllabus should be taken)

1. Determination of the mechanical properties of given composite materials.
2. Determination of the bursting strength, stiffness and areal density of the given nonwoven fabric.
3. Determination of air permeability and construction details of filters.
4. Determination of the water vapor permeability & air permeability of the given sports textiles.
5. Determination of the tearing strength and construction details of the given packaging technical textiles.
6. Determination of the abrasion resistance and stiffness of the given coated technical textiles.
7. Determination of mechanical strength and construction details of the given geo textiles.
8. Determination of the water resistance / repellency of water proof textiles.
9. Determination of the water absorbency / retention of given medical wound care material / felt textiles.
10. Determination of the flammability of the given fire proof fabric.
11. Determination of the construction particulars and tenacity of the different suture threads.
12. Production of fibre reinforced composites and determination of the fibre volume fraction / fibre mass fraction.

Practical: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Evaluation of the quality parameters of automotive seat fabric
2. Evaluation of the quality parameters of Surgical gowns
3. Collection of various automobile textile products with specification
4. Collection of various medical textile products with specification
5. Collection of various food grade textile products and analyze, study and report.



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U15TX *P*703 **Project Work-Phase I**

L	T	P	C
0	0	4	2

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Identify a problem in textile engineering field through literature survey.

CO 2: Construct a design to overcome its problems

CO 3: Make use of analysis, to confirm the identity

CO 4: Develop and analyse the product

CO 5: Select the optimum design

CO6: Summarize the project report

Pre-requisites :

1. Knowledge in Design and Fabrication of component

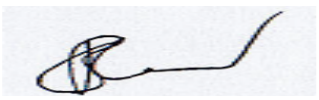
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO1	PSO2
CO1	S	S										M		S
CO2			S			M	M							S
CO3				S	S			M						S
CO4					S									S
CO5			S	S										S
CO6			S	S										S

Course Assessment methods

Direct	Indirect
1. Review 1 2. Review 2 3. Review 3 4. Viva-voce	1. Course end survey



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U15GHP701- GLOBAL VALUES

(Common to all branches of Engineering and Technology)

L	T	P	C
1	0	0	1

Objectives

1. To facilitate Students to think holistically
2. To empathize ecology and its benefits and thereby conserve it
3. To be aware of Issues related to Globalisation and how to mitigate it
4. To understand global economy and to know how economy driven world impacts happiness

Course outcomes:

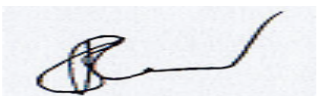
After successful completion of the course, the student would be able to:

1. The Students shall understand importance of ecology and its preservations
2. The Students shall understand the various global issues and their causes and solutions
3. The Students shall approach any problem holistically as against giving a reductionist solution
4. The Students shall learn impact of globalization on various factors such as environment, local population etc
5. The Students shall learn to integrate and understand how an Individual peace impacts world peace

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		W					M	M	M	M		M		
CO2		W				M	S	S	M	M		M		
CO3		W	W		W	M	M	M	W	W		M		
CO4		W				S	M	M	W	W		M		
CO5						W	W	W				S		



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Course Assessment methods:

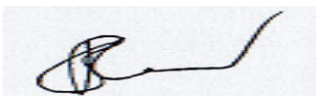
Direct	Indirect
1.Individual Assignment 2.Group Assignment 3.Presentation 4.Surprise Test 5.Practical Assessment 6.End Semester Assessment	1.Attendance and Behavioural Assessment

Introduction to Global Values	1 Period
Introduction to Systems Thinking	1 Period
Ecology, ecological imbalances and its solution	3 Periods
Globalisation Vs Localisation – an economic and Spiritual Perspective	3 Periods
Global Issues & Solutions	3 Periods
Advanced Contemplative Practices	4 Periods

Total Periods: 15

References Books:

1. Vethathiri's Maharishi's, ***"World peace"*** The World Community Service Centre, Vethathiri Publications,1957.
2. Fritz Schumacher, ***"Small is Beautiful",*** The Blond & Briggs, Published 1973.
3. Noam Chomsky, ***"Profit over People",*** Seven Stories Press, Published 1999.
4. Vethathiri's Maharishi's, ***"Atomic Poison"*** The World Community Service Centre, Vethathiri Publications, 1983.



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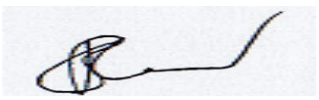
SEMESTER VIII



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U15TX *P801* **Project Work-Phase II**

L	T	P	C
0	0	20	10

Course Outcomes

After successful completion of this course, the students should be able to

CO 1: Perform methodology using appropriate tools for the problem.

CO 2: Analyze data and interpret the results obtained.

CO 3: Identify the process the fabrication / manufacturing.

CO 4: Experiment of the model developed.

CO5: Interpret and analyze the experimental / tested data

CO 6: Summarize the results and submit a report.

Pre-requisites :

1. Knowledge in Design and Fabrication of component

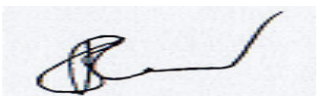
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		S												S
CO2		S												S
CO3		S												S
CO4				M					M					S
CO5				S						S	M			S
CO6	M			M			M							S

Course Assessment methods

Direct	Indirect
1. Review 1 2. Review 2 3. Review 3 4. Viva-voce	1. Course end survey



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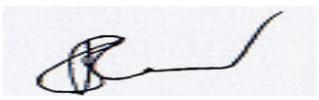
PROFESSIONAL ELECTIVE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U15TXTE01 **High Performance Fibres**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss the aramid and sulphur based fibres.

CO2: Explain the fundamentals, manufacturing, properties and applications of carbon and glass fibres

CO3: Differentiate the structure, manufacturing methods, properties and applications of ceramic, elastomeric and PBI fibres.

CO4: Demonstrate about the various aspects of metallic fibres.

CO5: Describe about the newly developed fibres.

CO6: Summarize the properties and application of high performance fibres

Pre-requisites :

1 U15TXT301 / Manufacturing fiber Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

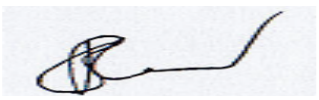
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S												S	
CO2		M											M	
CO3		M											M	
CO4		S	S	M									S	
CO5		S			S								S	
CO6	M			M			M						S	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

ARAMID AND SULPHER BASED FIBRES **9 hrs**

Requirements of high performance fibres. Aramid fibre – Kevlar fiber - Formation – Structure – Properties and application. Nomex fiber – formation



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– structure – properties and application.Polyphenyl sulphide fibres - Fibre formation - Properties – Applications.

CARBON AND GLASS FIBRES **9 hrs**

Classification of Carbon fibres - Manufacturing processes from Polyacrylonitrile (PAN), Rayon and Pitch based fibres - Properties and Applications. Glass fibres –Optical fibres Types and composition - manufacturing processes - Fibre structure - Properties - Applications.

CERAMIC, ELASTOMERIC AND PBI FIBRES **9 hrs**

Ceramic fibres – classification, fibre formation, composition, structure, properties and applications. Elastomeric (Polyurethane) fibres - manufacturing processes - Properties -Applications. HDPE fibers- manufacturing processes - Properties -Applications. Polybenzimidazole (PBI) - Fibre formation, structure, properties and applications.

METALLIC FIBRES **9 hrs**

Metallic fibres -. Steel fibre - Formation – Structure – Properties and application. Aluminium Oxide fibres - Preparation and manufacturing process - Properties - Applications – Composites of Aluminium Oxide fibres. Lead fibres – Fibre Preparation - Properties - Applications - Sound Control and Radiation Shielding Materials.

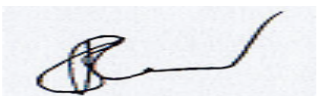
NEW FIBRES **9 hrs**

Polystyrene based fibres - Preparation - Properties – Applications. Micro fibres- Preparation – Properties; Bio-absorbable fibres from Cotton, Rayon, Poly Lactic Acid (PLA); Nano-fibres, Ultra-fine fibres, Hollow fibres and its uses.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. High performance application of textile fibers in civil engineering
2. Lyocell: High performance application for nonwovens
3. Extreme textiles: Designing for high performance fibers



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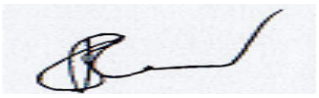
REFERENCES

1. Mukhopadyay S.K., “High Performance Fibres”, Textile Progress, Textile Institute, Manchester, Vol. 25, 1993.
2. Menachem Lewin and Jack Preston., “High Technology fibers - part B”, Marcel Dekker, New York, 1989.
3. Gupta V.B. and Kothari V.K., “Manufactured Fibre Technology”, Chapman Hall Publishing Company, 1997.
4. Anand S.C., “Medical textiles: Proceedings of the 2nd International conference” Bolton, UK. 2001.
5. Menachem Lewin & Jack Preston, “High Technology Fibres - Part A”, Marcel Dekker, New York, 1985.



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U15TX*T*E02 **Maintenance Management in Textile Mills**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Inventory control techniques in spinning mill.

CO2: One week maintenance schedule in preparatory and spinning departments

CO3: Erection procedure in carding machine

CO4: Cost work sheet

CO5: Production planning in spinning

CO6: Summarize the time schedule for maintenance of textile machines

Pre-requisites :

1. U15TXT401 Yarn Manufacturing Technology II
2. U15TXT402 Shuttleless Weaving Technology
3. U15EET311 Basics of Electrical and Electronics Engineering
4. U15TXT505 Textile Printing and Finishing Technology

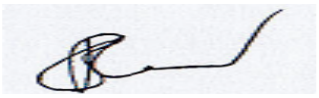
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S	M	S	M	S							S	
CO2	S	S	S	M	M	S							S	
CO3	M	M	S	M		S							M	
CO4	S	M	M	M									S	
CO5	S	S	M	M									S	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey



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INTRODUCTION TO MAINTENANCE **9 hrs**

Object of maintenance – types of maintenance- Organizational structure for 25,000 and 50,000 spindles spinning mill, composite mills and vertically integrated units- systems and procedure of maintenance- planning- scheduling- controlling- back logs rescheduling- roll of computer in maintenance management- Mill stores planning inventory control techniques- tools required for maintenance – general tools and specialty tools and gauges.

MAINTENANCE SCHEDULE **9 hrs**

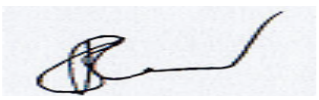
Maintenance schedule for blow room to autoconer in a spinning mill- maintenance schedule for TFO, Doubling Machine, Compact spinning machine, Rotor spinning machine, Air jet spinning machine, DREF Spinning machine- Maintenance schedule for preparatory machines in loom shed -auto looms and shuttle less looms-(projectile, rapier, air jet, water jet looms)- Maintenance schedule for Knitting machine- Maintenance schedule for wet processing machines-Kiers, washing machine, Jiggers, stenters, Calendaring machines, Soft flow dyeing machines.

POWER HOUSE MAINTENANCE **9 hrs**

Maintenance of power house- transformers- Generators- Humidification plants - Maintenance for special motors-Servo motors- Gear motors – Fluid coupling motors - Stepped speed drive motor- Variable speed motors- Starters and switches- Compressors- Regulators- Driers- Pressure monitors- Over head cleaners- Maintenance of electronic devices in textile industry- Maintenance of on line and off line monitors used in textile mills- Energy audit in textile mills.

