KUMARAGURU COLLEGE OF TECHNOLOGY,

An autonomous Institution affiliated to Anna University, Chennai

COIMBATORE – 641 049.

B.TECH., TEXTILE TECHNOLOGY

REGULATIONS 2017

CURRICULUM AND SYLLABI

III to VIII Semesters

Department of Textile Technology

VISION

To be a **Centre of Excellence** in **textile technology and management** with basic and applied research for the fulfilment of societal needs.

MISSION

- **Develop industry relevant curriculum,** innovative teaching and project-based learning methods that enables students to be efficient professionals.
- **Motivate Faculty** to update their knowledge and skills through continuous learning.
- **Provide holistic student development** by creating opportunities for lifelong learning and to develop entrepreneurship skills.
- **Undertake inter-disciplinary research** and development/Internship/Consultancy in the field of Textile Technology to support the industry and society.

Program Educational Objectives (PEOs)

Graduates of B. Tech - Textile Technology Programme will be able to:

PEO: 1 Hold leadership responsibilities in Textile and related segments such as product development, production, technical services, quality assurance and marketing.

PEO: 2 Become successful entrepreneur in Textile and related field and contributing to societal, technological and industry development.

PEO: 3 Partake professional qualifications/ certifications in Textile Technology related areas by pursuing specialized studies in engineering and business.

Program Outcomes (PO's)

Graduates of the Textile Technology Undergraduate Program should have the ability to:

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

PO 2: 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 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.

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

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

PO 6: Apply reasoning informed by the contextual knowledge to assess societal, health, safety, legal and cultural issues and the consequent responsibilities relevant to the professional engineering practice.

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

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

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

PO 10: 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: 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)

Graduates of the Textile Technology Undergraduate Program will have the ability to:

PSO1: Apply the knowledge of mathematics, science, engineering fundamentals and an engineering specialization for Process Optimization, Cost and Value analysis, Productivity improvement, Solutions to quality issues and Product development in textile and related fields.

PSO2: Demonstrate learned techniques, experiments, modern engineering tools and software to estimate the optimum utilization of resources such as raw materials, machineries, manpower and to predict the properties of fibre, yarn, fabric and garments as per the end uses.

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B.TECH TEXTILE TECHNOLOGY

CURRICULUM

Semester III										Pre-requisite
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**	
1	U17MAT3103	Numerical Methods	Theory & Tutorial	BS	3	1	0	0	4	--
2	U17EII3203	Measurements and Instrumentation	Embedded - Theory & Lab	PC	3	0	2	0	4	--
3	U17TXT3001	Physical Properties of Textile Fibres	Theory	PC	3	0	0	0	3	--
4	U17TXI3202	Yarn Manufacturing Technology I	Embedded - Theory & Lab	PC	3	0	2	0	4	--
5	U17TXI3203	Computer Applications in Textiles	Embedded - Theory & Lab	PC	2	0	2	0	3	--
6	U17INI3600	Engineering Clinic I	Practical & Project	ES	0	0	4	2	3	--
								Total Credits	**21**	
								Total Contact Hours/week	**27**	

Semester IV										Pre-requisite
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**	
1	U17MAT4104	Operations Research	Theory & Tutorial	BS	3	1	0	0	4	--
2	U17MET4007	Basics of Mechanical Engineering	Theory	ES	3	0	0	0	3	--
3	U17TXT4001	Yarn Manufacturing Technology II	Theory	PC	3	0	0	0	3	U17TXI3202
4	U17TXT4002	Fabric Manufacture -I	Theory	PC	3	0	0	0	3	--
5	U17TXI4203	Woven Fabric Structure and Design	Embedded - Theory & Lab	PC	3	0	2	0	4	--
6	U17TXP4504	Yarn Manufacturing Technology Lab	Lab	PC	0	0	2	0	1	U17TXI3202
7	U17TXP4505	Fabric Manufacture-I Lab	Lab	PC	0	0	2	0	1	--
8	U17INI4600	Engineering Clinic II	Practical & Project	ES	0	0	4	2	3	U17INI3600
								Total Credits	**22**	

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Total Contact Hours/week	**28**

Semester V										Pre-requisite
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**	
1	U17TXI5201	Fabric Manufacture-II	Embedded - Theory & Lab	PC	3	0	2	0	4	U17TXT4002
2	U17TXT5002	Mechanics of Textile Machinery	Theory	ES	3	0	0	0	3	--
3	U17TXT5003	Textile Chemical Processing-I	Theory	PC	3	0	0	0	3	U17TXT4002
4	U17TXT5004	Knitting Technology	Theory	PC	3	0	0	0	3	U17TXT4001
5	U17TXP5505	Textile Chemical Processing Lab-I	Lab	PC	0	0	2	0	1	U17TXT4002
6	U17TXE….	Professional Elective-I	Theory	PE	3	0	0	0	3	-
7	U17TXO5….	Open Elective-I	Theory	OE	3	0	0	0	3	-
8	U17INI5600	Engineering Clinic III	Practical & Project	ES	0	0	4	2	3	U17INI4600
								Total Credits	**23**	
								Total Contact Hours/week	**28**	

Semester VI										Pre-requisite
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**	
1	U17TXI6201	Garment Manufacturing Technology	Embedded - Theory & Lab	PC	2	0	2	0	3	--
2	U17TXI6202	Textile Chemical Processing -II	Embedded - Theory & Lab	PC	3	0	2	0	4	U17TXT5003
3	U17TXT6003	Textile and Apparel Quality Evaluation	Theory	PC	3	0	0	0	3	U17TXI5201
4	U17TXE….	Professional Elective-II	Theory	PE	3	0	0	0	3	-
5	U17TXO6….	Open Elective-II	Theory	OE	3	0	0	0	3	-
6	U17TXP6504	Textile and Apparel Quality Evaluation Lab	Lab	PC	0	0	2	0	1	U17TXI5201
7	U17TXE….	Professional Elective-III	Theory	PE	3	0	0	0	3	--
8	U17INI6600	Engineering Clinic IV	Practical & Project	ES	0	0	4	2	3	U17INI5600
								Total Credits	**23**	
								Total Contact Hours/week	**29**	

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Semester VII										Pre-requisite
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**	
1	U17TXT7001	Process Control in Spinning and Weaving	Theory	PC	3	0	0	0	3	U17TXT6003
2	U17TXT7002	Technical Textiles	Theory	PC	3	0	0	0	3	U17TXI5201
3	U17TXT7003	Textile and Apparel Costing	Theory	HS	3	0	0	0	3	U17TXT4001
4	U17TXE….	Professional Elective-IV	Theory	PE	3	0	0	0	3	-
5	U17TXP7504	Product Development and Characterization Lab	Lab	PC	0	0	2	0	1	U17TXP6504
6	U17TXP7505	Textile and Apparel CAD Lab	Lab	PC	0	0	2	0	1	U17TXI6201
7	U17TXP7706	Project - Phase I	Project	PR	0	0	0	6	3	U17INI6600
Total Credits									**17**	
Total Contact Hours/week									**22**	

Semester VIII										Prerequisite
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**	
1	U17TXP8701	Project- Phase II	Project	PR	0	0	0	24	12	U17TXP7706
Total Credits									**12**	
Total Contact Hours/week									**24**	

Total Credits	**163**

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List of Mandatory Courses					
S.No.	**Course Code**	**Course Title**	**CT**	**Semester**	**Credits**
1.	U17VEP3503	Family Values	HS	3	0
2.	U17CHT3000	Environmental Science and Engineering	MC	3	0
3.	U17VEP4504	Professional Values	HS	4	0
4.	U17INT4000	Constitution of India	MC	4	0
5.	U17VEP5505	Social Values	HS	5	0
6.	U17VEP6506	National Values	HS	6	0
7.	U17VEP7507	Global Values	HS	7	0

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Programme Electives									
S.No	**Course code**	**Course Title**	**Course Mode**	**CT**	**L**	**T**	**P**	**J**	**C**
Fibres, Yarn & Fabric									
1	U17TXE0001	Manufactured Fiber Technology	Theory	PE	3	0	0	0	3
2	U17TXE0002	High Performance Fibers	Theory	PE	3	0	0	0	3
3	U17TXE0003	Manufacture of Specialty Yarns and Fabrics	Theory	PE	3	0	0	0	3
Processing & Garments									
4	U17TXE0004	Apparel Production Planning and Control	Theory	PE	3	0	0	0	3
5	U17TXE0005	Garment Processing	Theory	PE	3	0	0	0	3
6	U17TXE0006	Textile Marketing and Merchandising	Theory	PE	3	0	0	0	3
7	U17TXE0007	Clothing Science	Theory	PE	3	0	0	0	3
Technical Textiles									
8	U17TXE0008	Nano and smart materials in Textiles	Theory	PE	3	0	0	0	3
9	U17TXE0009	Textile Composites	Theory	PE	3	0	0	0	3
10	U17TXE0010	Bio Polymers and Medical Textiles	Theory	PE	3	0	0	0	3
Management & Entrepreneurship									
11	U17TXE0011	Textile Project Management and Finance	Theory	PE	3	0	0	0	3
12	U17TXE0012	Entrepreneurship Development in Textiles	Theory	PE	3	0	0	0	3
13	U17TXE0013	Textile Mill Management	Theory	PE	3	0	0	0	3
14	U17TXE0014	Industrial Engineering for Textile and Apparel Industry	Theory	PE	3	0	0	0	3

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One credit Courses

S. No.	Course Code	Course Title
1.	U17TXC001	Work Study in Sewing Line
2.	U17TXC002	Retail Management
3.	U17TXC003	Fancy Yarns
4.	U17TXC004	Erection and Commissioning of Textile Machinery
5.	U17TXC005	Workload and Work Assignments
6.	U17TXC006	ERP in Textiles
7.	U17TXC007	Export Documentation

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SEMESTER III

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U17MAT3103 **NUMERICAL METHODS**
(For Textile Technology)

L	T	P	J	C
3	1	0	0	4

Course outcomes (COs)

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

CO1: Solve a set of algebraic equations representing steady state models formed in engineering problems.

CO2: Fit smooth curves for the discrete data connected to each other or to use interpolation methods over these data tables.

CO3: Find the trend information from discrete data set through numerical differentiation.

CO4: Estimate integrals from discrete data through numerical methods.

CO5: Predict the system dynamic behaviour through solution of ODEs modeling the system

CO6: Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.

Pre-requisite:

Basic knowledge in differentiation, integration and numerical operations.

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

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

Course Assessment methods:

Direct
1.Continuous Assessment Test I, II 2.Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc. (as applicable) 3.End Semester Examination
Indirect
1. Course-end survey

NUMERICAL SOLUTION OF ALGEBRAIC EQUATIONS & TRANSCEDENTAL EQUATIONS **9+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 equations. Solution of linear system of equations by Gaussian elimination, Gauss Jordan method - Gauss Seidel method. Matrix Inversion by Gauss Jordan method - Eigenvalues of a matrix by Power method.

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CURVE FITTING AND INTERPOLATION **9+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 **9+3 Hours**

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

NUMERICAL SOLUTION OF ORDINARY DIFFERENTIAL EQUATIONS 9+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 method: Milne's predictor - corrector method.

NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS 9+3 Hours

Finite difference techniques for the solution of two dimensional Laplace's and Poisson's equations on rectangular domain–Solution of one dimensional heat equation using Bender Schmidt and Crank Nicholson difference schemes –Solution of one dimensional wave equation by explicit scheme.

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

REFERENCES:

1. Kandasamy P., Thilagavathy K. and Gunavathy K., "Numerical Methods", S.Chand Co. Ltd., New Delhi, 2007.
2. Steven C. Chapra and Raymond P. Canale, "Numerical Methods for Engineers with Programming and Software Applications", McGraw-Hill, 2004.
3. John H. Mathews and Kurtis D. Fink, "Numerical Methods using Matlab", Prentice Hall of India, 2004.
4. Gerald C. F. and Wheatley P.O, "Applied Numerical Analysis",Pearson Education Asia, New Delhi, 2002.
5. Sastry S.S, "Introductory Methods of Numerical Analysis", Prentice Hall of India Pvt Ltd, New Delhi, 2003.

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U17EII3203 **Measurements and Instrumentation**

L	T	P	J	C
3	0	2	0	4

Course Outcomes (COs):

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

CO1: Understand the parameters used for measurement in textile industry.