SPECIAL MAINTENANCE ACTIVITIES **9 hrs**

Piano feed maintenance- Card grinding- Mounting- End milling – Flat burnishing- Cot buffing- Roller lapping prevention techniques-Berkolisation- Cot selection and mounting procedure- Spindle oiling – topping, replenishing- spindle and lappet gauging- top roller pressure setting- roller eccentricity measurement and removal methods- loom timing and setting procedure- causes and remedies for various defects in processing – Lubricants- Types- Properties- Selection of lubricant for different operations- various lubricating equipments and its applications- Textile bearings and selection – abrasives used in textile maintenance and their specifications –



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Maintenance of safety equipments- fire alarms- micro dust filters- fire extinguishers.

MODERNIZATION PROGRAMME **9 hrs**

House keeping techniques- lay out planning- basic erection procedure for ring frame and looms- Maintenance audit- maintenance cost control- depreciation concepts- - replacement theory and concepts- calculation of replacement duration – Renovation Vs Modernization – investment decision tools, disposal procedure for scrap items.

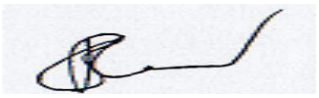
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Inventory control techniques in spinning mill.
2. One week maintenance schedule in preparatory and spinning departments
3. Erection procedure in carding machine
4. Cost work sheet
5. Production planning in spinning

REFERENCES

1. Ratnam T.V. and Chellamani K.P., "Maintenance management in Spinning", SITRA, Coimbatore, 2004.
2. "Spinning, Weaving and Processing Machinery Maintenance in Textile Mills", TAIRO, Baroda, 1970.
3. "Maintenance Schedules, Practices, and Check points in Spinning" BTRA, Bombay, 1979.
4. Paliwal M C and Kimothy P D, "Process Control in Weaving", ATIRA, Ahmedabad, 1983.
5. Balasubramaniyan.K and Manoharan J.S., "Maintenance management in weaving", SITRA, 2008.
6. K. Balasubramaniam, J.S.Manoharan 'Maintenance Management in Weaving", SITRA, Coimbatore , 2008.
7. T.R.Banga, N.K.Agarwal & S.C.Shama, "Industrial Engineering and Management" khama publishers, Chennai, 1995.



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U15TX*T*E03 **Pattern Making and Grading**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Explain the basic concepts about pattern making

CO2: Describe the drafting procedure for basic patterns

CO3: Explain the draping procedure

CO4: Describe the dart manipulating procedure

CO5: Explain the pattern alteration techniques

CO6: Summarize role of computer technology in pattern engineering

Pre-requisites :

1. U15TXT603 / Garment Manufacturing Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

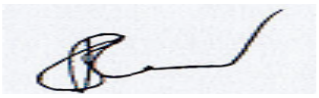
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S				S								S	
CO2		S											S	
CO3			S										S	
CO4			S	S	S								S	
CO5					S								S	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

BASIC PATTERN MAKING **9 hrs**

Patterns – definition and types – individual and commercial patterns. Pattern making – definition and types of pattern making- drafting, draping, flat pattern techniques, their advantages and disadvantages. Tools for pattern



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making. Body measurements – importance, principles, precautions. Size charts – ASTM Standards) definition and standardization.

DRAFTING **9 hrs**

Basic principles and methodologies used to draft standard basic block patterns for men, women and kids wear- top, skirt and bifurcated garment. Difference between permanent pattern, (Draft) Working patterns and Production patterns. Importance of pattern details – pattern name, cut number, on fold details, drill hole marks in the darts, Seam allowances, notches, Balances marks and grain lines.

DRAPING **9 hrs**

Draping - Tools for Draping. Draping skills – preparation of basic blocks- bodice, skirt sleeve, trouser ,cowl neck line and shawl collar.

FLAT PATTERN TECHNIQUES **9 hrs**

Dart Manipulation – basic techniques – pivot method, slash and spread, measurement method. Applications of dart manipulation – transferring, combining, dividing, converting into seams and fullness, shaped darts. Added fullness method.

PATTERN ALTERATION AND GRADING **9 hrs**

Pattern alteration - definition, principles, techniques – Lengthening, shortening, widening, narrowing patterns according to required body measurements by slash and spread or slash and overlap methods. Grading – Definition, Principles and types –manual grading and computerized grading for bodice block, sleeve and skirt.

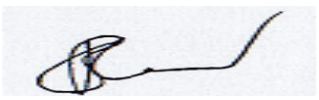
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. 3 D Body Scanning
2. Pattern Modification
3. Lay lot plan

REFERENCES

1. Helen Joseph Armstrong, “Pattern Making for Fashion Design”



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Pearson Education (Singapore) Pvt. Ltd., 2005.
2. Winifred Aldrich, “Metric Pattern Cutting” Blackwell Science Ltd.,1994.
3. Gillian Holman, “Pattern Cutting Made Easy”, Blackwell Scientific Publications, 1997.
4. Natalie Bray “More Dress Pattern Designing” Blackwell Scientific Publications, 1986.
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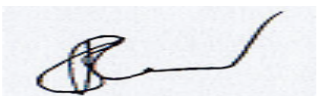
6. Gerry Cooklin, “Master Patterns and Grading for Women’s Outsizes”, Blackwell Scientific Publications, 1995.



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U15TX*TE*04	**Textile Project Management and Finance**	L	T	P	C
		3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Define about project management

CO2: Outline on project planning

CO3: Estimate the cost of production & working capital requirement

CO4: Differentiate between income statement and balance statement

CO5: Review about financial ratio

CO6: prepare a project report for new textile industry setup

Pre-requisites :

1. U15TXP502 In-Plant Training / Internship
2. U15TXT401 Yarn Manufacturing Technology II
3. U15TXT402 Shuttleless Weaving Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

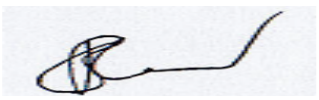
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S		M									S	
CO2	S	S	S										S	
CO3	M	M		S	S								M	
CO4	S	S	M	M									S	
CO5	M	S		M	M								M	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

PROJECT MANAGEMENT **9 Hours**

Definition-Importance-Forms of project organization-Project Planning-



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Project control-Human aspects of project management; Prerequisites for successful project implementation; Various clearances from government agencies; Technical analysis; Market and demand analysis: Objectives-Secondary information-Market survey-Characterization- Demand forecasting-Market planning.

PROJECT PLANNING **9 Hours**

Network analysis-CPM and PERT. Layout planning: Concept-Factors governing plant location-Types of layout- Flow pattern. Calculation of machinery requirement of spinning (Spin plan) and weaving factories. Equipment and plant selection- Machinery layout- Site and buildings: Size, Shape, Column spacing- Electrical Requirement-Lighting; Design consideration for humidification.

PROJECT COSTING **9 Hours**

Elements of total project cost; Means of finance; Cost of Production and its calculations- Working capital requirement and its financing; Essential contents of feasibility study. Capital Budgeting: Capital budgeting process-Appraisal criteria and its calculations.

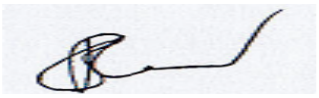
FINANCIAL ANALYSIS **9 Hours**

Balance sheet: Contents-Projected balance sheet; Income statement: Contents-Projected income statement at projected production; Profitability projections, Case studies of projected income and cost of production of a Spinning unit-Weaving unit- Textile Processing unit-Garment unit. Break-even point; Projected cash flow statement.

FINANCIAL RATIO ANALYSIS **9 Hours**

Ratios of liquidity, leverage, turnover, profitability and valuation-Comparison with industry averages. Finance Institutions- Financial Procedure – Regulation of Bank Finance-Sources of long term finance. Stock market: Development-Functions-Trading arrangements- Stock market reporting.

Theory: 45 Hours **Total: 45 Hours**



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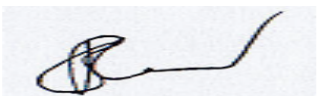
CASE STUDY (any two)

1. Study on growth of textile industry.
2. Study on importance of layouts and plant location.
3. Comparison of indigenous and imported machinery in textile industry.

REFERENCES

1. Prasanna Chandra, “Project – Preparation, Appraisal and Implementation”, Tata McGraw Hill, New Delhi, 2010.
2. Prasanna Chandra, “Fundamentals of Financial Management” Tata McGraw Hill Publications, 2010.Immer, J.R., “Layout Planning Techniques”, McGraw-Hill, New York, 1950.
3. Ormerod. A, “Textile Project Management”, Textile Institute, 1992.
4. O.P.Khanna, “Industrial Engineering and management”, DhanpatRai Publications, Reprint 2004.
5. R.Kesavan, C. Elanchezhian and T. Sunder Selwyn, “Engineering economics and financial Accounting”, Laxmi publication (P) ltd., New Delhi – 2005.
6. A.Ramachandra Arayasri and V.V.Ramana Morthy, “Engineering Economics and Financial Accounting”, Tata Mc GrawHill Puhlishing Company Ltd., New Delhi – 2006.



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U15TX*T*E05	Instrumental Analysis of Textile Fibres	L	T	P	C
		3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Summarize the instrument method and calibration procedure

CO2: Analyze the textiles and chemicals using UV and IR Spectrometry

CO3: Analyze the textiles and chemicals using X-Ray and MAS Spectrometry

CO4 : Analyze the textiles and chemicals using TGA and pH analysis instrument

CO5: Analyze the textiles and chemicals using Chromatographic instrument

CO6: Interpret the result with tested values

Pre-requisites :

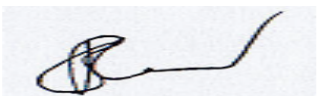
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		M											M	
CO2	S	M			M								M	
CO3	M	S	M										S	
CO4		M											M	
CO5		M											M	
CO6	M	M		M	M								M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey



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INSTRUMENT **9 Hours**

Functional description of instruments – Types & applications of Instrumentation – Generalised configuration - analog and digital modes of operation. Errors- Definitions, Significant figures – Types of Errors, Accuracy and Precision: Methods of expressing accuracy and precision , Confidence limits.

UV AND IR SPECTROMETRY ANALYSIS **9 Hours**

UV – VIS spectroscopy - Theory, Franck - Condon principle, Electronic transitions, Deviations from Beer's law – Instrumentation (block diagram only) - Applications. Infra red spectroscopy – Theory, Fundamental vibrations, Hook's law – Instrumentation (block diagram only)- Finger print region – Vibrations involved in H2O and CO2 - Applications.

MASS SPECTROMETRY AND X-RAY ANALYSIS **9 Hours**

Mass spectroscopy: Theory, Instrumentation (block diagram only) – Ionization Techniques – Electron impact ionization, Chemical ionization and Desorption techniques. Nirogen rule, McLafferty rearrangement.

X-Ray: optical and X-ray diffraction- image, pattern, reflection, distribution and intersection.

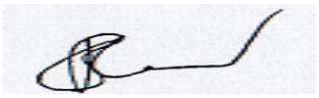
THERMAL AND pH ANALYSIS **9 Hours**

Potentiometric measurements – Ion selective electrodes – Glass electrode – Determination of pH – Buffers – Types of potentiometric titrations – Applications of Potentiometric measurements. Thermal Methods : Thermogravimetry – Factors affecting thermogravimetric curves – Instrumental and sample characteristics – Instrumentation (block diagram only) – Applications. Differential Thermal Analysis – Introduction – Factors affecting DTA curves – Environmental, Instrumental and Sample factors – Instrumentation (block diagram only) – Applications.

CHROMATAGRAPHIC ANALYSIS **9 Hours**

Chromatographic Techniques – Introduction – classification – Theory, Instrumentation and Applications of Paper Chromatography, Thin Layer Chromatography, Column Chromatography, High Performance Liquid Chromatography and Gas – Liquid Chromatography.