CO2: Identify the various transducers used for various applications.

CO3: Understand about how the feature extraction using mage analysis in textile processing.

CO4: Apply the criteria to choose appropriate sensors for specific applications.

CO5: Utilize and apply the control components for textile processing applications.

Pre-requisite: NIL

CO-POs & PSOs Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	**Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)**													
	PO1	**PO2**	**PO**	**PO4**	**PO5**	**PO6**	**PO7**	**PO8**	**PO9**	**PO10**	**PO11**	**PO12**	**PSO1**	**PSO2**
CO1	M													
CO2	S						S					S		
CO3					M									S
CO4			M											
CO5					W							M	S	

Course Assessment Methods:	
Direct	**Indirect**
1.Model Lab Exam 2.End Semester Practical Exam	1. Course Exit Survey

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TEXTILE MEASUREMENT PARAMETERS 5 Hours

Introduction to textile measurement parameters, Units and standards of displacement, force, pressure, temperature, pH concentration, strain, Flow

SENSOR TYPES 12 Hours

Introduction to Instrumentation, Sensors, classification of transducers according to the parameters: Pressure Detectors- Bellows and Bourdon type detectors, Resistance type transducers, Strain Gauge Transducers, Inductive type transducers, Differential Transformers, Capacitive type transducers, and Pressure detector functions Displacement Transducers, angular and linear, Level Detectors, Flow detectors, Temperature Sensors pH Concentration measurement Schemes for measurement with transducers ,measurement of thickness and humidity, temperature measurement using resistance thermometer, thermocouple and thermistor.

CONCEPT OF IMAGE PROCESSING: 4 Hours

Elements of Digital Image Processing Image formation and measures. Pre-processing techniques, image transforms - enhancement - restoration – encoding. – Application of image processing to textile process/product feature extraction.

SENSOR SELECTION CRITERIA 6 Hours

How to Select the Sensors, Interpretation of Sensor specifications, Datasheet, Static characteristics: error, accuracy, precision, resolution, Hysteresis, modelling and error reduction.

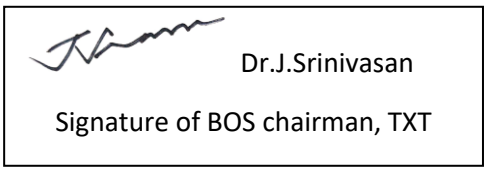
MEASUREMENT ACCESSORIES AND GENERAL TEST EQUIPMENTS: 5 Hours
Brief concept of instrumentation amplifiers, signal generation and processing, data acquisition and conversion, input –output devices and displays. Brief review of general purpose electronic test equipment's- CRO, Digital Multimeter, counters, signal generators, regulated power supplies. Digital recording techniques

CONTROL SYSTEM COMPONENTS: 13 Hours

Basics of control system – Control system examples - Stepper motors - Hydraulic valves - Pneumatic switches, proximity switches and flapper valves - Hydraulic and Pneumatic automation in textile machines –Simple sequential logic circuit design - Programmable Logic Controllers (PLC), Block diagram – programming methods – programs –applications - material handling system. Data acquisition system for spinning preparatory, ring spinning - rotor spinning.

REFERENCES

1. Rangan C S, Sharma G R, Mani V S, 'Instrumentation Devices and Systems', Tata McGraw Hill, New Delhi,2001
2. Alan S Morris, Measurement and Instrumentation Principles 4th edition



3. L. Ashok Kumar, M Senthilkumar, "Automation in Textile Machinery: Instrumentation and Control System Design Principles" CRC Press , 2018

4. Berk stresser G A. Grady P and Buchanan.D R, "Automation in the Textile Industry from Fibres to Apparel", the Textile Institute, Manchester, 1995.

List of Experiments: 30 hours

1 Characteristics of temperature sensors (thermocouple/ thermistor)

2 Measurement of Displacement using LVDT

3 Measurement of strain using strain gauge Bridges

4 Measurement of displacement using capacitive transducer

5 Measurement of flow using orifice meter

6 Measurement of Ph

7 Simple design of an amplifier using instrumentation amplifier

8 Design a simple counter for textile industry application

9 Identification of transfer function for a simple mechanical system used in textile industry

10 Simple ladder logic programming using PLC

Theory Hours:45	**Practical Hours:30**	**Total Hours:75**

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U17TXT3001 Physical Properties of Textile Fibres

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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 fibres.

CO6: Summarize the tensile properties of various textile fibres.

Pre-requisite: NIL

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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		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 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.

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

Theory 45 Hours	**Total: 45 Hours**

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REFERENCES

1. Morton W.E and Hearle., J.W.S., "Physical Properties of Textile Fibres", The Textile Institute, Manchester, U.K., 4th Edition,2008.
2. Meredith. R and Hearle, J.W.S., "Physical Methods of Investigation of Textiles", Wiley Publication, New York, 1989.
3. Gupta V.B., "Textile Fibres: Developments and Innovations", Vol. 2, "Progress in Textiles: Science & Technology". Edited by V.K. Kothari, IAFL Publications, 2000.
4. Meredith R.., "Mechanical Properties of Textile Fibres", North Holland, Amsterdam 1986.
5. Gohl E.P.G. and Vilensky L.D., "Textile Science", second edition, CBS Publisher and Distributor, 1983.
6. Mishra, S.P., Fibre Science & Technology, New Age International Publishers, 2000.
7. Gupta V.B. and Kothari V.K., "Manufactured Fibre Technology", Chapman and Hall, 1997.

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U17TXI3202 Yarn Manufacturing Technology – I

L	T	P	J	C
3	0	2	0	4

Course Outcomes (COs)

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: Discuss 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-requisite: NIL

CO-POs & PSOs Mapping (S/M/W indicates strength of correlation)S-Strong, M-Medium, W-Weak														
COs	**Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)**													
	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

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GINNING AND BLOW ROOM **15 Hours**

Theory

Study of different types of gins –Effect of ginning performance on yarn quality. Objectives of blow room –UNI Blending Machine-Types of beaters in Blow room, degree of blending- IBI, Opening of machine for coarse, fine& super fine fibre, Concepts of opening intensity and cleaning efficiency. Contamination sorters, Chute feed system. Automatic Waste Evacuation System (AWES). Use of air current, modern developments in blow room

Practical

1. Determination of speed & settings in ginning machine.

2. Determination of speeds of beaters in mono cylinder and ERM cleaner, bale opener.

CARDING **15 Hours**

Theory

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

Practical

1. Analysis of Working mechanism and calculation of draft distribution & production calculation in carding machine.

2.Setting between various zones of carding machine & to find out the nep content in the web

DRAWFRAME **15 Hours**

Theory

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

Practical

1.Determination of speed, draft distribution

2. Roller setting in draw frame.

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COMBING **15 Hours**

Theory

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.

Practical

1. Determination of speed, draft, production & combing cycle of comber.

2. Estimation of head-to-head variation in noil level.

SPEED FRAME **15 Hours**

Theory

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.

Practical

1. Determination of speed, draft distribution, twist & production calculation in speed frame.

2. Determination of bobbin speed at various belt positions on cone drums & plot the graph

Theory: 45 Hours	**Practical:30 Hours**	**Total: 75 Hours**

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 "Blow room 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.Arkady Cherakassky, Two dimensional mathematical model of the carding process, Textile research journal P. 169 – 175, March 1994.

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U17TXI3203 **COMPUTER APPLICATIONS IN TEXTILES**

L	T	P	J	C
2	0	2	0	3

Course Outcomes (COs)

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

CO1: Understand Overview of application of computers in textiles.

CO2: Discuss about various concepts of computer vision, image processing using MATLAB.

CO3: Explain about the detection of yarn and fabrics using computer vision.

CO4: Summarize about the various applications of computers in apparel industry.

CO5: Explain about the role of computers in textile design.

CO6: Analyze different parameters of textile materials using image processing techniques.

Pre-requisite:NIL

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

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

Course Assessment methods

Direct
1. Continuous Assessment Test I, II 2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc (as applicable) 3. End Semester Examination
Indirect
1. Course-end survey

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INTRODUCTION **6 Hours**

Overview of Applications of computers in textile production planning, process & quality, inventory control, automation of textile machinery.

INTRODUCTION TO MATLAB **6 Hours**

Basic concepts of computer vision – image, digital image, raster image, vector image.

Basic concepts of image processing – Pixels and Resolution, Aspect ratio. Image Representation – Black and White Images, Gray Scale Images, Color Images

Image Transformations - Basic Relationship between Pixels, Intensity Transformation Functions, Histogram Processing.

COMPUTER VISION TECHNIQUES FOR DETECTING YARN AND FABRIC DEFECTS **6 Hours**

Introduction, fundamentals of textile yarn, methods for detecting yarn parameters, yarn defect detection system.

Automation for fabric inspection, Fabric defect detection methods- Fabric defect detection in patterned fabrics, automated fabric defect detection.

ROLE OF COMPUTER SYSTEMS IN APPAREL INDUSTRY **6 Hours**

3D body scanning: Working principle of 3D body scanner: Layer scanning, white light pattern scanning, Image processing method. Computer aided production planning and control, application of cut planner and general sewing data (GSD), RFID application in logistics and supply chain management

ROLE OF COMPUTERS IN TEXTILE DESIGN **6 Hours**

Introduction – Role of computer technology in textile design, main computer technologies in textile design, benefits and limitations, future trends

REFERENCES

1.R.C. Gonzalez and R.E. Woods, ―Digital Image Processing, Third edition, Prentice Hall, 2008

2.Jinlian Hu “Computer technology for textiles and apparel” Woodhead Publishing Limited, 1991.

3.W.K. Wong, “Applications of Computer Vision in Fashion and Textiles” Elsevier, 2018

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4. M. L. Gulrajani, “Colour Measurement: Principles, Advances and Industrial Applications”, Wood head Publishing Limited, 2010

5. W.Aldrich, " CAD in Clothing and Textiles ", Blackwell Science 2nd edition, 1992

COMPUTER APPLICATIONS IN TEXTILES LABORATORY

Lab Experiments **30 Hours**

1. Study of MATLAB software
2. Demonstrate basic commands in MATLAB for image processing
3. Demonstrate basic commands in Statistical toolbox
4. Demonstrate various filters in image processing
5. Display an image and its histogram
6. Perform blurring and de-blurring on an image
7. Removal of noise from an image
8. Derive the features for yarn image and interpret the results
9. Derive the features for fabric image and interpret the results
10. Derive the features for garment image and interpret the results

Theory: 30	Tutorial: 0	Practical: 30	Project: 0	Total: 60 Hours

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U17INI3600 ENGINEERING CLINIC - I

L	T	P	J	C
0	0	4	2	3

Course objectives

- To help the students look into the functioning of simple to complex devices and systems.
- To enable the students to design and build simple systems on their own.
- To help experiment with innovative ideas in design and team work.
- To create an engaging and challenging environment in the engineering lab.

Course Outcomes (COs)

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

CO1: Identify a practical problems and find a solution.
CO2: Understand the project management techniques.
CO3: Demonstrate their technical report writing and presentation skills.

Pre-requisite: Nil

CO-POs & PSOs Mapping
(S/M/W indicates strength of correlation) 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	S	S	S	S	S	M	W		S			S		
CO2											S			
CO3										S				

Course Assessment methods:

Direct	Indirect
1. Project reviews 50% 2. Workbook report 10% 3. Demonstration & Viva-voce 40%	1. Course Exit Survey

Content:

The course will offer the students with an opportunity to gain a basic understanding of computer controlled electronic devices and apply the concepts to design and build simple to complex devices. As a practical project based embedded course, the students will be taught the concepts using a variety of reference material available in the public domain. While the course will start with formal instruction on hardware, programming and applications, the major portion of the course will provide the students with ample opportunity to be innovative in designing and building a range of products from toys to robots and flying machines.

In the third semester, students will focus primarily on IOT with C programming using Audino.

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GUIDELINES:

1. Practical based learning carrying credits.
2. Multi-disciplinary/ Multi-focus group of 5-6 students.
3. Groups can select to work on a specific tasks, or projects related to real world problems.
4. Each group has a faculty coordinator/Instructor who will guide/evaluate the overall group as well as individual students.
5. The students have to display their model in the 'Engineering Clinics Expo' at the end of semester.
6. The progress of the course is evaluated based on reviews and final demonstration of prototype.

Total Hours: 90

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U17CHT3000 **ENVIRONMENTAL SCIENCE AND ENGINEERING**
(Common to All branches)

L	T	P	J	C
3	0	0	0	0

Course Outcomes (COs)

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

CO 1: Analyze the impact of engineering solutions in a global and societal context.
CO 2: Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems.
CO 3: Highlight the importance of ecosystem and biodiversity.
CO 4: Consider issues of environment and sustainable development in his/her personal and professional undertakings.
CO 5: Paraphrase the importance of conservation of resources.
CO 6: Play an important role in transferring a healthy environment for future generations.

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

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

Course Assessment methods

Direct	Indirect
1. Internal Test I 2. Internal Test II 3. Assignment 4. Group presentation	Course end survey

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

Definition, scope and importance – Need for public awareness – Forest resources: Use and over-exploitation, deforestation, case studies – Timber extraction, mining, dams and their effects on forests and tribal people.

Water resources: Use and 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 nonrenewable energy sources, use of alternate energy sources, case studies.

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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 ECOSYSTEM: 9 Hours

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 – Bio geographical 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 8 Hours

Definition – Causes, effects and control measures of: (a) Air pollution – Organic and inorganic pollution – cyclone separator, electrostatic precipitator (b) Water pollution (c) Heavy metal pollution (d) Noise pollution (e) Thermal pollution (f) Nuclear hazards – Role of an individual in prevention of pollution – Pollution case studies – Solid waste and hazardous Management: Causes, effects and control measures from factories, small scale and large scale industries – 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 Production 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 7 Hours

Population growth and explosion – Welfare Program – Environment and human health – Communicable disease – Role of Information Technology in Environment and human health – Case studies.

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

REFERENCES

1. G. Tyler Miller and Scott Spoolman, 'Environmental Science', Fourteenth Edition, Brooks Cole, 2012.
2. Gilbert M. Masters and Wendell P. Ela, 'Introduction to Environmental Engineering and Science', Third Edition, Pearson Education, 2013.
3. Bharucha Erach, 'The Biodiversity of India', Mapin Publishing Pvt. Ltd., Ahmedabad, 2002.
4. Trivedi R.K and P.K.Goel, 'Introduction to Air Pollution', Techno-Science Publications, 2003.

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5. Trivedi R.K., ‘Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards’, Vol. I and II, Enviro Media, 1996.
6. Cunningham, W.P.Cooper and T.H.Gorhani, ‘Environmental Encyclopedia’, Jaico Publication House, Mumbai, 2001.
7. Wager K.D., ‘Environmental Management’, W.B. Saunders Co., Philadelphia, USA, 1998.
8. Colin R. Townsend, Michael Begon and John L. Harper, ‘Essentials of Ecology’, Third Edition, Blackwell Publishing, 2008.

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U17VEP3503 **FAMILY VALUES** (Mandatory)

L	T	P	J	C
0	0	2	0	0

Course Outcomes (COs)

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

CO 1: Develop skills in maintaining the harmony in the family.
CO 2: Create impulsive activities for healthy family
CO 3: Be receptive to troubled Individuals.
CO 4: Gain healthy life by practicing Kundalini Yoga & Kayakalpa.
CO 5: Possess Empathy among family members.
CO 6: Reason the life and its significance.

Pre-requisites :

1. U17VEP1501 / Personal Values
2. U17VEP2502 / Interpersonal Values

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

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

Course Assessment methods

Direct
1.Group Activity / Individual performance and assignment 2.Assessment on Value work sheet / Test
Indirect
1. Mini project on values / Goodwill Recognition

Values through Practical activities:

1. Family system: Introduction to Family Values – elements of family values - Adjustment, Tolerance, Sacrifice - Family structure in different society – work life balance.
2. Peace in Family : Family members and their responsibility - Roles of parents, children, grant parents -. Respectable women hood
3. Core value: Empathy: Unconditional love - Respect - Compassion - sacrifice–Care &share - helping – emotional support- hospitality – cleanliness
4. Blessing: Blessing - methods - Vibration effect - Benefits - Reason for misunderstanding in the Family and resolution through blessings.

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5. Healthy Family: Good relationship with neighbors - Counseling - Simplified Kundalini Yoga - Kaya Kalpa Yoga

Workshop mode

REFERENCES

1. FAMILY - www.download.nos.org/331courseE/L-13%20FAMILY.pdf

2. FRAMEWORK FOR ACTION ON VALUES EDUCATION IN EARLY CHILDHOOD – UNESCO – PDF – www.unesdoc.unesco.org/images/0012/001287/128712e.pdf

3. TRUE FAMILY VALUES Third Edition - Tparents Home www.tparents.org/Library/Unification/Books/TFV3/_TFV3.pdf

4. FAMILY VALUES IN A HISTORICAL PERSPECTIVE - The Tanner Lectures on www.tannerlectures.utah.edu/_documents/a-to-z/s/Stone95.pdf
5. PROBLEMS OF INDIA'S CHANGING FAMILY AND STATE ... - the United Nations - www.un.org/esa/socdev/family/docs/egm09/Singh.pdf

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SEMESTER IV

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L	T	P	J	C
3	1	0	0	4

U17MAT4104 **OPERATIONS RESEARCH**
(For Textile Technology)

Course Outcomes (COs)

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/PSO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak													
COs	**Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)**													
	PO1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S	S										M	M	
CO2	S	S										M	M	
CO3	S	S										M	M	
CO4	S	S										M	M	
CO5	S	S										M	M	
CO6	S	S										M	M	

Course Assessment methods:

Direct
1. Continuous Assessment Test I, II 2. Open book test; Cooperative learning report, Assignment; Journal paper review, Group Presentation, Project report, Poster preparation, Prototype or Product Demonstration etc. (as applicable) 3. End Semester Examination
Indirect
1. Course-end survey

LINEAR MODEL **9+3 Hours**

The phases of OR study – formation of an L.P model – graphical solution – simplex algorithm – artificial variables technique -Big M method

TRANSPORTATION AND ASSIGNMENT PROBLEM **9+3 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

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PROJECT MANAGEMENT BY PERT & CPM **9+3 Hours**

Basic terminologies – Constructing a project network – Scheduling computations – PERT - CPM –PERT Cost

REPLACEMENT AND SEQUENCING MODELS **9+3 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

INVENTORY CONTROL **5+1 Hours**

Variables in inventory problems, EOQ, deterministic inventory models, order quantity with price break, techniques in inventory management.

QUEUEING THEORY **4+2 Hours**

Queueing system and its structure – Kendall's notation – Markovian queuing models - M/M/1: FCFS/∞/∞ - M/M/1: FCFS/n/∞ - M/M/C: FCFS/∞/∞

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

REFERENCES

1. Taha H.A., "Operations Research: An Introduction", 10th Edition, Pearson Education, 2017
2. Hira and Gupta "Introduction to Operations Research", S.Chand and Co.2012
3. Hira and Gupta "Problems in Operations Research", S.Chand and Co.2013
4. Wagner, "Operations Research", Prentice Hall of India, 2011
5. S.Bhaskar, "Operations Research", Anuradha Agencies, Second Edition, 2014

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L	T	P	J	C
3	0	0	0	3

U17MET4007 BASICS OF MECHANICAL ENGINEERING

(Common to TXT and FT)

Course Outcomes (COs)

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

CO1 Explain principles of thermodynamics, renewable energy and power plants.
CO2 Explain the working principle and combustion characteristics of IC Engines.
CO3 Explain the working principle of VCR & VAR systems.
CO4 Understand and explain the various manufacturing processes and power transmission.
CO5 Demonstrate basic manufacturing process.
CO6 Explain various types of power transmission.

Pre Requisite: NIL

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	PO 1	PO2	PO3	PO4	PO5	PO6	PO7	PO8	PO9	PO10	PO11	PO12	PSO1	PSO2
CO1	S													
CO2		M												
CO3		M												
CO4	W													
CO5	M													
CO6	M													

Course Assessment Methods

Direct	Indirect
1. Internal tests 2. Assignment 3. Group Presentation 4. End Semester Exam	1.Course Exit Survey

LAWS OF THERMO DYNAMICS **9 Hours**

First law of thermodynamics – statement and application, steady flow of energy equation, Second law of thermodynamics. Heating and Expansion of Gases, Expression for work done, internal energy, hyperbolic and polytrophic processes. Properties of Steam, Dryness fraction, latent heat, total heat of wet steam.

POWER PLANTS **9 Hours**

Classification of Power Plants, Steam, Diesel, nuclear and Hydro Power Plants. Types of turbines, working of a single stage impulse and reaction turbine.

Alternate Sources of Energy: (Solar, Wind, Tidal, Geothermal, Ocean Thermal Energy Conversion (OTEC). Wind / Solar grid fed power plant, Solar /Water air heaters – Techno-economics of power plants and energy sources.

INTERNAL COMBUSTION ENGINES **9 Hours**

Classification of IC engines, Main components of IC engines, working of a 4 stroke and 2 stroke petrol and diesel engine, differences between 4 stroke and 2 stroke engines.

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Refrigeration and Air Conditioning: principle of vapour compression and vapour absorption refrigeration systems. Air conditioning, terminology and classifications. Humidification and Air conditioning.

MANUFACTURING PROCESSES **9 Hours**

Basic principles of Arc and Gas Welding, Soldering and Brazing, Extrusion, Forging, Rolling, and Drawing Processes. Milling – Types, Operations and Equipment's.

POWER TRANSMISSION **9 Hours**

Types of drives, belt drives – flat and V belts, rope drives, chain drive, gear drives – spur, helical, bevel and worm gears (Descriptive treatment only) – gear trains, simple and compound.

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

REFERENCES

1. Shanmugam G, Palanichamy M S, "Basic Civil and Mechanical Engineering", Tata McGraw Hill Company, New Delhi, 2nd Edition, 2000.
2. Venugopal.K. and Prabu Raja, "Basic Mechanical Engineering", Anuradha Publications, Chennai, 2007.
3. Sarkar B. K.,"Thermal Engineering" Tata McGraw Hill Company, New Delhi. 2000
4. Rao N., "Manufacturing Technology: Foundry, Forming and Welding", Tata McGraw Hill Co., New Delhi, Paperback Edition. 1998 James Brown, "Advanced Machining Technology Handbook", McGraw Hill, New York,1998

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U17TXT4001 **YARN MANUFACTURING TECHNOLOGY II**

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

CO1: Explain the basic principles of different spinning system.
CO2: Compare the basic 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: Understand the modern development in all spinning system.
CO6: Production of different type of yarns with different spinning system.

Pre Requisite:

U17TXI3202: Yarn Manufacturing Technology I

CO-POs & PSOs Mapping

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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, Balloon mechanism, Traveler- lag, Production

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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 spinning Systems-Eli twist- Comfort win, 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. 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**

REFERENCES

1. Gowda R.V.M., “New Spinning Systems”, NCUTE, IIT Delhi, 2003.
2. Ishtiaque, S.M., Salhotra K.R. and Gowda R.V.M., "Friction Spinning", Textile Progress, Vol. 33, No.2, Textile Institute, U.K., 2001

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3. Chattopadhyay R. (Ed)., “Advances in Technology of Yarn Production”, NCUTE, IIT Delhi, 2002.
4. Lawrence C.A. and Chen K.Z., “Rotor Spinning”, Textile Progress, Vol. 13, No.4, Textile Institute, U.K., 1981.
5. Basu A., "Progress in Air-jet Spinning", Textile Progress, Vol. 29, No.3, Textile Institute, U.K., 1997.
6. Oxtoby E., “Spun Yarn Technology” Butterworths, London 1983.
7. W.Klein, “New spinning systems”, The Textile Institute Manchester, U.K. 1993.

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U17TXT4002 FABRIC MANUFACTURE - I

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

CO1: Summarize the requirements of preparatory machines for producing woven fabric with required qualities.

CO2: Explain the concept and mechanism of preparatory processes.

CO3: Describe the functioning of various motions and it's timing in shuttle weaving machine.

CO4: Explain the concept and mechanism of various motions of shuttle weaving machine.

CO5: Select and control the process variables of various motion at loom.

CO6: Design and execute the procedure for producing woven fabric.