Theory: 45 Hours **Total: 45 Hours**



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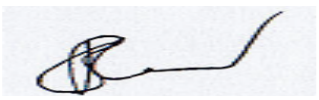
CASE STUDY (any two)

REFERENCES

1. Rouessac,F., “Chemical analysis – modern international method and techniques”, Wiely,New Delhi, 1999.
2. Day, R.A., and Unerwood, A.L., “Qualitative inorganic analysis, 5th edition”, Prentice-Hall of India, New Delhi, 2004.
3. Bona,M., “Modern control Techniques in textile finishing and making up”, Eurotex, Blachwells Bookshop, London, 2001
4. Banwell,G.C., “Fundamentals of molecular spectroscopy”, TMH, 2003.



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U15TX*T*E06 **Textile Composites**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Describe the various reinforcements/resin materials used in composites with its basic testing.

CO2: Distinguish the type of reinforcements/resin materials used in composites and compare its properties with conventional engineering materials.

CO3: Analyze and interpret the necessary steps involved in textile composite formation

CO4: Demonstrate the different composite manufacturing techniques with its limitations

CO5: Outline the various testing performed in composite materials

CO6: Summarize the requisite Properties of Textile Composite for various applications

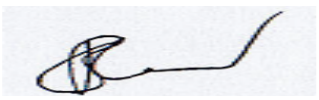
Pre-requisites :

1. U15TXT504Woven Fabric Structure and Design
2. U15TXTE01 High Performance Fibres

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1			M		S					M			M	
CO2		M	M		S								M	
CO3	M	M	M		S					M			M	
CO4	S	M	M		M								M	
CO5	M	M	M		M					M			M	
CO6	M			M			M						M	



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Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION TO COMPOSITES **9 hrs**

Composites- Introduction, Definition and classification –Structure of the matrix such as MMC, CMC and PMC. Reinforcement forms – Limitations of the conventional engineering materials such as metal, plastics and ceramics- Advantages of Composites over Conventional Engineering materials. Introduction to green composites and nano-composites.

MATRIX AND REINFORCEMENT **9 hrs**

Matrix polymer-Thermosets, thermoplastics-Reinforcing agents-Types of reinforcing agents such as fibre, particulate and laminates-Fibre forms such as roving, yarns, fabrics. Testing of Matrix and Reinforcement materials. Prepregs and preforms – manufacturing technologies, advantages and Limitations.

MECHANICS OF COMPOSITES **9 hrs**

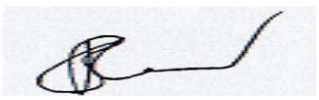
Mechanical Properties of composites-Elasticity of Composites-Failure modes of Composites-Ply and orientation- Rule of Mixture and Property prediction-Fibre Volume fraction(FVF) and Fibre Mass Fraction(FMF)-Interface and interfacial reactions-Other properties of Composites such as Delamination and Fracture toughness-Compression behavior of Composites- Calculations in FVF, FMF and ply thickness.

COMPOSITES MANUFACTURING METHOD **9 hrs**

Goals of Composite manufacturing process, Manufacturing Technologies, Characteristics, Application and Limitations: Lay-up, Spray lay-up, Automatic Lay-up, Vacuum bagging, Compression moulding, Injection moulding, Filament winding, Pultrusion, Resin transfer moulding.

TESTING OF COMPOSITES **9 hrs**

Types of loading: Tension, Compression, shear, flexure. Destructive Testing: Tensile Testing: Inplane tension test, out of plane tensile test -



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Compression test, interlaminar shear testing, $\pm 45^{o}$ tensile test, rail shear test, short beam shear test, interlaminar fracture testing, Fibre volume fraction: Matrix digestion, Ignition Loss. Moisture diffusivity, void content, accelerated weathering test. Non destructive test: visual, optical, ultrasonic, acoustic, radiographic, thermal.

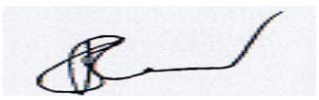
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. With lower Fibre Volume Fraction, Interface strength of jute/epoxy composite found lower.
2. Web form of matrix inclusion in composite preparation has good Interface strength.
3. Prepregs are economical in composite manufacturing process.

REFERENCES

1. Guneri Akovali "Handbook of Composite Fabrication", Rapra Technology Ltd, 2003.
2. Autar K.Kaw , "Mechanics of Composite Materials", Second Edition, CRC press, 2006.
3. George H.Stab , "Laminar Composites", B-H publication,1999.
4. Sanjay K.Mazumdar, "Composite manufacturing-Material, Product and Process engineering", CRC press, 2002.
5. Daniel Gay, Suong V. Hoa, Stephen W. Tsai, "Composite Materials– Design and Applications", CRC press, 2002.



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U15TX*T*E07 Garment Processing and Garment Care

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Outline the process flow for garment processing

CO2: Explain the various dyeing, printing and finishing methods involved in garment processing

CO3: Prepare the garment with different style using advanced finishing

CO4: Explain the working principle of garment processing machines

CO5: Summarize the laundry equipment and reagents

CO6: Label the garment care

Pre-requisites :

1. U15TXT505 / Textile Printing and Finishing Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

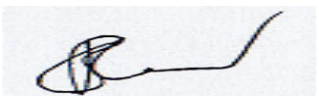
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	P O 12	PSO 1	PSO 2
CO1	S	M											S	
CO2	S	M	M										S	
CO3	S				W								S	
CO4	S						W						S	
CO5	M	M											M	
CO6	M										W		M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

GARMENT PROCESSING **9 hrs**

Developments in garment processing and its future – Problems in garment dyeing – Remedies– Considerations and precautions to be taken for garment Dyeing – Pros and Cons of garment dyeing – Chemical



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preparation of garments for dyeing and printing. Use of enzymes in the preparation.

EFFECTS ON GARMENTS **9 hrs**

Wash down effects, stone wash, Enzyme wash, Bio – polishing, Acid wash, sand blasting, leather finish, rubbery touch, feather touch, peach skin finish, ION wash, mud wash, chalk wash, easy care finishes, wrinkle free and wrinkle resistant finish, water repellent finish, UV protective garments, Anti – microbial (or) anti – bacterial inhibition finish, silicone softeners, fire retardant finishes for garments.

GARMENT FINISHING **9 hrs**

Finishing techniques, Dip process, Tumbling process, pad – dry – cure method. Stone washing machines, tumble dryer, used look finishing machines, garment finishers, hand finishers, multiform finishers, shirt finishers, pant finishers, cabinet finishers, tunnel finishers, continuous finishers.

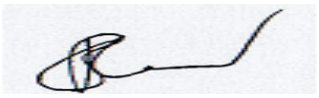
LAUNDERING **9 hrs**

Study of laundry equipment and reagents – soaps – detergents – cleaning action of soaps, study of modern and industrial cleaning agents. Principles of laundering – stain removal – various solvents for stain removing blood, tea, rust, oil/grease etc. – different methods of washing – application of friction by hand rubbing – scribing – tumble wash

GARMENT CARE **9 hrs**

Selection of garments, need for garment care. Identification of stain – classification of soil and stains cleaning processes – Air & Wet cleaning, Stain removal, Drying, pressing, storage –protection against light, temperature, microbes, hand washable and machine washable garments– Garment care and care labeling. Use of care labels and standards / norms for care labels.

Theory: 45 Hours **Total: 45 Hours**



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CASE STUDY (any two)

1. Quality aspects of garment wet processed material
2. Energy conservation in garment wet processing industry
3. Techno economic study for garment wet processing industry

REFERENCES

1. Trotman.E.R."Dyeing and Chemical technology of textile fibres",B.I.Pub.,New Delhi.1994.
2. Noemia D' Souza ,Fabric Care, , New AGE International Pub.1998
3. NCUTE – Programme series, Finishing of Garments and Knits, held at Ichalkaranchi, IIT, Delhi.
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5. Harrison.P.W Garment Dyeing, , The Textile Institute Publication, Textile Progress, Vol .19 No.2,1988.
6. "Garment Wet Processing Technical Manual", AATCC/SDC, 1994.
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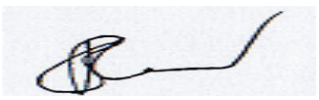

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U15TX*T*E08 **Medical Textiles**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Outline on medical textile industry

CO2: Explain properties, types, applications of implantable, non-implantable and drug delivery textiles

CO3: Discuss on property requirements, applications and testing of biopolymers and Tissue engineering

CO4: Summarize different types and its properties of wound care and reusable medical textiles

CO5: Compare the characteristics of different smart medical textiles and its applications

CO6: Summarize the evaluation technique of medical textile products

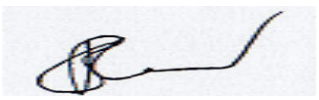
Pre-requisites :

1. U15TXT503 / Nonwoven Technology
2. U15TXT702 / Technical Textiles

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M												M	
CO2	M	M											M	
CO3								M					M	
CO4								M					M	
CO5		M											M	
CO6	M			M			M						M	



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Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION **9 hrs**

Medical textiles — classification, current market scenario in international and national level – government initiatives; antimicrobial fibres and finishes; nano fibrous materials and films; super absorbent polymers; operating room garments; personal health care and hygiene products and their testing methods; applications of non-wovens in medicine; textiles in infection prevention control.

BIOPOLYMERS, TESTING AND TISSUE ENGINEERING **9 hrs**

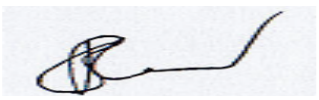
Biopolymers: classification and their properties, requirements, and applications, testing methods; In vitro tests – direct contact, agar diffusion & elution methods – in vivo assessment of tissue compatibility. Tissue engineering: properties and materials of scaffolds- relationship between textile architecture and cell behavior – applications of textile scaffolds in tissue engineering.

IMPLANTABLES, NON-IMPLANTABLES AND DRUG DELIVERY **9 hrs**

Bandages-types, properties and applications; compression garments-types, properties and applications; sutures: types and properties; implantable textiles: hernia mesh – vascular prostheses – stents; Extra corporeal materials: Cartilage nerves – liver ligaments, kidney, tendons, cornea; Drug delivery textiles: classification – mechanism various fabrication methods – characterization – applications.

WOUND CARE AND REUSABLE MEDICAL TEXTILES **9 hrs**

Wound: types and healing mechanism- textile materials for wound dressing – bio active dressing – anti microbial textiles dressing – composite dressing –- testing of wound care materials; Wound compression textiles; Reusable medical textiles: types, advantages, physical properties and performance — reusable processing methods.



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SMART MEDICAL TEXTILES AND LEGAL ISSUES **9 hrs**

Smart textiles – types, characteristics – smart textiles in wound care; applications of phase change and shape memory materials – monitoring pregnancy, children and cardio patients – mobile health monitoring ; electronics in medical textiles; Smart textiles in rehabilitation and applications; textile sensors for healthcare ;legal and ethical values involved in the medical textile materials.

Theory: 45 Hours **Total: 45 Hours s**

CASE STUDY (any two)

1. Study about the various wound care materials.
2. Analysis on market & its potential of medical textiles in national and international level.
3. Study of various bandages available in market.

REFERENCES

1. Rajendran.S, "Advanced Textiles for Wound Care", Wood Head publishing in Textiles: Number 85, 2009.
2. Bartel.V.T, "Handbook of medical textiles", Wood Head publishing, 2011.
3. Van Langenhove, "Smart textiles for medicine and health care – materials, systems and applications", Wood Head publishing, 2007.
4. Ray smith, "Biodegradable polymers for industrial application", CRC press, 2005.
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6. Pourdegtimi..B, "Vascular grafts: Textile structures and their performance", Textile progress, vol. 15, No. 3, the Textile Institute, 1986.
7. Cusick. GE and Teresa Hopkins, "Absorbent incontinence products", the Textile Institute, 1990.
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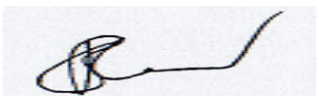

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U15TX*T*E09 **Clothing Science**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Outline dimensional stability of clothing with different mechanisms.
CO2: Explain tailorability and serviceability of woven and knitted fabrics.
CO3: Summarize handle and aesthetic properties of fabrics.
CO4: Relate human-clothing-environment system in terms of comfort.
CO5: Explain thermal properties of clothing related to clothing comfort.
CO6: Summarize the influence of various factors for clothing comfort

Pre-requisites :

1. U15TX*T*301 / Manufactured fibre technology
2. U15TX*T*504 / Woven fabric structure and design

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

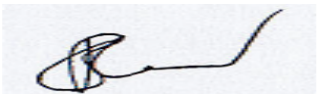
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M	S											M	
CO2	M	M			M								M	
CO3	M	M			M								M	
CO4	M	M	M										M	
CO5	M				M								M	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

DIMENSIONAL STABILITY **9 hrs**

Dimensional Stability of Fabrics: Hygral expansion, Relaxation shrinkage, Swelling shrinkage, Felting shrinkage. Mechanism of fabric shrinkage-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Relationship between Hygral Expansion, Relaxation shrinkage and extensibility - Knitting Process Parameters and fabric stability.

TAILORABILITY & SERVICEABILITY **9 hrs**

Tailorability of fabrics: Woven and knitted - formability, sewability. Serviceability of Fabrics: Wear- Abrasion resistance, Tearing strength. Pilling - mechanism of pilling formation, anti-pilling techniques, snagging, seam strength and seam slippage-Color fastness.

HANDLE AND ASTHETIC PROPERTIES **9 hrs**

Fabric Handle: Handle characteristics, subjective hand judgment, objective evaluation of fabric hand and its applications. Aesthetic properties: Drape, Crease and Wrinkle recovery - Lustre. Scroopiness - Stain resistance.

CLOTHING COMFORT **9 hrs**

Definition of comfort - Human clothing system - Physical, Physiological and psychological aspects of comfort – Tactile and pressure sensation aspects. Applications of clothing comfort research.

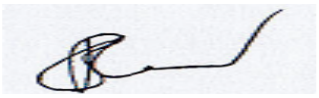
THERMAL COMFORT **9 hrs**

Introduction. Thermal transfer processes – Dry heat transfer and Rapid heat transfer. Flammability – burning behaviour. Thermal degradation. Function of Textiles in enhancing thermal comfort. Comparison of thermal comfort properties for different textile structures

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Comfort properties of PV blended suiting fabrics
2. Comfort properties of linen knits
3. Designing comfort garment for children



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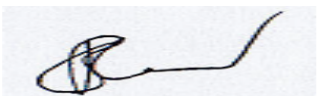
1. Kothari, V K, “Testing and Quality Management “, CBS Book Publishers, New Delhi, 2000.
2. Li. Y, “The Science of Clothing Comfort”, Textile Progress, Volume: 31, No. 1/2, Textile Institute, ISBN: 1870372247, 2001.
3. Saville B P, “Physical Testing of Textiles,” The Textile Institute, Woodhead publication limited, Cambridge, ISBN: 1855733676, 1999.
4. Billie J Collier and Helen H Epps,” Textile Testing and Analysis,”Prentice- Hall Inc., New Jersey , ISBN 0134882148, 1999.
5. Lyman Fourt & Norman R.S. Hollies, “Clothing: Comfort & Functions”, Marcel Dekker, Inc, Newyork, ISBN: 0-8247-1214-5.
6. G.Song, “Improving Comfort in Clothing”, Woodhead Publication Ltd, ISBN: 1-84569-539-9.
7. A.Das, R.Alagirusamy, IIT Delhi, “Science in Clothing Comfort”, Woodhead Publication Ltd, ISBN: 1-84569-789-8.



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U15TX*T*E10 Marketing and Merchandising

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Explain marketing concept in textile industry

CO2: Define the marketing segmentation

CO3: Summarize the export documentation for export the product

CO4: Recall the pricing methods and their application

CO5: Discuss the sourcing strategies in textile marketing

CO6: List the different activities involved in visual merchandising

Pre-requisites :

1. U15TXT603 / Garment Manufacturing Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M	M				M	M						M	
CO2	M	M											M	
CO3						M							M	
CO4	M	M											M	
CO5	M						M	M	M				M	
CO6	M			M			M						M	

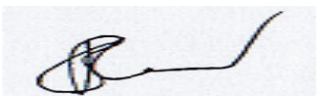
Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

MARKETING AND CONSUMER BEHAVIOR 9 hrs

MARKETING

Introduction to Marketing - marketing in a developing economy – Marketing of services – planning marketing mix – market segmentation – Marketing research and its applications.



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CONSUMER BEHAVIOUR **9 hrs**

Understanding Consumers -Determinants of Consumer behaviour – models of Consumer Behaviour – Indian Consumer Environment.

PRODUCTION PLANNING AND MANAGEMENT **9 hrs**

Introduction to Product Planning – Product Divisions and Strategies – Product Life Cycle and New Product Development –Branding and Packaging Decisions with special reference to textile products.- RETAILING AND WHOLE SALING**:** Importance of retailing and wholesaling – types of retailing and wholesaling – recent trends in retailing and wholesaling with reference to textiles – retail and wholesale centres with reference to textiles in India.

MERCHANDISING AND SOURCING **9 hrs**

Definition of merchandising – functions of merchandising division – role and responsibilities of a merchandiser – different types of buyers – communications with the buyers – awareness of current market trends – product development, line planning – line presentation.

SOURCING: Need for sourcing- sourcing materials- manufacturing resources planning – principles of MRP – Overseas sourcing – sourcing strategies. Supply chain and demand chain analysis – Materials management for quick response – Just In Time technology.

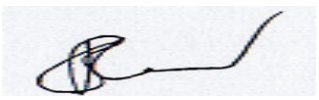
EXPORT DOCUMENTATION **9 hrs**

Order confirmation, various types of export documents, pre-shipment and post-shipment documentation, terms of sale, payment and shipment. Duty drawback, DEPB, I/E license-exchange control regulation-foreign exchange regulation acts-export management risk-export finance. Functions and objectives of WTO-Concepts of GATT and MFA.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Study on the consumer behavior in textile marketing
2. Study on the export documentation and processing



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3. Study on the impact of globalization and effect on export marketing
4. Study on the export documentation and processing.

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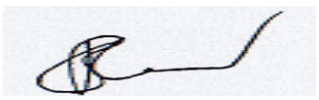
1. Evans. J. R. “Marketing: Marketing In The 21st Century”, 8th edition, 2003.
2. Philip Kotler, “Marketing Management”, PHI publications, 2004.
3. S.Shivaramu, “Export Marketing – A practical Guide to Exporters”, McGraw-Hill Book Company, 1985.
4. Ruth E.Glock and Grace L.Kunz, “Apparel manufacturing and sewn product analysis”, Prentice Hall, New Jersey, 2000.
5. D. Sinha, “Export Planning and Promotion”, IIM, Calcutta, 1981.
6. Tuhin K. Nandi, “Import–Export Finance”, IIM, Calcutta, 1989.
7. J.A. Jarnow, M.Guerreiro, B.Judelle, “Inside the Fashion Business”, MacMillan Publishing Company ISBN: 0-02-360000-4., 1987.
8. Ruth E.Glock, Grace I.Kunz, “Apparel Manufacturing: Sewn Product Analysis”, Pearson Education, Fourth Edition, 2005.
9. Elaine Stone, Jean A. Samples, “Fashion Merchandising”, McGraw-Hill Book Company, ISBN: 0–07–061742–2., 1985.
10. S.Shivaramu. “Export Marketing” – A Practical Guide to Exporters”, Wheeler Publishing, ISBN: 81-7544-166-6, 1996.



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U15TX*T*E11 **Apparel Production Planning and Control**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss various apparel production systems

CO2: Illustrate production planning techniques in marker planning and spreading

CO3: Illustrate production planning techniques sewing line

CO4: Explain the concept of work study

CO5: Apply production control techniques in garment industry

CO6: Determine man and machine requirement for production line

Pre-requisites :

1. U15TXT603 / Garment Manufacturing Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

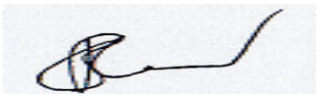
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M	S	S							M			M	
CO2	M	S	S		M					M			M	
CO3	M	S	S										M	
CO4		S		S									M	
CO5	M	M	M										M	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTROCUCTION **9 hrs**

Introduction-Objectives-Production management-Product design-Design of production system-Types of production system-Manufacturing process-Types of manufacturing process-Factors affecting the choice of manufacturing process-Production planning and control-Benefits to small



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entrepreneur-Steps of production planning and control- Planning & lead Time -Importance of pre- production activities.

MARKER AND LAY PLANNING **9 hrs**

Marker planning –Direction of Design-Marker utilization –spreading technique for plain – stripes, plaid and checks –splicing – marker making; lay lot planning; cutting and sewing schedule- preparation of cutting schedule- numerical exercises on lay lot planning-Types of Lay

OPERATION SEQUENCE DEVELOPMENT **9 hrs**

Garment breakdown with machine and attachment details, development of production grid for T- Shirts - development of production flowchart – men's full sleeve shirt – trousers – five-pocket jeans – ladies night dress – shorts – T-shirt

WORK STUDY **9 hrs**

Method Study and Work Measurement -Techniques - Principles of Motion Economy – Classification to Movements - Process Flow Chart – Two-handed Process Chart, Micro-motion Study - Time Study – Definition - Steps in making a Time Study - Breaking the Job into Elements - Stop Watch Procedure. Time Study Rating, Calculation of Standard Time

PRODUCTION PLANNING AND CONTROL **9 hrs**

Production scheduling-Gantt chart preparation-Capacity calculation for cutting, sewing and finishing; determination of machine requirements for a new factory; line balancing: determination and allocation of manpower and machine for balanced production in existing plant for a given target

Theory: 45 Hours **Total: 45 Hours**

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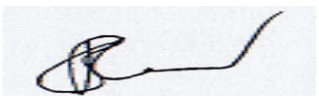
1. Solinger Jacob, "Apparel Manufacturing Hand Book - Analysis, Principles and Practice", Columbia Boblin Media Corp., 1988.
2. David J.Tyler, "Materials Management in Clothing Production", 2000.
3. William K.Hodson, "Maynord's Industrial Engineering Handbook", IV edition, McGraw Hill Inc., New York, 2010.
4. Herold Carr and Barbara Lathem, " The Technology of Clothing Manufacturing", II nd Edition, Blackwell Scientific Publications,



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6. Managing Quality In Apparel Industry, S.K.Bhrdwaj & Pradip V Mehta. Quality is Free,Philip Crosby.
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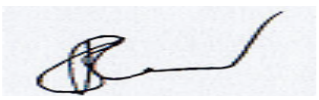

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U15TX*T*E12 **Quantitative Analysis in Textile Engineering**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Apply the distribution functions in Textile related problems

CO2: Analyze the significance of sampling and its techniques

CO3: Analyze the different models of variance

CO4: Design and interpret the process control charts

CO5: Analyze the experiments by correlation and regression

CO6: Apply and analyze the data in statistical tools

Pre-requisites :

1. U15MAT306 Probability and Applied Statistics
2. U15TXT601 Textile Quality Evaluation

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

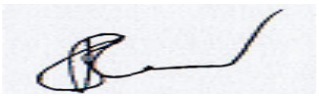
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S	S	S									S	
CO2	S	S	S	S									S	
CO3	S	S	S	S									S	
CO4	S	S	S	S									S	
CO5	S	S	S	S									S	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

DATA COLLECTION AND INTERPRETATION **9 hrs**

Population – Samples – Variation – variables Random variation – uncertainty- frequency distribution- Relative frequency – Probability – Relative frequency – Probability curves – Probability- Probability density



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curves – measures of variability – Standard deviation – Coefficient of variation – Point Estimates _ Confidence limits – Choosing the sample size

DISTRIBUTION FUNCTIONS AND TEST OF SIGNIFICANCE **9 hrs**

Binomial –poission– Normal – Probability distribution _ F distribution – 'T' distribution – chi-square distribution

TEST HYPOTHESIS **9 hrs**

One way ANOVA - Two ways ANOVA – randomized block design – Test method for ANOVA

QUALITY CONTROL AND ACCEPTANCE SAMPLING **9 hrs**

Sampling inspection – Acceptance sampling – producer and Consumer Risk – quality control chart – Action and warning Limits – control Chart for defects – defectives, Averages and Ranges – Average run length

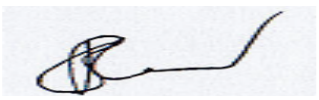
CORRELATION AND REGRESSION **9 hrs**

Analysis of Discrete and Ranking data- Relation between variable – Fitting Straight Line – Confidence limits – correlation coefficient – interpretation of 'r' regression through origin.