Pre- requisite: NIL

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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
CO3	M												M	
CO4		S												M
CO5				S									M	
CO6			S						M			M		S

Course Assessment methods

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

WINDING **9 Hours**

Objectives of winding, Geometry of cone winding, Classification of yarn faults and its identification. Electronics yarn clearer. Knotters and Splicers. Classification of winders. Working principles of automatic cone winders, Pirn winder, Pirn bunching. Production calculations of cone and Pirn winders.

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WARPING AND SIZING **9 Hours**

Types of creels; working principles of beam and sectional warpers; Objectives of sizing - Working principles of multi cylinder, single end sizing machines and combined dyeing and sizing. Size ingredients, Size preparation. Production calculation in warping and sizing.

WEAVING **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.

PRIMARY MOTIONS **9 Hours**

Shed geometry and shedding requirement; types of shed; shedding mechanisms - principles of tappet, dobby and jacquard shedding mechanisms; reversing mechanisms; Shuttle picking and checking mechanisms; beat up mechanism in shuttle looms.

SECONDARY AND TERTIARY MOTIONS **9 Hours**

Take-up and let-off motion used in power loom; Warp protector mechanism and Warp and weft stop motion; Weft feelers and weft replenishment mechanism; Multiple box motions; Terry mechanism.

Theory 45 Hours	**Total: 45 Hours**

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. Sriramlu P.K., Ajgaonkar D.B. &Talukdar M.K., "Weaving Machines: Mechanisms, Management", Mahajan Publishers, Ahmedabad, 1998.
4. Modi J.R.D., "Sizing Ingredients", Mahajan Publications, Ahmedabad
5. Booth J.E., "Textile Mathematics", Vol. II & III, Textile Institute, Manchester,U.K., 1975.
6. Sengupta E., "Yarn Preparation", Vol. I & II, Popular Prakasam, Bombay, 1970.
7. "Woven fabric production – I", Quality CBT & course material from NCUTE, 2002.
8. "Woven fabric production – II", Quality CBT & course material from NCUTE, 2002.

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U17TXI4203 WOVEN FABRIC STRUCTURE AND DESIGN

L	T	P	J	C
3	0	2	0	4

Course Outcomes

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

CO1: Design various weave structures.
CO2: Draw corded structures.
CO3: Illustrate colour and weave effects.
CO4: Draw and analyses the double cloth structures.
CO5: Draw pile structures.
CO6: Learn to create new structures.

Pre-requisite: NIL

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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.

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.

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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

DOUBLE CLOTH **9 Hours**

Double cloth: Classification – types of stitches-wadded double cloth – warp and weft wadded double cloth – centre warp and weft stitched double cloth. Ply fabrics.

PILE FABRICS **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.

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

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.
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.

List of Experiments

1. Analysis of plain weave structures.
2. Analysis of twill weave structures.
3. Analysis of satin/sateen weave structures.
4. Analysis of honey comb weave structures.
5. Analysis of Huck a back-weave structures.
6. Analysis of crepe weave structures.
7. Analysis of Bedford cord weave structures.
8. Analysis of extra warp/weft figured weave structures.
9. Analysis of double cloth structures.
10. Analysis of velveteen structures.

Practical: 30 Hours	**Total: 30 Hours**

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U17TXP4504 YARN MANUFACTURING TECHNOLOGY LAB

L	T	P	J	C
0	0	2	0	1

Course Outcomes (COs)

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 machines.

Pre-requisite:
U17TXI3202 Yarn Manufacturing Technology I

CO-POs & PSOs Mapping

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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					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

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List of Experiments

1. Determination of draft distribution & production calculation in ring 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: 30 Hours **Total: 30 Hours**

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U17TXP4505 FABRIC MANUFACTURE -I LAB

L	T	P	J	C
0	0	2	0	1

Course Outcomes (COs)

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: Describe the safety precautions in weaving industry

Pre-requisite: NIL

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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				S	M									S
CO3				M										S
CO4			M										M	
CO5		M											M	
CO6					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

List of Experiments

1. Determination of package density, winding angle, wind and traverse ratio in automatic cone winders and calculate the production in kgs per shift of 8 hours.
2. Study the mechanisms for regulating pirn dimensions and characteristics in automatic pirn winder.
3. Preparation of single end sizing of given yarn and determination of size pick-up % and tensile properties.
4. Determination of depth of shed, heald shaft movements and reversing motion in tappet shedding.
5. Study of jacquard shedding mechanism in shuttle loom.

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6. Study of dobby shedding mechanism and preparation of pattern card for new design.
7. Study of picking mechanisms and calculate the shuttle velocity with changing the settings.
8. Study of let-off motion and back rest.
9. Study of seven-wheel take-up motion and dividend calculation.
10. Study of warp and weft stop motions.
11. Study of warp protector mechanisms and setting of parts during normal and shuttle trap.
12. Study of automatic pirn changing mechanism and weft feeler mechanism.

Practical 30 Hours	**Total: 30 Hours**

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U17INI4600 ENGINEERING CLINIC - II

L	T	P	J	C
0	0	4	2	3

Course objectives

- To help the students look into the functioning of simple to complex devices and systems.
- To enable the students to design and build simple systems on their own.
- To help experiment with innovative ideas in design and team work.
- To create an engaging and challenging environment in the engineering lab.

Course Outcomes (COs)

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

CO1: Identify a practical problems and find a solution.
CO2: Understand the project management techniques.
CO3: Demonstrate their technical report writing and presentation skills.

Pre-requisite:U17INI3600 Engineering Clinic -I

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

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

Course Assessment methods:

Direct	Indirect
1. Project reviews 50% 2. Workbook report 10% 3. Demonstration & Viva-voce 40%	1. Course Exit Survey

Content:

The course will offer the students with an opportunity to gain a basic understanding of computer controlled electronic devices and apply the concepts to design and build simple to complex devices. As a practical project based embedded course, the students will be taught the concepts using a variety of reference material available in the public domain. While the course will start with formal instruction on hardware, programming and applications, the major portion of the course will provide the students with ample opportunity to be innovative in designing and building a range of products from toys to robots and flying machines.

In the fourth semester, students will focus primarily on Raspberry pi based controllers with Python programming.

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GUIDELINES:

1. Practical based learning carrying credits.
2. Multi-disciplinary/ Multi-focus group of 5-6 students.
3. Groups can select to work on a specific tasks, or projects related to real world problems.
4. Each group has a faculty coordinator/Instructor who will guide/evaluate the overall group as well as individual students.
5. The students have to display their model in the 'Engineering Clinics Expo' at the end of semester.
6. The progress of the course is evaluated based on reviews and final demonstration of prototype.

Total Hours: 90

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U17VEP4504 **PROFESSIONAL VALUES** (Mandatory)

L	T	P	J	C
0	0	2	0	0

Course Outcomes (COs)

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

CO 1: Develop the ethical values in both professional and personal life.
CO 2: Develop ability to take decision to reinforce professional life.
CO 3: Rational in professional skills required for diverse society.
CO 4: Excel in ingenious attitude to congregate professional life.
CO 5: Research into the professional stand.
CO 6: Spruce an Individual with decorum to achieve professional life.

Pre-requisite:
1. U17VEP1501 / Personal Values.
2. U17VEP2502 / Interpersonal Values.
3. U17VEP3503 / Family Values.

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

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

Course Assessment methods

Direct
1.Group Activity / Individual performance and assignment 2.Assessment on Value work sheet / Test
Indirect
1. Mini project on values / Goodwill Recognition

Values through Practical activities:

1.Professional skills With Values: Positive Attitude, Adaptability, Responsibility, Honesty and Integrity, Self Esteem, & Self Confidence

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2.Building Innovative work cultures: Creative thinking, Critical thinking, Conflict Resolution, Problem Solving, & Decision making

3.Professional Work Ethics: Types of Ethics, Etiquette, personality Grooming, Emotional quotient, Human Dignity, Safety & Role of Professional in Social Responsibility

4.Engineering Ethics: Engineering Council of India - Objectives - Code of Ethics - Social responsibility -Professional Quality - Ethical issues - Effects - Strategy – Corruption, Consequences, Cures

5.Case studies in engineering ethics: Discussion of case studies relating to Public safety, health, welfare, Quality of product, Improper conduct by management, Product responsibility, Intellectual property

Workshop mode

REFERENCES

1. LEARNING TO DO SOURCEBOOK 3 - UNESCO-UNEVOC -PDF
   www.unevoc.unesco.org/fileadmin/user_upload/pubs/LearningToDo.pdf

2. DECLARATION OF PROFESSIONAL VALUES AND ETHICAL STANDARDS
   www.garda.ie/Documents/User/declarationvalues.pdf

3. KARMA YOGA - SWAMI VIVEKANANDA
   www.vivekananda.net/PDFBooks/KarmaYoga.pdf

4. PROFESSIONAL ETHICS IN ENGINEERING - Sasurie College of Engineering
   www.sasurieengg.com/.../GE2025%20Professional%20Ethics%20in%20Engineering.

5. ENGINEERING ETHICS CASE STUDY; Challenger
   www.ucc.ie/en/processeng/staff/academic/ebyrne/.../PE1006PptNotesLect7.pdf

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U17INT4000	CONSTITUTION OF INDIA (Mandatory course)	L	T	P	J	C
		2	0	0	0	0

Course Outcomes (COs)

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

CO 1: Gain Knowledge about the Constitutional Law of India.
CO 2: Understand the Fundamental Rights and Duties of a citizen.
CO 3: Apply the concept of Federal structure of Indian Government.
CO 4: Analyze the Amendments and Emergency provisions in the Constitution.
CO 5: Develop a holistic approach in their life as a Citizen of India.

Pre-requisite: NIL

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

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

Course Assessment methods

Direct
1. Group Activity / Quiz/ Debate / Case studies 2. Class test / Assignment
Indirect
Surveys

THEORY COMPONENT:

Module.1: Introduction to Indian Constitution **4 hours**

Meaning of the constitution law and constitutionalism - Historical perspective of the Constitution - Salient features and characteristics of the Constitution of India

Module.2: Fundamental Rights **8 hours**

Scheme of the fundamental rights - Right to Equality - Fundamental Right under Article 19 - Scope of the Right to Life and Liberty - Fundamental Duties and its legal status - Directive Principles of State Policy – Its importance and implementation

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Module.3: Federal Structure **8 hours**

Federal structure and distribution of legislative and financial powers between the Union and the States - Parliamentary Form of Government in India - The constitutional powers and status of the President of India

Module.4: Amendment to Constitution **6 hours**

Amendment of the Constitutional Powers and Procedure - The historical perspectives of the constitutional amendments in India

Module.5: Emergency Provisions **4 hours**

National Emergency, President Rule, Financial Emergency
Local Self Government – Constitutional Scheme in India

Theory: 30	**Tutorial: 0**	**Practical: 0**	**Project: 0**	**Total: 30 hours**

REFERENCES

1. Constitution of India - Ministry of Law & Justice – PDF format
awmin.nic.in/coi/coiason29july08.pdf
2. Introduction to the Constitution of India by Durgadas Basu
3. The Constitution of India – Google free material -
www.constitution.org/cons/india/const.html
4. Parliament of India – PDF format
download.nos.org/srsec317newE/317EL11.pdf
5. The Role of the President of India – By Prof.Balkrishna
6. Local Government in India – E Book - Pradeep Sachdeva
https://books.google.com/books/.../Local_Government_in_In...

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SEMESTER V

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U17TXI5201 FABRIC MANUFACTURE - II

L	T	P	J	C
3	0	2	0	4

Course Outcomes (COs)

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

CO1: Discuss the concept of shuttle less loom and its evaluation.
CO2: Discuss the concept and mechanism of shuttleless weaving machine.
CO3: Discover the nonwoven technology.
CO4: Describe the various nonwoven web laying and web bonding systems.

Pre-requisites:
U17TXT4002 Fabric Manufacture I

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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	
CO2		S											M	
CO3		S												S
CO4		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

SHUTTLELESS WEAVING AND NONWOVEN **9 hours**

Limitation of shuttle looms- Classification of shuttleless loom- Weft accumulator – types- Formation of unconventional selvedges – tuck-in, leno, chain, fused and adhesive. Nonwovens: Introduction, Definition as per INDA and EDANA, Fibres used in nonwovens. Classification of web laying and web bonding systems-Comparison of woven, knitted and nonwoven.

PROJECTILE AND RAPIER 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. Weft insertion rate and production calculation. Classification of rapier weaving machines: Flexible, Rigid rapiers- Principles of tip and loop transfer- Rapier drives - Salient features.