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. Statistical Technique in Textile mills SITRA- Year 2006
2. Practical Statistics for the Textile Industry Part-I, II GAV- leaf – 1984/ Textile Institute England
3. Textile Processes – quality Control and design of Experiments;-Georgi Damyanov and Diana Germanova – Krasteva / Momentum Press Newyork – 2013



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U15TX*T*E13 **Industrial Engineering in Textile Industry**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss the relationship berween productivity and workstudy

CO2: Explain the various method study techniques.

CO3: Calculate the standard time by using work measurement techniques

CO4: Describe the Industrial Engineering concepts in apparel

CO5: Explain how the work study used in optimization of work load in sewing.

C06: Prepare Operation bulletin and apparel layouts for different styles.

Pre-requisites :

1. U15TXT603 / Garment Manufacturing Technology

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

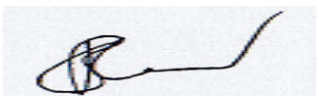
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PS0 2
CO1	S	S	S	M	M								S	
CO2	M	S	S	M	S								S	
CO3	M	S	S	M									S	
CO4	M	S	M	S									S	
CO5		S			S								S	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

PRODUCTIVITY AND WORK STUDY PRODUCTIVITY **9 hrs**

Productivity in textile and apparel industry: units of productivity - total time to do a job – factors affecting productivity – work content and total time – reducing work content due to the product and process method – reducing ineffective time due to worker and supervision.



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Work Study: definition, work-study and productivity - basic procedure of work-study – work study and the worker, supervisor and the management - working condition and the working environment.

METHOD STUDY **9 hrs**

Method study: definition and objects of method study – basic procedure, selection of work, Recording, examining, development of method – Textile / Apparel factory lay out and movement of workers and material - string diagram – man type flow process chart – multiple activity chart – travel chart – principle of motion economy – classification to movements – two-handed process chart – micro motion study – SIMO chart – Define, installs and maintain improved method.

WORK MEASUREMENT **9 hrs**

Work measurement: definition, purpose, procedure and uses – techniques of work measurement – work sampling: need and use time study – definition – basic time study equipment – time study forms – selecting the job, steps in making a time study – breaking the job into elements – sample size, timing card element – stop watch procedure - time study rating – calculation of standard time – setting time standards for work with apparel production machineries.

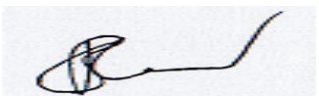
INDUSTRIAL ENGINNEERING **9 hrs**

Industrial engineering term in textile and apparel industry-role of industrial engineering in textile industry- methodology- benefits- tools and techniques- pre production activities- capacity study- operator performance follow ups- work in progress- operation bulletin- line balancing- steps in line balancing – efficiency-cycle checks-balancing tools- scientific method of training.

APPLICATION OF WORKSTUDY **9 hrs**

Application of work study technique in optimizing work load in stitching activity in garment industry – comparative study of different manufacturing systems used in the garment production - group system, batch system – industrial system – productivity calculation in Stitching activity. Ergonomics and its concept in textile industry

Theory: 45 Hours **Tutorial: Hours** **Total: 45 Hours**



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CASE STUDY (any two)

1. Productivity Improvement in Garment Industry
2. Principle of Motion Economy
3. Method study and Time study for given operation

REFERENCES

1. Johnson Maurice “Introduction to Work Study”, International Labour Organization, Geneva, 2006.
2. JaccoSolinger “Apparel Manufacturing Hand Book”, Reinhold Co., 1998.
3. Juan CrloHiba “Improving working conditions and productivity in the garment industry” International Labour Organization, Geneva, 1998.
4. V.RameshBabu “ Industrial Engineering in Apparel Production” Wood Head publishing India Ltd., ISBN 13:978-93-80308-17-3, 2012.
5. M.I.KHAN”Industrial Engineering”New age international, 2007
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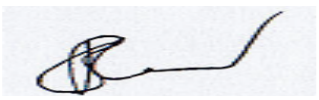

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U15TX*T*E14 **Environmental Management in Textile Industry**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Outline the sources of pollution

CO2: Examine the pollution problems in textile industry

CO3: Summarize the pollution control measures in textile industry

CO4: Describe environment management systems (EMS)

CO5: Choose eco-friendly dyes and chemicals in wet processing of fabric

CO6: Summarize the ISO 14000

Pre-requisites :

U15GST001 Environmental Science and Engineering

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

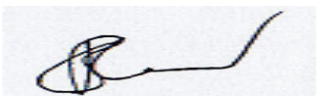
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PS0 2
CO1	S	M	W		W								S	
CO2	S								W				S	
CO3	S			W			W						S	
CO4	M												M	
CO5	S	M				S					W		S	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION TO POLLUTION AND ITS SOURCES **9 hrs**

Pollution and its impact on ecology, environment and society - Sources of pollution -Air, water, noise pollution in textile industry-Overview of pollutants and waste streams-hazardous waste-Waste categorization for the textile industry-Problems associated with waste-Importance of pollution control in textile industry.



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POLLUTION IN SPINNING AND WEAVING **9 hrs**

Air pollution in yarn and fabric manufacturing process-standards –causes-effects- health hazards associated with air pollution-pollution prevention measures-Noise pollution in various textile departments- standards - causes and effects- preventive measures-health hazards associated with noise pollution-Method of noise control in textile mills. Water pollution in slashing and sizing- water pollutants –causes and effects – remedial measures.

POLLUTION IN TEXTILE CHEMICAL PROCESSING **9 hrs**

Pollutant associated with dyeing- Toxicity of dyes, intermediates, auxiliaries, finishing chemicals –causes and effects – health hazards associated with hazardous dyes and chemicals -Pollution prevention measures in dyeing– Emerging pollution prevention technologies-pollution in printing, finishing, garment manufacturing process – Pollution control and preventive measures.

EFFLUENT TREATMENT **9 hrs**

Textile effluent and their characterization, measurement of effluent strength-BOD-COD-AOX-TDS- methods of effluent treatment: primary, secondary and tertiary treatments- disposal and recycling of effluents-Environment legislation in India and other countries with respect to dyes and other chemicals- Banned dyes and chemicals.

ENVIRONMENTAL MANAGEMENT **9 hrs**

Organisation involved in pollution control-national & international-Waste Audit-Pollution prevention programme-Pollution control board, pollution norms -ISO 14000-Ecolabels-Organic Clothing-Eco-friendly garment processing-Environmental management, Study of polluted rivers and audit system-Pollution prevention case studies.

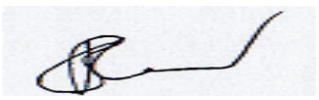
Theory: 45 Hours **Tutorial: Hours** **Total: 45 Hours**

CASE STUDY (any two)

1. Lack of awareness on air pollution caused by cotton dust among textile industry personnel. Do a case study.
2. Noise in the textile mill and its consequences. Do a case study.
3. Application of Eco-standards in chemical processing industry. Do a case study.

REFERENCES

1. Harold R, Park Ridge. N.J, “Pollution Control in the Textile Industry”, Jones Noyes Data Corp., 1973.



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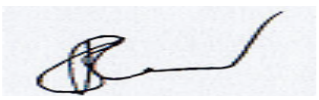
3. K.Slater, “Environmental Impact of Textiles” , Wood head publication,2003.
4. Trivedi R.K and Goel P.K., “Introduction to Air pollution” Techno-science Publications. 2003
5. Pollution Prevention in Textile Industry manual by U.S EPA/SEMARNAP Pollution prevention work group, 1996.
6. S.C.Bhatia “Handbook of Industrial Pollution and Control (Vol. 1 & 2), CBS edition, 2002.
7. Peter I Norman and Roy Seddon , Low Moor, “ Pollution Control in the Textile industry the chemical auxiliary manufacturer’s role”, Allied Colloids plc, Bradford , UK, Journal of Society of Dyers and Colourists, Volume 107 May/June 1991.



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U15TX*TE15* **Textile and Apparel Costing**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss the cost management concepts

CO2: Explain elements of cost of a product

CO3: Discuss various expenses incurred in textile industry

CO4: Elaborate factors influencing costing of textile product.

CO5: Prepare cost sheet for garment industry

CO6: Compile various trims and accessories for apparels.

Pre-requisites :

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

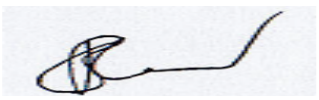
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M												M	
CO2	M	M											M	
CO3	M	M		S	M								M	
CO4	M	M		S	M								M	
CO5	M	M		M									M	
CO6	M			M			M						M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION **9 Hours**

Costing: Aims of costing- Costing as an aid to management. Cost terms related to income measurement, profit planning and cost control for textile industry. Inventory control in textile industry, Types of costing- Aims of estimation - Difference between Estimation and Costing - Types of estimates.



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ELEMENTS OF COST **9 Hours**

Elements of cost –Fixed cost, Variable cost- Material cost – Labour cost – Different types of expenses – Cost of product – Advertisement cost. Factors affecting pricing, Full-cost pricing, Marginal cost pricing. Cost sheet.

COSTING STRATEGY **9 Hours**

Analysis of overhead expenses – Factory expenses – Administrative expenses – Selling and distribution expenses – Allocation of overhead expenses – Depreciation: Causes and reasons– Methods of calculating depreciation – Break even analysis - Simple calculations.

COSTING OF TEXTILE PRODUCTS **9 Hours**

Yarn costing - Fabric Costing - Costing of fabric processing – Factors that determination of the price of garments –Cost of components - Job-order costing for a garment industry. Batch costing. Process costing; waste cost and its control in a textile mill. CMT (Cutting, Making & Trimming) Cost, simple cost calculations.

COSTING OF ACCESSORIES **9 Hours**

Packing and labeling cost – different types and functions – Cost of bought out components. Shipment cost - Duty drawback. Cost calculation of Ladies and Men and Children's wear – Woven and Knitted - Simple calculations.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Cost reduction in spinning mills
2. Factors influencing costing of woven fabrics
3. Production cost optimization of a weaving preparation plant

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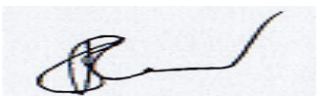
1. Rajkishore Nayak, Rajiv Padhye., "Garment Manufacturing Technology", Woodhead Publishing in association with The Textile Institute, UK,2015.
2. Lall Nigam B.M and Jain I.C., "Cost accounting: Principles & practice Prentice Hall India, 2000.



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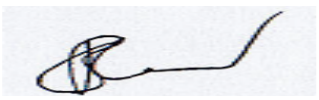
3. Jain S.P., Narang.K.L., “Elements of Cost Accounting”, Kalyani publishers, 2000.
4. Johnson Maurice, E. Moore, “Apparel Product Development”, Om Book Service, 2001.
5. Katherine McKelvy, “Fashion Source Book”, Om Book Service, 2001.
6. Jain S.P., Narang, K.L., “Cost Accounting –Principles and Practice”, Kalyani Publishers, 2009.
7. Larry M,Walther& Christopher J Kousen, “ Managerial and Cost Accounting”, Ventus Publishing,ISBN:978 87 7681 491 5 (2009)
8. M.Krishnakumar “Apparel Costing: A functional Approach” Abhishek Publications, 2011, ISBN, 8182473926.



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U15TX*TE16* **Chemistry of Textile Auxiliaries**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Explain the functions of pretreatment chemical auxiliaries

CO2: Explain the principle of various bleaching agents and auxiliaries

CO3: Summarize the effect of dyeing auxiliaries on the process and environment

CO4: Discuss the various printing auxiliaries and their impact on printing performance

CO5: Explain the application of finishing on textiles

CO6: Summarize the eco standards in application of chemical auxiliaries

Pre-requisites :

5. U15TXT403 Textile Pretreatment and Colouration Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

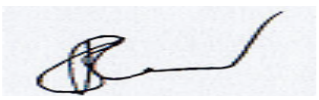
Cos	Programme Outcomes(Pos)												PSO	
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S												S	
CO2	S												S	
CO3		M											M	
CO4			M	S									M	
CO5	S			S									S	
CO6	M												M	

Course Assessment methods

Direct	Indirect
5. Internal test I 6. Internal test II 7. Assignment/ Seminar/ Tutorial 8. End Semester Examination	2. Course end survey

INTRODUCTION **9 Hours**

Classification of textile auxiliaries – Pretreatment chemicals - Chemical constitution, Chemical analysis of oils and fats – acid, saponification and iodine values Desizing agents, Chelating agents, sequestering agents – test



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for eco standards

SURFACTANT CHEMISTRY **9 Hours**

Surfactants: Mode of action and classification of surfactants – cationic, anionic, nonionic and amphoteric surfactants.Oxidizing and reductive bleaching agents , peroxide stabilizers , per oxide killers , Optical brightening agents – Evaluation of whiteness

DYEING AUXILIARIES **9 Hours**

Definition , chemistry and mechanism of Dispersing agents , levelling agents , Dye fixing agents , Retarding agents , Dye blocking agents , Crease inhibitors , Bio degradable surfactants , spin finishes – Testing methods – impact of auxiliaries on effluent discharge

PRINTING AUXILIARIES **9 Hours**

Printing auxiliaries – requirements – techniques, pigment printing binders , thickeners , washing off agents – Testing methods.

FINISHING AUXILIARIES **9 Hours**

Principle and applications of Cross linking agents - BTCA– specialty softeners – silicones , elastomeric silicones , hydrophilic silicones –Testing of finished fabric for performance – impact of finishes on environment

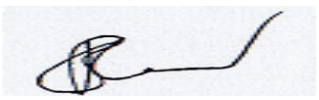
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Eco standards for pre treatment chemicals
2. Environmental impact of dyeing and printing auxiliary chemicals
3. Effect of fabric performance due to application of finishes

REFERENCES

1. Sivaramakrishnan., “Anthology of speciality chemicals for Textiles”,Colour Publications Pvt. Ltd., Mumbai, 2009
2. Dhara S. S., “A Text Book of Engineering Chemistry”, S. Chand & Co. Ltd., New Delhi, 2002
3. Puri B. R., Sharma L. R. and Madhan S. Pathania, “Principles of Physical Chemistry”, Shoban Lal Nagin Chand & Co., Jalandar, 2000
4. Shore J., “Colourants and Auxiliaries: Volume I Colorants”, Wood



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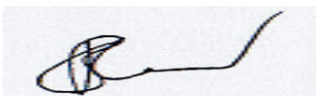
6. Trotman E. R., “Dyeing and Chemical Technology of Textile Fibres”, B.I Publishing Pvt. Ltd., New Delhi, 1994



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U15TX*TE17* **Computer Colour Matching of Textile**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Discuss the basic concepts of colour physics and colour system

CO2: Explain the principle of various colour measuring instrument

CO3: Summarize the colour specification and reflectance value of colour order system

CO4: Examine the colour difference of solid and liquid formulation

CO5: Explain the colour analysis method and formulation

CO6: Summarize the application of colour matching in textile processing industry

Pre-requisites :

1. U15TXT403 Textile Pretreatment and Dyeing Technology

CO/PO Mapping

(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

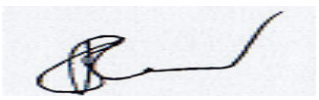
Cos	Programme Outcomes(Pos)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S												S	
CO2	S												S	
CO3		M											M	
CO4			M	S									M	
CO5	S			S									S	
CO6	M												M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION **9 Hours**

Brief discussion of colour science, colour harmony, perception of colour, colour mixing laws metamerism, colour order systems. Light and colour



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phenomenon. Physical basis of colour emissions, absorption of light. Primary, Secondary and Tertiary Colours. Complementary colours, Hues, Tints and Shades. Importance of Computer Colour Analysis and Computer Colour Matching, Subjective Shade assessment, Objective Shade assessment.

COLOUR MEASURING INSTRUMENT **9 Hours**

Types of Spectrophotometer - Reflectance Spectrophotometer; multi-angle spectrophotometer; non-contact spectrophotometers -- Basic components, principles, performance Parameter, Calibration, reflectance curves, features. New commercial spectrophotometer - Tristimulus colorimeters - Gloss meters. Optical sensor signal processor.

COLOUR ORDER SYSTEM **9 Hours**

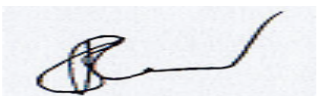
Hunter Lab system, CIE Lab system, Munsell system, Colour atlas system. Chromaticity coordinates. CIE color specifications –Computation of tristimulus values - XYZ from reflectance values – The CIE standard illuminants – The CIE standard observer – computation of tristimulus values – chromaticity coordinates & chromaticity diagram – Features of CIE system – Limitations of the CIE systems – The CIELAB color specification.

COLOUR MEASUREMENT **9 Hours**

Colour difference and its measurement using computer colour matching system, Practical Importance of Colour difference measurement, and various systems evolved for colour difference measurement, Equations for calculating colour difference, Practical applications of measuring colour difference like Fastness rating, Pass - Fail program, Shade sorting. Database Preparation, formulation and process of computation for generating match recipe and Batch correction using CCMS. Whiteness Yellowness measurement, various systems and Indices for measurement of whiteness and yellowness.

COLOUR ANALYSIS IN SOLID AND LIQUID **9 Hours**

Measuring strength of colour on solid substrate, Kubelka-Munk Equation - K/S values, Pseudo tristimulus values. Application of CCM system to Textile processing. Advantages and Limitations. Improvement of the



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formulation accuracy. Measuring strength of colour in solution- Beer - Lambert's law. Measurement of Absorbency value of dye liquor using spectrophotometer – preparation of dye liquor and standard solution. Development of calibration graph. Calculation of dye concentration. Applications.

Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

4. Self-shade card preparation with reactive and direct dyes.
5. Prediction of recipe using computer colour matching system
6. Correction recipe predication from computer colour matching

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1. Peters.A.T and Freeman,H.S 'Physico – Chemical Principles of Colour Chemistry', Blackie.
2. Gupte .V.C., 'Colur Technology Tools, Techniques & Applications'Colour publication PLTD, 2008.
3. Johnson,A, 'The Theory of Colouration of Textiles', SDC 2nd Edition,1998
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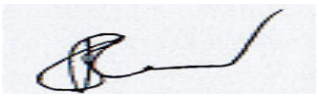

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L	T	P	C
3	0	0	3

U15GS*T*002 **TOTAL QUALITY MANAGEMENT**

Course Outcomes

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

CO1: Apply & analyze quality concepts and philosophies of TQM

CO2: Apply concepts of continuous improvement

CO3: Apply TQM concepts to enhance customer satisfaction and deal with customer related aspects

CO4: Apply and analyze the quality tools, management tools and statistical fundamentals to improve quality

CO5: Apply and analyze the TQM tools as a means to improve quality

CO6: Understand quality systems, procedures for its implementation, documentation and auditing

Pre-requisite:

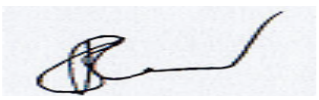
1. Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1		M		M							M			M
CO2		M		M							M			M
CO3		M		M							M			M
CO4					S						M		M	
CO5		M			S						M			M
CO6					W						M		M	

Course Assessment methods:

Direct		Indirect
1.	Assignment	1. Course End Survey
2.	Internal Test	
3.	Group presentation	
4.	End Semester Examination	



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INTRODUCTION **9 Hours**

Definition of Quality, Dimensions of Quality, Quality Costs, Top Management Commitment, Quality Council, Quality Statements, Barriers to TQM Implementation, Contributions of Deming, Juran and Crosby, Team Balancing

TQM PRINCIPLES **9 Hours**

Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Continuous Process Improvement,5S, Kaizen, Just-In-Time and TPS

STATISTICAL PROCESS CONTROL **9 Hours**

The seven tools of quality, New seven Management tools, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Concept of six sigma

TQM TOOLS **9 Hours**

Quality Policy Deployment (QPD), Quality Function Deployment (QFD), Benchmarking, Taguchi Quality Loss Function, Total Productive Maintenance (TPM), FMEA

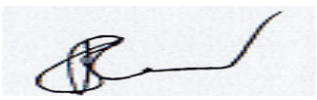
QUALITY SYSTEMS **9 Hours**

Need for ISO 9000 and Other Quality Systems, ISO 9001:2008 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 14001:2004

Theory :45 Hours **Total Hours: 45**

References:

1. Dale H.Besterfield, "Total Quality Management", Pearson Education
2. James R.Evans& William M.Lindsay, "The Management and Control of Quality", South-Western (Thomson Learning), 2008.
3. Feigenbaum.A.V."Total Quality Management", McGraw Hill
4. Oakland.J.S. "Total Quality Management", Butterworth – Hcinemann Ltd., Oxford
5. Bhaskar S. "Total Quality Management", (2007-revised edition) Anuradha Agencies, Chennai
6. Narayana V. and Sreenivasan, N.S. "Quality Management – Concepts and Tasks", New Age International 2007
7. Zeiri, "Total Quality Management for Engineers", Wood Head Publishers.