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FLUID JET AND MULTIPHASE LOOMS **9 hours**

Air jet weaving Machine - Principle of air jet weaving, types of nozzles, profile reed. Air requirements. Principle of water jet weaving – Weft insertion system – Nozzles - Water requirements –Weft insertion rate and production calculation. Multiphase weaving machine – Warp and weft direction shed wave principle. Principle and operation of circular weaving machines

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 - properties & applications. Wet-laid web formation: theoretical basis of wet forming – raw materials – fibre preparation – web forming technology – bonding systems –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.

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

REFERENCES:

1. Sabit Adanur, “Hand book of weaving”, CRC Press Co. ISBN No. 1-58716-013-7, 2001.
2. Prabir Kumar Banerjee., “Principles of Fabric Formation”, CRC Press, 2014.
3. Talukdar M K, Sriramulu P K and Ajgaonkar D B, “Weaving: Machines, Mechanisms and Management”, Mahajan publishers, Ahmedabad, 1981.
4. Talavasek O & Svaty V, “Shuttleless weaving machines”, Elsevier science publications, Newyork, 1981.
5. Hand Book of Nonwovens – Edited by S.J.Russell, Wood head publications Ltd., ISBN- 13: 978-1-85573-603-0, 2007.
6. 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.

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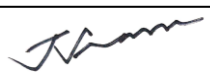
LIST OF EXPERIMENTS **30 Hours**

1. Critically analyze the yarn quality requirements in shuttleless weaving machine.
2. Study of weft accumulator and unconventional selvedge formation in shuttleless weaving machine.
3. Study of weft insertion cycle and picking mechanism in projectile weaving machine.
4. Study of rapier weaving machine and its cycle.
5. Study of rapier drive and calculate the speed and production rate.
6. Critically analyze the air and water quality requirements in fluid jet weaving machine.
7. Create new design in rapier weaving machine.
8. Study of parallel laid web formation in carding machine.
9. Study of needle punching nonwoven machine.
10. Study of thermal bonding nonwoven machine.

Theory 45 hours	**Practical 30 Hours**	**Total: 75 Hours**



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U17TXT5002 MECHANICS OF TEXTILE MACHINERY

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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-requisite: NIL

CO-POs & PSOs Mapping

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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 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 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 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 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 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 **Total: 45 Hours**

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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U17TXT5003 TEXTILE CHEMICAL PROCESSING -I

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

CO1: Discuss the principle and mechanism of singeing, desizing,
CO2: Explain the various methods of scouring, bleaching and mercerization
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 environmental impact of chemical treatment and ISO-14000 in dyeing industry

Pre-requisite :

U17TXT4002: Fabric Manufacture -I

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

Cos	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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	

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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 Hours

Objectives of textile chemical processing. Process Sequence of Cotton, Silk, Wool, Polyester and Polyester / Cotton blend. Singeing: Objectives. Methods, drawbacks and alternative methods. Desizing: Objectives. Methods and Mechanism of Hydrolytic and Oxidative Desizing, evaluation of desizing efficiency.

CHEMICAL PRETREATMENT : 9 Hours

Scouring - Objectives. Mechanism of Alkaline and Bio scouring. Bleaching - Objectives. Mechanisms of Oxidative and Reduction Bleaching. Evaluation – Copper Number , Methylene Blue Absorption and Cupprammonium Fluidity. Mercerization**:** Objectives, Mechanism and Methods. Mercerization of knitted fabric and Blends. Liquid Ammonia Treatment. Assessment of Mercerization efficiency.

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. Application of Acid, Basic and Reactive dyes on wool and silk.

DYEING OF PROTEIN FIBRES, SYNTHETIC FIBRES AND BLENDS 9 Hours

Mass coloration of synthetic fibres. Dyeing of polyester with Disperse dyes - Carrier, HTHP and Thermosol dyeing. Dyeing of acrylic fabrics with cationic dyes. Dyeing of elastomeric fibres and blends. Dyeing of blends. Assessment of fastness properties of dyed material. Eco friendly chemicals and banned dyes

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DYEING MACHINERIES **9 Hours**

Fibre dyeing machines: Loose stock, bale. Yarn dyeing machines: Hank, Cone and Beam. Fabric dyeing machines: Jigger, Winch, Jet, Soft flow, Infra Red dyeing, Padding mangles. Garment dyeing machines: Paddle and Drum. Washing ranges. Concurrent and counter current washing principle. Drying- Water extraction techniques - mangling, suction drying and centrifuging. Thermal drying – cylinder drying, stenter drying and radiation drying

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

REFERENCES

1. A K Roy Choudhary, "Textile Preparation & Dyeing", Science Publishers, USA, 2006.
2. Broadbent D.A., "Basic Principles of Colouration", Society of Dyers &Colourists, 2001.
3. Karmakar S.R., "Chemical Technology in the pretreatment processing of textiles", Textile Science & Technology, Elsevier Publication, 1999.
4. Shore J, "Cellulosics dyeing", Society of Dyers &Colourists, Bradford, UK, 1995.
5. Mittal R M and Trivedi S S, "Chemical Processing of polyester / cellulosic Blends",
6. Trotman, E.R., "Dyeing and Chemical Technology of Textile Fibres", Charles Griffin and Co. Ltd., London. 1991.
7. Shenai, V.A. "Technology of Bleaching and Mercerizing - Vol. III", Sevak Publications Chennai, 1991.
8. Bhagwat R.S "Handbook of Textile Processing", Colour Publication, Mumbai, 1999.
9. Shenai, V.A., "Principle and Practice of Dyeing", Sevak Publisher, Bombay,1991.
10. T.L.Vigo, "Textile Processing and Properties", Elsevier, New York, 1994.

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L	T	P	J	C
3	0	0	0	3

U17TXT5004 KNITTING TECHNOLOGY

Course Outcomes (COs)

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 :

U17TXT4001 Yarn Manufacturing Technology II

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

Cos	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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. Assignment/ Seminar/ Tutorial 4. 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-Lock knit-Reverse lock knit-Satin. Application of weft and warp knit fabric in Technical Textiles. Seamless knitting; working and advantages.

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

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.
6. Samuel Raz., “Flat Knitting Technology”, C. F. Rees GmbH, 1993
7. Chandrasekhar Iyer, Bernd Mammal and Wolfgang Schach., Circular Kintting, Meisenbach GmbH, Bamberg, 1995.

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U17TXP5505 TEXTILE CHEMICAL PROCESSING LAB-I

L	T	P	J	C
0	0	2	0	1

Course Outcomes (COs)

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 coloring 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-requisite :

U17TXT4002: Fabric Manufacture-I

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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			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 Examination	1. Course end survey

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List of Experiments

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.
3. Bleaching of cotton fabric with hypochlorite agent and measurement of the whiteness index.
4. Bleaching of cotton fabric with hydrogen peroxide agent and measurement of the whiteness index,
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: 30 Hours **Total: 30 Hours**

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U17INI5600 ENGINEERING CLINIC - III

L	T	P	J	C
0	0	4	2	3

Course objectives

- To help the students look into the functioning of simple to complex devices and systems.
- To enable the students to design and build simple systems on their own.
- To help experiment with innovative ideas in design and team work.
- To create an engaging and challenging environment in the engineering lab.

Course Outcomes (COs)

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

CO1: Identify a practical problems and find a solution.
CO2: Understand the project management techniques.
CO3: Demonstrate their technical report writing and presentation skills.

Pre-requisite: U17INI4600 Engineering Clinic -II

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

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

Course Assessment methods:

Direct	Indirect
1. Project reviews 50% 2. Workbook report 10% 3. Demonstration & Viva-voce 40%	1. Course Exit Survey

Content:

The course will offer the students with an opportunity to gain a basic understanding of computer controlled electronic devices and apply the concepts to design and build simple to complex devices. As a practical project based embedded course, the students will be taught the concepts using a variety of reference material available in the public domain. While the course will start with formal instruction on hardware, programming and applications, the major portion of the course will provide the students with ample opportunity to be innovative in designing and building a range of products from toys to robots and flying machines.

In the fifth semester, students will focus primarily on design project combining concepts learnt in Engineering clinics I and II.

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GUIDELINES:

1. Practical based learning carrying credits.
2. Multi-disciplinary/ Multi-focus group of 5-6 students.
3. Groups can select to work on a specific tasks, or projects related to real world problems.
4. Each group has a faculty coordinator/Instructor who will guide/evaluate the overall group as well as individual students.
5. The students have to display their model in the 'Engineering Clinics Expo' at the end of semester.
6. The progress of the course is evaluated based on reviews and final demonstration of prototype.

Total Hours: 90

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U17VEP5505 **SOCIAL VALUES** (Mandatory)

L	T	P	J	C
0	0	2	0	0

Course Outcomes (COs)

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

CO 1: Understand the transformation from self to society.
CO 2: Acquire knowledge about disparity among Human Beings.
CO 3: Realize the new ethics in creating a more sustainable Society.
CO 4: Develop skills to manage challenges in social issues.
CO 5: Acquire the skills for Management of Social work & Holistic Society.
CO 6: Validate the social liabilities at dissimilar situations.

Pre-requisites :

1. U17VEP1501 / Personal Values
2. U17VEP2502 / Interpersonal Values
3. U17VEP3503 / Family Values
4. U17VEP4504 / Professional Values

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

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

Course Assessment methods

Direct
1.Group Activity / Individual performance and assignment 2.Assessment on Value work sheet / Test
Indirect
1. Mini project on values / Goodwill Recognition

Values through Practical activities:

1. Self and Society: Relation between self and society – Different forms of society - Elements of Social structures – Realization of Duties and Responsibilities of Individual in the Society

2. Social Values: Tolerance – Responsibility – Sacrifice – Sympathy - Service – peace-nonviolence - right conduct- Unity – forgive – dedication – Honest

3. Social issues : Disparity among Human beings- Poverty-Sanitation -corruption- un employment-superstition – religious intolerance & castes – terrorism.

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4. Emerging Ethics for Sustainable Society: Unison of Men in Society - Positive Social Ethics - Cause and Effect - Ensuring an Equitable Society- Effect of Social Media in society - development of Education and Science in the Society

5. Social Welfare: Social welfare Organization - Programme by Government and NGO's - Benefits of Social Service - Balancing the Family and Social Life – Development of Holistic Society

Workshop mode

REFERENCES

1. SOCIAL PROBLEMS IN INDIA - ForumIAS.com – PDF
   discuss.forumias.com/uploads/File upload/.../711b18f321d406be9c79980b179932.pd...

2. INVESTING IN CULTURAL DIVERSITY AND INTERCULTURAL DIALOGUE: UNESCO ...
   www.un.org/en/events/culturaldiversityday/pdf/Investing_in_cultural_diversity.pdf

3. INDIAN SOCIETY AND SOCIAL CHANGE - University of Calicut
   www.universityofcalicut.info/SDE/BA_sociology_indian_society.pdf

4. CULTURE, SOCIETY AND THE MEDIA - E- class
   www.eclass.uoa.gr/.../MEDIA164/.../%5BTony_Bennett,_James_Curran,_Michael_G

5. SOCIAL WELFARE ADMINISTRATION - IGNOU
   www.ignou.ac.in/upload/Bswe-003%20Block-2-UNIT-6-small%20size.pdf

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SEMESTER VI

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U17TXI6201 GARMENT MANUFACTURING TECHNOLOGY

L	T	P	J	C
2	0	2	0	3

Course Outcomes (COs)

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: Explain different types of accessories used in garment industry.

CO5: Explain different types of pressing methods.

CO6: Explain different types of packing methods.

Pre-requisite: NIL

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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	

PATTERN MAKING **6 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.

CUTTING **6 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 **6 Hours**

Definition of Stitch and Seam- Stitch and Seam classifications- Classification of sewing machines – based on application, based on bed type. Basic stitching machine-principle parts and their functions. Mechanism of stitch formation in lock stitch machine -Feed system: Drop feed system-Unison feed-Differential feed-Compound feed. Stitch and seam defects – causes and remedial measures

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APPAREL ACCESSORIES **6 Hours**

Needle – types and selection. Sewing thread–types and applications- ticket number. Supporting materials & closures--buttons-Zippers-Velcro-Hook and eye-Hook and Bar-Fasteners-Closures-Lining-Interlining-Wadding-Tapes-Elastic- Popular brands.