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U15GS*T*003 PRINCIPLES OF MANAGEMENT

L	T	P	C
3	0	0	3

Course outcomes

After successful completion of the course, the students should be able to

CO1: Apply the concepts of management and administration and analyze the evolution of management thoughts.
CO2: Apply the concepts of planning, forecasting and decision making
CO3: Analyze organizational structures and apply staffing concepts
CO4: Analyze the motivational and leadership theories
CO5: Apply & analyze the communication and controlling processes.
CO6: Analyze the various international approaches to management

Pre-requisite:

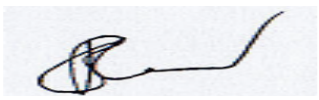
1. Nil

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1											M		M	
CO2											M			
CO3											M			M
CO4									M		M		M	
CO5										M	M		M	
CO6											M			

Course Assessment methods:

Direct	Indirect
1. Assignment	Course End Survey
2. Internal Test	
3 Group presentation	
4. End semester exam	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MANAGEMENT CONCEPTS **9 Hours**

Management – Definition – Importance – Functions – Skills required for managers - Roles and functions of managers – Science and Art of Management –Management and Administration. Evolution of Classical, Behavioral and Contemporary management thoughts.

PLANNING **9 Hours**

Nature & Purpose – Steps involved in Planning – Forms of Planning – Types of plans – Plans at Individual, Department and Organization level - Managing by Objectives. Forecasting – Purpose – Steps and techniques. Decision-making – Steps in decision making.

ORGANISING **9 Hours**

Nature and Purpose of Organizing - Types of Business Organization - Formal and informal organization – Organization Chart – Structure and Process – Strategies of Departmentation– Line and Staff authority –Benefits and Limitations. Centralization Vs De-Centralization and Delegation of Authority. Staffing – Manpower Planning – Recruitment – Selection – Placement – Induction.

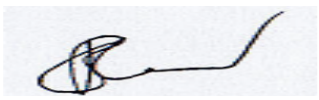
DIRECTING & CONTROLLING **9 Hours**

Nature & Purpose – Manager Vs. Leader - Motivation - Theories and Techniques of Motivation. Leadership – Styles and theories of Leadership.
Communication – Process – Types – Barriers – Improving effectiveness in Communication.
Controlling – Nature – Significance – Tools and Techniques.

CONTEMPORARY ISSUES IN MANAGEMENT **9 Hours**

Corporate Governance Social responsibilities – Ethics in business – Recent issues. American approach to Management, Japanese approach to Management, Chinese approach to Management and Indian approach to Management.

Theory : 45 Hours **Total:45 Hours**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4. Vijayaraghavan, G.K.and Sivakumar, M. "Principles of Management", Lakshmi Publications, 5th Edition, 2009.
5. Bhaskar S. "Principles Of Management", (2011) Anuradha Agencies, Chennai
6. Harold Koontz & Heinz Weihrich, "Essentials of Management – An International perspective", 8th edition. Tata McGraw-Hill, 2009.
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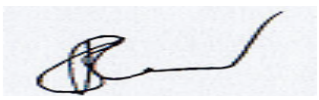

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U15GS*T*007 PROFESSIONAL ETHICS

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Analyze the various concepts and theories of engineering ethics

CO2: Apply concepts of ethics and analyze its impact on society

CO3: Apply and analyze the concept of safety and risk in the light of engineering ethics

CO4: Analyze and evaluate the rights & responsibilities of engineers

CO5: e the ethical issues engineers are to consider while operating globally

CO6: Applying and analyzing the responsibilities of engineers in management and leadership roles

Analyz

Pre-requisite: NIL

CO/PO Mapping
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

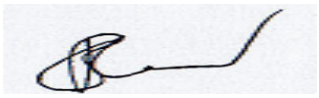
COs	Programme Outcomes(POs)												
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1						M		S					M	
CO2						M		S				M	M	
CO3						M		S						M
CO4						M		S					M	
CO5						M		S						M

Course Assessment methods:

Direct	Indirect
1. Assignment	1. Course End Survey
2. Internal Test	
3. Group presentation	
4. End Semester Examination	

ENGINEERING ETHICS AND THEORIES **9 Hours**

Definition, Moral issues, Types of inquiry, Morality and issues of morality, Kohlberg and Gilligan's theories, consensus and controversy, Professional and professionalism, moral reasoning and ethical theories, virtues, professional responsibility, integrity, self respect, duty ethics, ethical rights, self interest, egos, moral obligations.



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SOCIAL ETHICS AND ENGINEERING AS SOCIAL EXPERIMENTATION **9 Hours**

Engineering as social experimentation, codes of ethics, Legal aspects of social ethics, the challenger case study, Engineers duty to society and environment.

SAFETY **9 Hours**

Safety and risk – assessment of safety and risk – risk benefit analysis and reducing risk – the Three Mile Island and Chernobyl case studies. Bhopal gas tragedy.

RESPONSIBILITIES AND RIGHTS OF ENGINEERS **9 Hours**

Collegiality and loyalty – respect for authority – collective bargaining – confidentiality – conflicts of interest – occupational crime – professional rights – employee rights – Intellectual Property Rights (IPR) – discrimination.

GLOBAL ISSUES AND ENGINEERS AS MANAGERS, CONSULTANTS AND LEADERS **9 Hours**

Multinational Corporations – Environmental ethics – computer ethics – weapons development – engineers as managers – consulting engineers – engineers as expert witnesses and advisors – moral leadership – Engineers as trend setters for global values.

Theory :45 Hours **Total Hours: 45**

References:

1. Mike Martin and Roland Schinzinger, "Ethics in Engineering". (2005) McGraw-Hill, New York.
2. John R. Boatright, "Ethics and the Conduct of Business", (2003) Pearson Education, New Delhi.
3. Bhaskar S. "Professional Ethics and Human Values", (2005) Anuradha Agencies, Chennai.
4. Charles D. Fleddermann, "Engineering Ethics", 2004 (Indian Reprint) Pearson Education / Prentice Hall, New Jersey.
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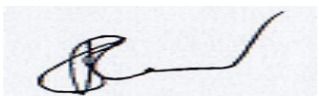

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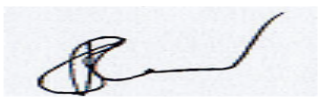
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U15TX0E01 **Textiles in Civil Engineering**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Outline the classification of geotextiles, fibres used in different fabric structures and geotextile manufacturing.

CO2: Summarize the properties of geotextile materials used in different applications along with its specific functions

CO3: Analyze and interpret the necessary physical, mechanical, hydraulic, endurance and degradation properties for geotextile selection

CO4: Outline the various testing performed for Geotextiles

CO5: Appraise the various materials and required functions of significant applications

CO6: Compile the different textile forms used in civil engineering applications with its key properties and, role-play functions

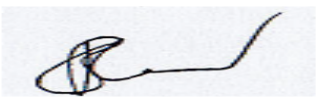
Pre-requisites :

-

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	M											S	
CO2	S	M											S	
CO3	S	M		M									S	
CO4	S	M											S	
CO5	S	M											S	
CO6	S	M											S	



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Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION **9 Hrs**

History of Geotextiles – definition – classification – Fibres utilised - Essential properties of geotextiles - Fabric types and different fabric structures - Manufacturing process – installation procedures.

GEOTEXTILE FUNCTIONS **9 Hrs**

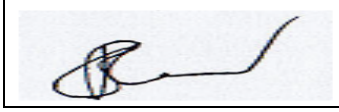
Classifications of geotextiles Functions: separation – reinforcement - Filtration – drainage – erosion control - Soil stabilization – fluid barrier – protection, Typical properties of polymers, overview on various applications of Geotextiles.

SELECTION OF GEOTEXTILES **9 Hrs**

Introduction –Physical properties: thickness – mass per unit area - Mechanical properties: tensile properties – compressibility – seam strength – burst strength - Tear strength - puncture strength – friction – pull-out resistance - Hydraulic properties: porosity - Percentage open area (POA) - apparent opening size (AOS) - Permittivity – Transmittivity – soil retention - Endurance properties: creep and stress relaxation - Abrasion – clogging - Degradation properties: temperature – oxidation – hydrolysis - Chemical degradation – ultra violet light

TESTING OF GEOTEXTILES **9 Hrs**

Sampling of geotextiles - Deterioration of geotextiles from exposure to UV and water - Trapezoid tear strength – tensile testing by wide-width strip method - Dynamic puncture strength test – bursting strength test – fatigue test



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- Interface testing - Hydraulic property testing: dry sieving test method - Endurance and degradation testing: creep test – abrasion test.

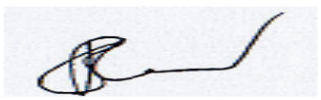
REMARKABLE APPLICATIONS **9 Hrs**

Design of geotextile for road: reinforcement function design - Separation function design - geotextile layer at the soil subgrade level - materials used - Design of geotextile for embankments: functions – materials used - overall slope stability failure - Lateral spreading – embankment settlement - Design of geotextile for retaining walls - functions – materials used - Property requirement of geotextiles

Theory: 45 Hours **Tutorial: Hours** **Total: 45 Hours**

REFERENCES

1. Senthil Kumar R, "Textiles for Industrial Applications", CRC Press, 2014
2. Saravanan M, "Geotextile and its application to Civil Engineering – Overview", Asian Technical Textiles, October - December 2014
3. Sanjay Kumar Shukla & Juan-Hua Yin, Taylor & Francis, "Fundamentals of Geosynthetic Engineering" UK, ISBN10 0–415–39444–9, 2006.
4. Hand book of Geosynthetics – Geosynthetics materials Association. R.W.Sarsby, "Geosynthetics in Civil Engineering", Wood head publications Ltd., ISBN-13: 978-1-85573-607-8, 2007.
5. Khalid a Meccai & Eyad al Hussain, "Geotextiles in Transportation Applications", Second Gulf Conference on Roads, Abu Dhabi, March 2004.
6. S.C. Anand & A.R.Horrocks, "Hand Book of Technical Textiles", Wood head publications Ltd., ISBN 1 85573 385 4, 2000.
7. Stephen Corbet, John King, Proceedings of the Conference Geofad '92: Geotextiles in Filtration and Drainage Organized by the U. K. Chapter of the International Geotextile Society, Held at Churchill College, Cambridge, U. K.1992.



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U15TX0E02 **Textile in Automobiles**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Identify suitable textile materials for automobiles
CO2: Review of smart textile in automobiles
CO3: Discuss the various products in automobile by using textile
CO4: Design of textile reinforced composites for automobile
CO5: Apply the textile material in safety purpose in automobile
CO6: Apply the knowledge of special fibers in automotive engineering

Pre-requisites : NIL

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

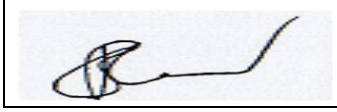
COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S	S	S	M									S	
CO2	S	S	M	M									S	
CO3	S	S	S	M									S	
CO4	S	S	S	M									S	
CO5	S	S	M	M									S	
CO6	S	S	S	M									S	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

AUTOMOTIVE TEXTILES **9 hrs**

Requirements for automotive textiles, design demands, woven & knitted ,non-woven fabrics used in automotive interiors, Recycling of automotive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textiles –Future trends

SMART TEXTILES IN AUTOMOTIVE INTERIORS **9 hrs**

Car seats- Types of materials used as cushions. Technology for replacing polyurethane foams in car seats. Smart textiles: definition, textile sensors, textile actuators- heating fabrics for car interior, Shape memory alloys for car seats**.**

TRANSPORTATION TEXTILES **9 hrs**

Materials used in automobiles – tire cord, filter, air bag- future applications , belt, seat cover, acoustic textiles for noise insulation; Design and development of textile reinforced composites in automobile industry

AUTOMOTIVE TEXTILE STRUCTURES & COMPOSITES **9 hrs**

2D and 3D textile structures for load bearing applications in automobiles, future trends in applications of textile structures in automobiles, composite structural components

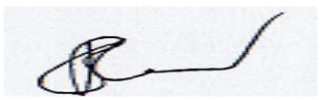
SAFETY APPLICATIONS & FUTURE TRENDS **9 hrs**

Recent developments in fibre/textile reinforcements used in tyres,fibre-rubber adhesion in tyres resent advances in tyre design

Theory: 45 Hours **Total: 45 Hours**

REFERENCES

1. R.Shishoo, Textile advances in the automotive industry, Woodhead Publishing Limited, Cambridge, England- 2008
2. A.R. Horrocks & S.C. Anand (Edrs.), "Handbook of Technical Textiles", The Textile Institute, Manchester, U.K., Woodhead Publishing Ltd., Cambridge, England, 2000.
3. S. Adanur "Wellington Sears Handbook of Industrial Textiles", Technomic Publishing Co. Inc., Lancaster, Pennsylvania, 1995.
4. S.K. Mukhopadhyay and J.F. Partridge, "Automotive Textiles", Text.