FUSING, PRESSING AND PACKING **6 Hours**

Fusing: Means-equipment and Methods-Requirements- Pressing: Purpose -Categories - Means- Equipment and methods-Pleating- Permanent press. Packing-Method-types-Components of packing

Theory 30 Hours	**Total : 30 Hours**

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.

List of Experiments **30 Hours**

1. Developing pattern for Baby frock.
2. Developing pattern for Men's shirt.
3. Developing pattern for Trousers.
4. Prepare manual marker plan for plain /check/stripe fabric, Optimization of marker efficiency by trial and error method.
5. Demonstrate sewing operation in Single Needle Lock Stitch Machine, Machine adjustments-Threading-SPI and Tension.
6. Construction of Various stitches and Seams.
7. Prepare trim card for one garment- Baby frock, Men's shirt, Trousers & skirt
8. Demonstrate Sewing operations in Overlock and Flat lock machines and machine adjustments-Threading-SPI and Tension setting.
9. Study on fusing and pressing machines.
10. Conduct quality audit and measurement check for garment.

Practical 30 Hours	**Total 30 Hours**

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L	T	P	J	C
3	0	2	0	4

U17TXI6202 TEXTILE CHEMICAL PROCESSING -II

Course Outcomes (COs)

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-requisite:

U17TXT5003: Textile Chemical Processing -I

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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

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, 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.

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

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

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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List of Experiments: 30 Hours

1. Printing of cotton fabric with direct style printing and assessment of fastness properties of printed material.
2. Printing of cotton fabric with discharge style printing and assessment of fastness properties of printed material.
3. Printing of cotton fabric with resist style printing and assessment of fastness properties of printed material.
4. Finishing of cotton fabric using starch and evaluation of stiffness and add-on%.
5. Finishing of cotton fabric using softeners and evaluation of drape and add-on%.
6. Crease Proofing of cotton fabric and evaluation of crease recovery angle.
7. Assessment of shrinkage of woven and knitted fabrics.
8. Finishing of cotton fabric with anti-pilling finish and evaluation of pilling.
9. Finishing of cotton fabric with water repellent finish and evaluation of wetting angle.
10. Finishing of cotton fabric with flame retardant finish and evaluation of LOI.
11. Finishing of cotton fabric with soil release finish and measure the ability of fabric to release oily stains during home laundering.
12. Determination of the colour difference and colour strength value of dyed material using computer colour matching system

Practical 30 Hours	**Total 30 Hours**

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U17TXT6003 TEXTILE AND APPAREL QUALITY EVALUATION

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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.

Pre-requisite:

U17TXI5201: Fabric Manufacture - II

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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	
CO2	S	S	S	M	S									
CO3	S	S	M	S	S								M	
CO4	S	S	S	S										
CO5	S	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

INTRODUCTION TO QUALITY 9 Hours

Definition of Quality, Types of quality, factors influencing quality, quality control and quality assurance. Objectives of textile testing. Standard test conditions. Accuracy, precision, calibration. Sampling methods, Statistical Quality control: sample size –Applications of 'F' test, 't' test, 'X2' test..

FIBRE TESTING 9 Hours

Fibre properties - Fibre length: staple length span length – hand stapling method - Baer sorter, Fibro graph-uniformity. Fibre fineness: Fibre fineness testers, calculations. Moisture regain, moisture content determination, calculations. Maturity – testing methods of maturity, calculations – High Volume Instruments-length, strength, maturity and trash & colour

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modules- analysis and interpretation of results. Advanced Fibre Information System- length, nep and trash modules- analysis and interpretation of results.

YARN TESTING **9 Hours**

Yarn numbering systems and calculation - Count Determination, Twist and its measurement. Tensile properties of yarn, tensile testing of yarn: Constant Rate of Elongation, Constant Rate of Loading and Constant Rate of Traverse, Factors influencing tensile testing of yarns. Evenness – principle of measurement, Imperfections, irregularity charts and calculations. Hairiness – principle of measurement. Classimat faults -Yarn appearance assessment

FABRIC TESTING **9 Hours**

Testing of tensile strength, tearing strength and bursting strength. Testing of dimensional stability-Stiffness, Crease recovery, hygral expansion and relaxation shrinkage. Testing of air permeability and water repellency. Testing of abrasion resistance and pilling. Testing of handle and drape, calculations. Objective evaluation of fabric handle –KES and FAST systems.

TESTING OF GARMENTS **9 Hours**

Characteristic requirements of accessories of garments. Testing of buttons, zippers, elastic and hooks. Testing of Linings, interlinings, and fusible interlinings. Testing of sewing threads. Seam strength, Seam Elasticity, Seam Durability. Quality standards in garment industry- Acceptable Quality Level.

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

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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U17TXP6504 TEXTILE AND APPAREL QUALITY EVALUATION LAB

L	T	P	J	C
0	0	2	0	1

Course Outcomes (COs)

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-requisite:

U17TXI5201: Fabric Manufacture- II

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

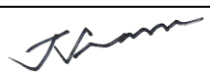
COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12	PSO 1	PSO 2
CO1	S			S	M									
CO2	M	S	S		M								M	
CO3														
CO4														
CO5	S		S											
CO6						M								

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 Experiments

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
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.



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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: 30 Hours	**Total: 30 Hours**

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U17INT6000 PROFESSIONAL COMMUNICATION AND ANALYTICAL REASONING

L	T	P	J	C
3	0	0	0	3

Course Outcomes: (COs)

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

CO 1: Prepare resumes, and face GDs & Interviews.
CO 2: Crack Questions on Quantitative Ability.
CO 3: Crack Problems and Puzzles on Analytical and Logical Reasoning.
CO 4: Crack Questions on Verbal Ability.
CO 5: Develop a holistic approach to face Campus Placements and Competitive Examinations.

Pre-requisites : NIL

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

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

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

Resume Preparation, Group Discussion & Interview **9 hours**

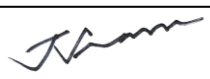
Importance of resume, essentials of a good resume, do's and don'ts of resume, sample resume, importance of group discussion, practice GD, interviews, types of interviews, how to prepare for interview, interview etiquettes, Mock GD & Interview

Quantitative Ability 1 **9 hours**

Number theory, Average, Mixture & Allegation, Ages, Ratio, Percentage, Partnership, Profit & Loss, SI, CI, Clocks, Calendar

Quantitative Ability 2 **9 hours**

Speed Distance Time, Boats & Stream, Train, Time and Work, Pipes and Cistern, Probability, Permutation & Combinations, Linear and Quadratics Equations



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Logical reasoning **9 hours**

Based Problems on Cubes and Dices, Blood relations, Analytical reasoning, Syllogism, Series completion

Verbal reasoning **9 hours**

Basic Grammar / Types of Sentence/ Selecting Words / Spotting Errors/ Sentence Formation / Sentence Improvement/ Sentence Completion / Sentence Correction / Idioms &Phrases

Theory 45 Hours	**Total : 45 Hours**

REFERENCES:

1) Campus Placements – A Comprehensive Guide by Mr. ANKUR MALHOTRA - TATA McGRAW HILL'S PUBLICATIONS.
2) Resumes and interviews – The art of winning by Mr. ASHRAF RIZVI - TATA McGRAW HILL'S PUBLICATIONS.
3) How to Prepare for group Discussion & Interviews by Mr. HARI MOHAN PRASAD and Mr. RAJNISH MOHAN - TATA McGRAW HILL'S WINNING EDGE SERIES.
4) Quantitative Ability – Quantitative Aptitude for Competitive Examinations (Revised Edition – 2017) by Dr. R.S AGGARWAL – S. CHAND PUBLICATIONS.
5) Quantitative Ability – Quantitative Aptitude – Quantum CAT by Mr. SARVESH K VARMA – ARIHANT PUBLICATIONS.
6) Logical Reasoning – A Modern Approach to Verbal and Non Verbal Reasoning (Revised Edition) by Dr. R.S AGGARWAL – S. CHAND PUBLICATIONS.
7) Logical Reasoning – A New Approach to Reasoning by Mr. BS SIJAWALI and Ms. INDU SIJWALI – ARIHANT PUBLICATIONS.
8) Verbal Reasoning – General English for Competitions by Mr. A.N. KAPOOR – S. CHAND PUBLICATIONS.
9) Verbal Reasoning – Objective English for Competitive Examinations by Mr. HARI MOHAN PRASAD and Ms. UMA RANI SINHA – TATA McGRAW HILL'S WINNING EDGE SERIES

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U17INI6600 ENGINEERING CLINIC - IV

L	T	P	J	C
0	0	4	2	3

Course objectives

- To help the students look into the functioning of simple to complex devices and systems.
- To enable the students to design and build simple systems on their own.
- To help experiment with innovative ideas in design and team work.
- To create an engaging and challenging environment in the engineering lab.

Course Outcomes (COs)

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

CO1: Identify a practical problems and find a solution.
CO2: Understand the project management techniques.
CO3: Demonstrate their technical report writing and presentation skills.

Pre-requisite: U17INI5600 Engineering Clinic -III

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

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

Course Assessment methods:

Direct	Indirect
1. Project reviews 50% 2. Workbook report 10% 3. Demonstration & Viva-voce 40%	1. Course Exit Survey

Content:

The course will offer the students with an opportunity to gain a basic understanding of computer controlled electronic devices and apply the concepts to design and build simple to complex devices. As a practical project based embedded course, the students will be taught the concepts using a variety of reference material available in the public domain. While the course will start with formal instruction on hardware, programming and applications, the major portion of the course will provide the students with ample opportunity to be innovative in designing and building a range of products from toys to robots and flying machines.

In the sixth semester, students will focus primarily on Reverse engineering project to improve performance of a product, design and developing a prototype.

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GUIDELINES:

1. Practical based learning carrying credits.
2. Multi-disciplinary/ Multi-focus group of 5-6 students.
3. Groups can select to work on a specific tasks, or projects related to real world problems.
4. Each group has a faculty coordinator/Instructor who will guide/evaluate the overall group as well as individual students.
5. The students have to display their model in the 'Engineering Clinics Expo' at the end of semester.
6. The progress of the course is evaluated based on reviews and final demonstration of prototype.

Total Hours: 90

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U17VEP6506 **NATIONAL VALUES** (Mandatory)

L	T	P	J	C
0	0	2	0	0

Course Outcomes (COs)

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

CO 1: Acquire knowledge on the Essence of Indian Knowledge Tradition.
CO 2: Know the great Indian personalities and follow their trail.
CO 3: Understand the specialty of democracy.
CO 4: Disseminate our Nation and its values to propagate peace.
CO 5: Contribute with their energy and effort for a prosperous India.
CO 6: Propagate the youth and the contribution for development of our Nation.

Pre-requisites :

1. U17VEP1501 / Personal Values
2. U17VEP2502 / Interpersonal Values
3. U17VEP3503 / Family Values
4. U17VEP4504 / Professional Values
5. U17VEP5505 / Social Values

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

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

Course Assessment methods

Direct
1.Group Activity / Individual performance and assignment 2.Assessment on Value work sheet / Test
Indirect
1. Mini project on values / Goodwill Recognition

Values through Practical activities:

1. Essence of Indian Knowledge Tradition:
Basic structure of Indian Knowledge System - Modern Science and Indian Knowledge System - Yoga and Holistic Health care - Case studies - Philosophical Tradition - Indian Linguistic Tradition - Indian Artistic Tradition.
2. Great Indian Leaders : Ancient rulers - Freedom fighters - Social reformers -Religious and Spiritual leaders - Noble laureates -Scientists – Statesman.
3. Largest Democracy : Socialist -Secular - Democratic and Republic – special features of Indian constitution – Three pillar of Indian democracy - Fundamental rights – Duties of a citizen – centre state relationship.

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4. India's Contribution to World peace : Nonaligned Nation – Principle of Pancha Sheela – Mutual respect, non-aggression, non-interference, Equality and cooperation – Role of India in UNO -Yoga India's gift to the world.

5. Emerging India : World's largest young work force - Stable Economic development - Labor market & Achievement in space technology – Value based Social structure. Emerging economic superpower.