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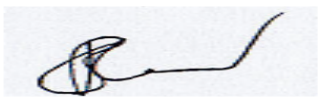
Prog, Vol. 29, No.1/2, 1998.
5. Walter Fung and Mike Hard Castle, Textiles in Automotive Engineering, Woodhead Publication, USA, 2001.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U15TX0E03 **Textile Mechatronics**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Explain the evolution of textile technology and manufacturing with textile fibers

CO2: Describe various process and machines involved in spinning

CO3: Explain various process and machines involved in weaving

CO4: Explain various stages of automation scopes in spinning and weaving

CO5: Explain role of computers in automated textile manufacturing

CO6: Advancements in the field of textile machinery.

Pre-requisites : NIL

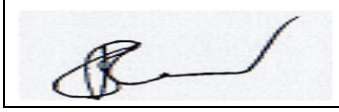
CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M		S				W						M	
CO2	M				S	S							M	
CO3	M				S	S							M	
CO4	M				S	S	S						M	
CO5	M		S										M	
CO6	M		S		S								M	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey



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INTRODUCTION TO TEXTILE TECHNOLOGY **4 Hours**

History of textile technology and its advancements, introduction to textile fibers, overview of textile manufacturing, Introduction to automation in textile industries.

BASICS OF SPINNING **8 Hours**

Spinning process flow chart – Objectives and process variables of textile spinning machineries: Mixing, Blow room, Carding, Draw frame, Combing, Speed frame, Ring frame, rotor spinning.

BASICS OF WEAVING **8 Hours**

Weaving process flowchart – Objectives and process variables in weaving preparatory: Winding, Warping, Sizing and beaming. Objectives and process variables in weaving: drawing in, knotting, denting and weaving.

BASICS OF PROCESSING **5 Hours**

Objectives and process variables in processing machines: Singeing, Desizing, Scouring, Bleaching, Mercerizing, Dyeing, Printing, Finishing.

AUTOMATION IN SPINNING MACHINERY **8 Hours**

Machinery material flow and its variation controls – Feeders & Stop motions – Auto levelers – Safety switches – Production and quality monitors – Full doff and pre-set length monitors. Data acquisition system for spinning preparatory, ring spinning – rotor spinning.

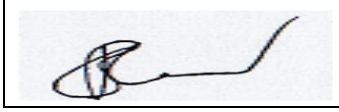
AUTOMATION IN WEAVING MACHINERY **8 Hours**

Yarn cleaner controls – Knotter / splicer carriage controls – Warping machine monitors and controls – sizing machine monitors and controls – Auto reaching / drawing in and knotting machine monitors and controls – Data acquisition system in weaving preparatory and weaving – humidification systems .

APPLICATIONS **4 Hours**

CAD / CAM / CIM in spinning, Weaving, Dyeing, Printing, Apparel production – Electronics data interchange - Robotics in textile industries

Theory: 45 Hours **Total: 45 Hours**



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REFERENCES

1. Chattopadhyay R. (Ed), "Advances in Technology of Yarn Production", NCUTE, IIT Delhi, 2002.
2. Oxtoby E "Spun Yarn Technology" butter worth's, London, New Edition 2002.
3. Lord P.R. and Mohammed M.H., "Weaving – Conversion of Yarn to Fabric", Merrow Publication, 2001.
4. Krishna Kant, "Computer – Based Industrial Control", PHI Learning Pvt Ltd, 2nd edition, New Delhi, 2011.
5. Venkatachalam. A and Ashok Kumar L, "Monograph on ― Instrumentation & Textile Control Engineering" – 2005.
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7. "Textiles Go On-line", the textile Institute, UK, 1996.
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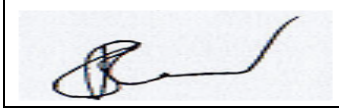

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U15TX0E04 **Functional Finishes in Textiles**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Summarize the classification and various requirements of functional Textiles, various fibres and fabric types used

CO2: Classify the various finishing techniques, basics of wetting phenomenon

CO3: Distinguish the various novel finishes and its applications for selective functions to Textile materials

CO4: Outline the medical textile classes, essential properties of sutures and wound dressings

CO5: Detail on the sportswear design, materials and various evaluation of sportswear textiles

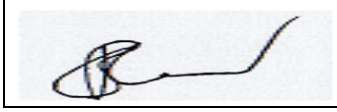
CO6: Summarize the necessary materials, finishes, and properties of different sportswear

Pre-requisites : NIL

CO/PO Mapping

(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1			M		S					M			M	
CO2		M	M		S								M	
CO3	M	M	M		S					M			M	
CO4	S	M	M		M								M	
CO5	M	M	M		M					M			M	
CO6			M		S					M			M	



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Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

INTRODUCTION TO FUNCTIONAL TEXTILES 9 Hrs

Classification of functional textiles. Requirements from functional textiles - Physiological, biomechanical, ergonomical and psychological. Steps involved in clothing design. Role of fiber, yarn and fabric parameters on functional attributes

FINISHES FOR FUNCTIONAL TEXTILES 9 Hrs

Chemical and mechanical finishing. Importance of chemical finishing. Application of chemical finishes. Other techniques: Impregnation, coating and surface modification techniques. Wetting and Wicking; surface energy – concept, measurement and relevance to repellency;
repellents applied to textile substrates; repellency tests

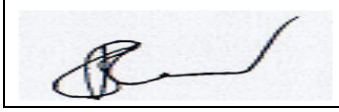
NOVEL FINISHES 9 Hrs

ANTIMICROBIAL FINISHES: Properties of an effective antimicrobial finish. Mechanisms of antimicrobial finishes, chemistry and application of antimicrobial finishes; evaluation of antimicrobial finishes

OTHER ESSENTIAL FINISHES: Introduction. Anti-odour and fragrance finishes. Mosquito repellent finish. Conductive finishing Microencapsulation technique for finishing of Textiles, Nanotechnology based finishes.

MEDICAL TEXTILES 9 Hrs

Medical textiles market. Classification of medical textiles. Sutures - Classification based on origin, physical configuration and abosrbabaility, properties of sutures, Evaluation and standards. Wound dressings - Functional requirements, materials used, wound healing mechanism and factors affecting wound healing, Evaluation and standards.



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SPORTS TEXTILES **9 Hrs**

Sports wear market. Key trends in sportswear design. Material requirements for the design of performance sportswear. Developments in active sports wear - New fibers, coated and laminated textiles. Evaluation and standards

Theory: 45 Hours **Total: 45 Hours**

REFERENCE

1. Horrocks A R and Anand S C, "Handbook of Technical Textiles", Woodhead Publishers and Textile Institute, England, 2000.
2. Charles T, "Chemistry & Technology of Fabric Preparation & Finishing", North Carolina State University, 1992.
3. Shishoo R, "Textiles in sport", Woodhead Publishers, Cambridge, England, 2005
4. .Deepti Gupta, "Special Issue on Functional Clothing", Indian Journal of Fibre and Textile Research,I ndia, 2011
5. Schindler W D and Hauser P J, "Chemical Finishing of Textiles", The Textile Institute, Woodhead Publishing Ltd., Cambridge, 2004.
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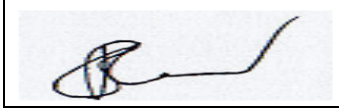

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U15TX0E05 **Textiles for Biomedical Applications**

L	T	P	C
3	0	0	3

Course Outcomes

After successful completion of this course, the students should be able to

CO1: Outline on textile and medical textile industry

CO2: Explain properties, types of biopolymers in biomedical applications

CO3: Discuss on property requirements, applications of implantable, non-implantable

CO4: Summarize different types of drug delivery textiles

CO5: Discuss on the manufacture and applications of scaffolds

CO6 : Compare the characteristics of different smart medical textiles and its applications

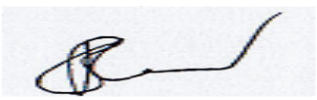
Pre-requisites :

CO/PO Mapping
(S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak

COs	Programme Outcomes(POs)												PSO	
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	M	M											M	
CO2	M	M											M	
CO3	M	M	M										M	
CO4	M	M		M									M	
CO5	S	M											S	
CO6	S	M		M									S	

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey



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INTRODUCTION **9 Hours**

Definition, classification, properties and application of textile fibres, yarns and fabrics in biomedical field. Medical textiles — classification, current market scenario in international and national level – government initiatives, Biopolymers: classification and their properties, requirements, and applications.

NON-IMPLANTABLE AND IMPLANTABLE MATERIALS **9 Hours**

Wound-healing mechanism- Wound-dressing- types and applications Bandages: Simple, Light support, Compression, Orthopedic bandages- Gauzes. Dialysis membrane. Surgically implantable bio-textile products - Vascular grafts - nonwoven, electrospinning and types and applications of electrospun nano structures- Sutures - mono/multifilament, braided – resorbable sutures - Heart valves – Hernia mesh.

DRUG DELIVERY TEXTILES **9 Hours**

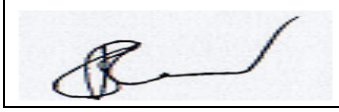
Importance of drug delivery textiles -Drawbacks of oral ingestion and intra venous drug delivery system. – Types of drug delivery systems , implantable , non implantable drug delivery textiles - Soluble factor release -Drug, Hormone, Growth factor Delivery, Enzyme Matrix metalloprotease, proteases etc., attachment on fibrous materials.

EXTRA-CORPOREAL MATERIALS & TISSUE ENGINEERED PRODUCTS **9 Hours**

Cartilage – Skin- Liver - Kidney- Urinary bladder – Tendons-Ligaments - Cornea –woven , 3D Weaving . Tissue engineering: properties and materials of scaffolds- relationship between textile architecture and cell behavior – applications of textile scaffolds in tissue engineering.

HEALTHCARE AND HYGIENE PRODUCTS **9 Hours**

Surgical gowns, Masks, Wipes - Specially designed bed sheets for critically



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ill patients -Antibacterial, Antiviral Textiles - Insecticidal textiles for controlling infectious diseases -smart mosquito net – Super absorbent polymers.
Invitro tests – direct contact, agar diffusion & elution methods – Invivo assessment of tissue compatibility. Porosity – Drug Release rate- Absorbency- MVTR- Airpermeability

Theory: 45 Hours **Total: 45 Hours**

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1. Rajendran.S, "Advanced Textiles for Wound Care", Wood Head publishing in Textiles: Number 85, 2009.
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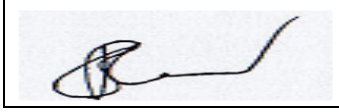
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