Workshop mode

REFERENCES

1. KNOWLEDGE TRADITIONS AND PRACTICES OF INDIA, *CBSE Publication* cbseacademic.nic.in/web_material/Circulars/2012/68_KTPI/Module_6_2.pdf
2. CULTURAL HERITAGE OF INDIA - SCERT Kerala www.scert.kerala.gov.in/images/2014/HSC.../35_Gandhian_Studies_unit-01.pdf
3. LEARNING TO DO: VALUES FOR LEARNING AND WORKING TOGETHER - UNESCO www.unesdoc.unesco.org/images/0014/001480/148021e.pdf
4. INDIA AFTER GANDHI.pdf - Ramachandra Guha - University of Warwick www2.warwick.ac.uk/fac/arts/history/students/modules/hi297/.../week1.pdf
5. INDIA'S CONTRIBUTION TO THE REST OF THE WORLD - YouSigma www.yousigma.com/interesting facts/indiasgifttotheworld.pdf
6. INDIA AS AN EMERGING POWER - International Studies Association web.isanet.org/Web/Conferences/.../11353cac-9e9b-434f-a25b-a2b51dc4af78.pdf

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SEMESTER VII

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L	T	P	J	C
3	0	0	0	3

U17TXT7001 PROCESS CONTROL IN SPINNING AND WEAVING

Course Outcomes (COs)

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-requisite : U17TXT6003 Textile and Apparel Quality Evaluation

CO-POs & PSOs Mapping

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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				M	M		M	S	M
CO2	S	S	S	S	S	M				M			S	
CO3	S	S	S	S	S				M		M		S	
CO4	S	S	S	S	M							M	S	M
CO5	S	S	S	S	M				M				S	
CO6	M			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

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.

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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 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**

REFERENCES

1. Abhijit Majumdar, Apurba Das , R. Alagirusamy, V. K. Kothari, "Process Control in Textile Manufacturing", Woodhead Publishing Series in Textiles, November 2012.
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.
6. Ratnam T.V. & Chellamani. K. P., "Quality Control in Spinning", SITRA Coimbatore 1999.
7. "Loom shed", BTRA Publication, Mumbai, 1986.
8. "Warping and Sizing", BTRA Publication, Mumbai, 1983.
9. "Winding", BTRA Publication, Mumbai, 1986.

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U17TXT7002 TECHNICAL TEXTILES

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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-requisite: U17TXI5201 Fabric Manufacture II

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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 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, Yarns, Fabric types and their construction details, Properties and applications. Textiles in Filtration**:** Dust collection principles, 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 and their types, 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 textile products.

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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 and 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 and 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**

REFERENCES

1. A.R. Horrocks & S.C. Anand (Edrs.), "Handbook of Technical Textiles", The Textile Institute, Manchester, U.K., Woodhead Publishing Ltd., Cambridge, England, 2000.
2. S. Adanur "Wellington Sears Handbook of Industrial Textiles", Technomic Publishing Co. Inc., Lancaster, Pennsylvania, 1995.
3. N.W.M. John, "Geotextiles", Blackie, London, 1987.
4. S.K. Mukhopadhyay and J.F. Partridge, "Automotive Textiles", Text. Prog, Vol. 29, No.1/2, 1998.
5. S. Anand, "Medical Textiles", Textile Institute, 1996.
6. R.Shishoo, Textiles in Sports, CRC press, 2005.
7. R.Senthil Kumar, Textiles for Industrial Applications, CRC press, USA, August 2013.
8. A.K.Sen, Coated Textiles: Principal and Applications, Techno,ic Publication, Lancaster, Pennsylvania, USA, 2001.
9. Walter Fung and Mike Hard Castle, Textiles in Automotive Engineering, Woodhead Publication, USA, 2001.
10. Richard. A.Scott, Textiles for Protection, CRC press, Woodhead Publication, USA, 2005.

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U17TXT7003 TEXTILE AND APPAREL COSTING

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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 Requisite: U17TXT4001 Yarn Manufacturing Technology-II

CO-POs & PSOs Mapping

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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													
CO2	M	M											M	
CO3		M		S	M									
CO4	M	M		S										
CO5		M												
CO6	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.

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.

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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**

REFERENCES

1. RajkishoreNayak, Rajiv Padhye., "Garment ManufacturingTechnology", 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.
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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U17TXP7504 PRODUCT DEVELOPMENT AND CHARACTERIZATION LAB

L	T	P	J	C
0	0	2	0	1

Course Outcomes (COs)

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-requisite:

U17TXP6504 Textile and Apparel Quality Evaluation Lab

CO-POs & PSOs Mapping

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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

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 Experiments **30 Hours**

1. Determination of stiffness and bursting strength of the given nonwoven fabric.
2. Determination of air permeability and construction details of filters.
3. Determination of air and water vapor permeability characteristics of the given sports textiles.
4. Determination of the construction details and tearing strength of the given packaging technical textiles.
5. Determination of stiffness, thickness and abrasion resistance of the given coated technical textiles.
6. Determination of construction details and mechanical strength of the given geo textiles.
7. Determination of the water resistance/repellency tendency of water proof textiles.
8. Determination of the water absorbency / retention of given medical wound care material / felt textiles.

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9. Determination of the flammability characteristic of the given fire proof fabric.
10. Determination of the construction particulars and tenacity of the different suture threads.
11. Production of fibre reinforced composites and determination of the fibre volume fraction / fibre mass fraction.
12. Determination of the mechanical properties of given composite materials.

Practical: 30 Hours	**Total: 30 Hours**

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U17TXP7505 TEXTILE AND APPAREL CAD LAB

L	T	P	J	C
0	0	2	0	1

Course Outcomes (COs)

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 software.

Pre-requisite:

U17TXI6201 Garment Manufacturing Technology

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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

List of Experiment(s)

Development of various motifs using software tools.

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

Practical: 30 Hours **Total: 30 Hours**

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U17VEP7507 **GLOBAL VALUES**
(Mandatory)

L	T	P	J	C
0	0	2	0	0

Course Outcomes (COs)

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

CO 1: Aware of the concept of Universal Brotherhood and support the organizations which are working for it

CO 2: Follow the path of Ahimsa in every aspect of their life

CO 3: Uphold the Universal declaration of Human Rights

CO 4: Understand the unequal distribution of wealth in the World and bestow their effort towards inclusive growth

CO 5: Sensitize the environmental degradation and work for the sustainable development

CO 6: Amalgamate harmony through Non-violence and edify the nation headed for upholding development

Pre-requisites :

1. U17VEP1501 / Personal Values
2. U17VEP2502 / Interpersonal Values
3. U17VEP3503 / Family Values
4. U17VEP4504 / Professional Values
5. U17VEP5505 / Social Values
6. U17VEP6506 / National Values

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

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

Course Assessment methods

Direct
1.Group Activity / Individual performance and assignment 2.Assessment on Value work sheet / Test
Indirect
1. Mini project on values / Goodwill Recognition

Values through Practical activities:

1. Universal Brotherhood : Meaning of Universal Brotherhood- Functioning of Various organization for Universal human beings -Red Cross, UN Office for Humanitarian Affairs – Case study on humanitarian problems and intervention - Active role of Students/Individual on Universal Brotherhood.

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2. Global Peace, Harmony and Unity : Functions of UNO - Principal Organizations - Special organization – Case study relating to disturbance of world peace and role of UNO – Participatory role of Students/Individual in attaining the Global peace and Unity.

3. Non-Violence : Philosophy of nonviolence- Nonviolence practiced by Mahatma Gandhi – Global recognition for nonviolence - Forms of nonviolence - Case study on the success story of nonviolence– Practicing nonviolence in everyday life.

4. Humanity and Justice: Universal declaration of Human Rights - Broad classification - Relevant Constitutional Provisions– Judicial activism on human rights violation - Case study on Human rights violation– Adherence to human rights by Students/Individuals.

5. Inclusive growth and sustainable development : Goals to transform our World: No Poverty - Good Health - Education – Equality - Economic Growth - Reduced Inequality – Protection of environment – Case study on inequality and environmental degradation and remedial measures.

Workshop mode

REFERENCES

1. TEACHING ASIA-PACIFIC CORE VALUES OF PEACE AND HARMONY – UNICEF www.unicef.org/.../pdf/Teaching%20Asia-Pacific%20core%20values.pdf
2. THREE-DIMENSIONAL ACTION FOR WORLD PROSPERITY AND PEACE- IIM Indore - www.iimidr.ac.in/.../Three-Dimensional-Action-for-World-Prosperity-and-Peace-Glo...
3. MY NON-VIOLENCE - MAHATMA GANDHI www.mkgandhi.org/ebks/my_nonviolence.pdf
4. HUMAN RIGHTS AND THE CONSTITUTION OF INDIA 8th ... - India Juris www.indiajuris.com/uploads/.../pdf/l1410776927qHuman%20Rights%20080914.pdf
5. THE ETHICS OF SUSTAINABILITY – Research Gate www.researchgate.net/file.PostFileLoader.html?id...assetKey

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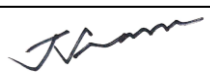
SEMESTER-VIII



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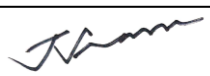
PROFESSIONAL ELCETIVES



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U17TXE0001 MANUFACTURED FIBRE TECHNOLOGY

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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

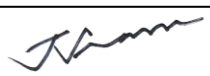
Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

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.



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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. 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**

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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U17TXE0002 HIGH PERFORMANCE FIBERS

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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 Hours**

Requirements of high performance fibres. Aramid fibre – Kevlar fiber - Formation – Structure – Properties and application. Nomex fiber – formation – structure – properties and application. Polyphenyl sulphide fibres - Fibre formation - Properties – Applications.

CARBON AND GLASS FIBRES **9 Hours**

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.

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

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 Hours**

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 Hours**

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**

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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U17TXE0003 MANUFACTURE OF SPECIALTY YARNS AND FABRICS

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

CO1: Understand the production and application of various specialty yarns.
CO2: Design and application of fancy yarns**.**
CO3: Understand the production and application of various specialty fabrics.
CO4: Understand industrial application of specialty fabrics.
CO5: Understand the Pile surfaced carpet weaves.
CO6: Develop various fancy yarn structures.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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										
CO5					M									
CO6	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

MANUFACTURING ATTITUDES AND THE APPLICATIONS OF FANCY YARNS **9 Hours**

Manufacturing attitudes and equipment, Applications for fancy yarns, Structures and formation of fancy yarns, The design and application of fancy yarns.

MANUFACTURING TECHNIQUES **9 Hours**

Yarn production systems, elastomeric yarns, core spun yarn, bi component and bi constituent yarn, SIRO yarn.

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NARROW FABRICS: **9 Hours**

Introduction –fibre and yarn types, fabrics. Preparation for narrow fabric production - winding, warping, sizing, looming. Woven narrow fabrics and their constructions – structure of narrow fabrics woven on shuttleless looms. Conventional shuttle looms, unconventional shuttle looms and shuttleless looms for narrow fabrics production.

SPECIAL FABRICS AND CARPETS **9 Hours**

Elasticated fabrics, zip - fastener tapes, curtain - heading tapes, ladder tapes, trimmings, braids, labels, nets, laces, flocked fabrics. Non-pile carpet weaves and their looms. Pile surfaced carpet weaves and their looms. Needle felt floor coverings.

INDUSTRIAL TAPES AND WEBBINGS **9 Hours**

Slide fastener tapes - Insulating tapes – Book binder's tapes – Labeling Tapes – Border Tapes – Elastic- Pleated lingerie ribbing. Manufacture of spindle drive webbing – Print webbings – Webbings for automobile safety belts

Theory 45 Hours	**Total 45 Hours**

REFERENCES:

1. Jarmila Svedova ," Industrial Textiles", Elsevier Science Publishing Co in, ISBN – 0444-98754-1, New york, 1990.
2. Alexander N G," Desighing Interior Environment", Mas court Brace Covanorich Inc, Newyork, 1996.
3. Crew A H and Arahamsen H, "Carpets: Back to Front", Textile Progress, Vol.19 No.3, The Textile Institute, Mancheste,1987.
4. Turner J P, " The production and properties of narrow fabrics", Textile Progress , Vol.8 No.4, The Textile Institute Manchester, 2002
5. Sabit Adanur, "Wellington Sears Handbook of Industrial Textiles", Technomic publishing company Inc., USA, 1995
6. R H Gong and R M Wright " Fancy yarns Their manufacture and application" Woodhead Publishing Ltd, 2002, ISBN 1 85573 577 6

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U17TXE0004 APPAREL PRODUCTION PLANNING AND CONTROL

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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: Elaborate on Apparel Production Planning and Control.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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											S	
CO4	S	M											S	
CO5	S	M											S	
CO6	S	M							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

INTROCUCTION **9 Hours**

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 entrepreneur-Steps of production planning and control- Planning & lead Time -Importance of pre-production activities.

MARKER AND LAY PLANNING **9 Hours**

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 Hours**

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 Hours**

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

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PRODUCTION PLANNING AND CONTROL **9 Hours**

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**

REFERENCES

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, London, 1988.
5. Prodip V.Mehta, "An Introduction of Quality Control for the Apparel Industry". ASQC quality Press, Marcel Dekker Inc., Newyork, 1992.
6. Managing Quality In Apparel Industry, S.K.Bhrdwaj & Pradip V Mehta. Quality is Free,Philip Crosby.
7. V.RameshBabu " Industrial Engineering in Apparel Production" Wood Head publishing India Ltd., ISBN 13:978-93-80308-17-3, 2012.

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U17TXE0005 GARMENT PROCESSING

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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	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 Hours**

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 preparation of garments for dyeing and printing. Use of enzymes in the preparation.

EFFECTS ON GARMENTS **9 Hours**

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.

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GARMENT FINISHING **9 Hours**

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 Hours**

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 Hours**

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**

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.
4. NCUTE – Programme series, Garment Manufacturing Technology, IIT, New Delhi.
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.
7. Nicholas P Cheremisinoff, "Handbook of Chemical Processing Equipment, Butterworth-Heinemann 2000

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U17TXE0006 TEXTILE MARKETING AND MERCHANDISING

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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: Elaborate on Marketing and Merchandising.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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	
CO4	M	M											M	
CO5	M	M											M	
CO6	M	M							M	M	M		M	

Course Assessment methods

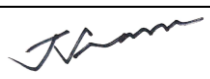
Direct	Indirect
1. Internal test I 2. Internal test II 3. Assignment/ Seminar/ Tutorial 4. End Semester Examination	1. Course end survey

MARKETING AND CONSUMER BEHAVIOR MARKETING 9 Hours

Introduction to Marketing - marketing in a developing economy – Marketing of services – planning marketing mix – market segmentation – Marketing research and its applications.

CONSUMER BEHAVIOUR 9 Hours

Understanding Consumers -Determinants of Consumer behaviour – models of Consumer Behaviour – Indian Consumer Environment.



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PRODUCTION PLANNING AND MANAGEMENT **9 Hours**

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 Hours**

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 Hours**

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**

REFERENCES

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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U17TXE0007 CLOTHING SCIENCE

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

CO1: Understand the Estimation of transmission characteristics of various fabrics and their suitability of applications.
CO2: Understand the Estimation of transformation characteristics of various fabrics and their suitability of applications.
CO3: Do the Selection of fibre type, yarn structure and fabric structure for sports applications.
CO4: Design of a fabric with suitable fibre type, yarn structure, fabric structure and finishes for bullet proof fabrics.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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													
CO2		M											M	
CO3		M												
CO4														
CO5														
CO6		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

TRANSMISSION CHARACTERISTICS 9 Hours

Air permeability – Heat transmission – Thermal resistance – Light permeability – Moisture transmission – Water permeability – wicking characteristics – Radioactivity transmission.

TRANSFORMATION CHARACTERISTICS 9 Hours

Crease resistance and recovery – Crock resistance – Dimensional stability – Hygral expansion – Relaxation shrinkage – Swelling shrinkage and felting shrinkage. Pilling – Scorching and Soiling – Flame retardance – Fusing and Mildew resistance ,Subjective and objective evaluation: Drape – Colour, colour fastness – Shade variation and measurement.

FABRIC HANDLE AND COMFORT 9 Hours

Bending – Compression – Tensile – Shear – surface friction – Bias extension – Formability – Tailorability – Objective evaluation of fabric handle by KES and FAST Fabric parameters and its influence on fabric comfort – Garment fit and size on comfort.

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DESIGN LOGIC OF APPAREL PRODUCT **9 Hours**

Classification of textile products – Components – Materials – Specification – Properties – Selection of constituent fibres, yarns, fabrics and apparels

DEVELOPMENT OF APPARELS FOR SPECIFIC END USE **9 Hours**

Fit analysis for various end uses: Winter – summer wear – innerwear – Sports – Casual – Swim wear. Protective wear; Ballistic protection – UV protection – Functional and quality requirements. Factors to be considered while developing apparels for specific end use

Theory 45 Hours **Total: 45 Hours**

REFERENCES

1. Pradip V. Metha, An Introduction to Quality Control for the Apparel Industry, ASQC Quality Press, Marcel Dekker Inc New York, 1992.
2. R. Ed Postle, S. Kawabata and M. Niwa, Objective Evaluation of Fabrics, Textile Machinery Society, Japan, Osaka, 1983.
3. Miller, Textiles: Properties and Behaviors in Clothing Use, The Textile Institute, 1998.
4. T. Mastudaira and M. N. Suresh, Design Logic of Textile Products, Textile Progress, The Textile Institute, Manchester, 1997.
5. B. P. Saville, Physical Testing of Textiles, The Textile Institute, Woodhead Publishing Limited, Cambridge, 1999.
6. R. M. Laing and G. G. Sleivert, Clothing, Textiles and Human Performance, Textile Progress, Vol.32, No.2, 2002.

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U17TXE0008 NANO AND SMART MATERIALS IN TEXTILES

L	T	P	J	C
3	0	0	0	3

Course outcomes (COs)

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

CO1: Understand the principle of electro spinning**.**

CO2: Understand the Nano particle preparation and characterization.

CO3: Understand the Smart technology for textiles and clothing.

CO4: Understand the applications of intelligent polymers in biomedical

CO5: Understand the Current and future trends for wearable technology.

CO6: Develop Nano and smart materials in Textiles.

CO-POs & PSOs Mapping

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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		W								M	
CO4	M						W							
CO5		M												
CO6											W			

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

NANOFIBRE PRODUCTION: 9 Hours

Principle of electrospinning. Electrospinning of nano fibres – conditions, structure formation, properties, effect of process parameters upon fibre formation. Methods to produce continuous filaments. Electrospinning of polyamides and polyesters.

NANOPARTICLES: **9 Hours**

Preparation, characterization, and application of silver nanoparticles, Fe nanoparticles ZnO, TiO2, MgO, SiO2 & Al2O3 with PP or PE coating, Indium-tin oxide Nanoparticles, Ceramic Nano-Particles, Carbon black Nanoparticles, Clay nanoparticles, Cellulose Nanowhiskers and Nanoparticles. Self- assembled nanolayer films, Nano structuring of polymers with cyclo dextrins

BASIC CONCEPTS OF SMART TEXTILES 9 Hours

Smart technology for textiles and clothing, Development of smart technology for textiles and clothing. Electrically active polymer materials-Polymer materials as actuators or artificial muscle, Peculiarity of polymer gel actuator, Triggers for actuating polymer gels, Electro-active polymer gels as artificial muscles.

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INTELLIGENT TEXTILES **9 Hours**

Tailor-made intelligent polymers for biomedical applications –Introduction, Fundamental aspects of shape memory materials, Concept of biodegradable SMP , Degradable thermoplastic elastomers having SM properties , Degradable polymer networks having SM properties.

WEARABLE TECHNOLOGY **9 Hours**

Current and future trends for wearable technology; Applications of wearable electronics and photonics; Implications of wearable technology; Electro active fabrics-Sensing fabrics, Actuating fabrics, Smart fabrics for health care, Smart fabrics for motion capture, Smart textiles as kinesthetic interfaces.

Theory 45 Hours **Total 45 Hours**

REFERENCES:

1.Brown P J and Stevens K, "Nanofibres and Nanotechnology in Textiles", Woodhead Pub. Ltd., Cambridge, 2007.
2.Yury Gogotsi, "Nanotubes and Nanofibres", CRC Taylor & Francis, Boca Raton, 2006.
3.Guazhong Cao, "Nanostructure and Nanomaterials", Imperial College Press, USA, 2006.
4. Mick Wilson, Kamali Kannangara, Geoff Smith, Michelle Simons and Burkhard Raguse, "Nanotechnology- Basic Science and Emerging Technologies", Overseas Press, New Delhi, 2005.
5. X.M.Tao, ―Smart Fibres, Fabrics and Clothing: Fundamentals and Applications‖, Woodhead Publishing Ltd., England, 2001.
6. Jinlian Hu, ―Shape Memory Polymers and Textiles‖, 1st edition, CRC, USA, 2007.

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L	T	P	J	C
3	0	0	0	3

U17TXE0009 TEXTILE COMPOSITES

Course Outcomes (COs)

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.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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	

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 Hours**

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 Hours**

Matrix polymer-Thermosets, thermoplastics-Reinforcing agents-Types of reinforcing agents such as fibre, particulate and laminates-Fibre forms such as roving, yarns, fabrics. Prepregs and preforms – manufacturing technologies, advantages and Limitations.

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MECHANICS OF COMPOSITES **9 Hours**

Mechanical Properties of composites. Critical Length of short fiber composites. Modulus & Ultimate failure stress of continuous fiber composites. Rule of Mixture and Property prediction-Fibre Volume fraction and Fibre Mass Fraction.

COMPOSITES MANUFACTURING METHOD **9 Hours**

Manufacturing Technologies-Spray lay-up, Sheet Moulding, Automatic Lay-up, Vacuum bagging, Compression moulding, Injection moulding, Filament winding, Pultrusion, Resin transfer moulding.

TESTING OF COMPOSITES **9 Hours**

Destructive Testing: Tensile Testing: Inplane tension test, out of plane tensile test - Compression test, interlaminar shear testing, interlaminar fracture testing, Full Fragmentation Technique. Fibre volume fraction: Matrix digestion. Non destructive test: visual, optical, ultrasonic, acoustic, radiographic, thermal.

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

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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U17TXE0010 BIO POLYMERS AND MEDICAL TEXTILES

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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	

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

BIOPOLYMERS 9 Hours

Classification of biopolymers used in medicine – Natural biopolymers - properties and applications. Synthetic biopolymers - raw material, synthesis, properties, storage stability and sterilization of biopolymers. Evaluation of biopolymers - *In vitro* tests- direct contact, agar diffusion, elution methods, *In vivo* assessment of biopolymers to tissue compatibility.

HEALTH CARE TEXTILES 9 Hours

Classification of medical textiles, current market scenario in international and national level – government initiatives. Operating room garments- personal health care and hygiene products and their testing methods; applications of non-wovens in medicine; textiles in infection prevention control.

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IMPLANTABLE TEXTILES **9 Hours**

Implantable textiles: hernia mesh – vascular prostheses – stents. Tissue engineering: properties and materials of scaffolds- relationship between textile architecture and cell behavior – applications of textile scaffolds in tissue engineering.

NON-IMPLANTABLE AND EXTRA CORPOREAL TEXTILES **9 Hours**

Bandages-types, properties and applications; compression garments-types, properties and applications; sutures: types and properties;

Extra corporeal materials: Cartilage nerves – liver ligaments, kidney, tendons, cornea; Drug delivery textiles: classification – mechanism various fabrication methods – characterization – applications.

WOUND DRESSING MATERIALS **9 Hours**

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

SMART MEDICAL TEXTILES AND LEGAL ISSUES **9 Hours**

Smart textiles – types, characteristics – smart textiles in wound care; applications of phase change and shape memory materials –mobile health monitoring; electronics in medical textiles; Smart textiles in rehabilitation and applications. legal and ethical values involved in the medical textile materials.

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

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.
5. Buddy D.Ratner and Allan S. Hoffman, "Biomaterials science – An introduction to materials in medicine", Academic press, 1996.
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.
8. Kothari.V.K., "Progress in textiles: Technology developments and applications", volume 3, IAFL Publications, 2008.

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U17TXE0011 TEXTILE PROJECT MANAGEMENT AND FINANCE

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

CO1: Summarize 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 project financing.
CO6: prepare a project report for new textile industry setup.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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
CO2	S	S											S	
CO3	M	M											M	
CO4	S	S											S	M
CO5	M	S											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

PROJECT MANAGEMENT **9 Hours**

Definition-Forms of project organization-Project Planning-Project control: Variance analysis and modern approach with calculation-Human aspects of project management; Prerequisites for successful project implementation- Technical analysis- Essential contents of feasibility study- Various clearances from government agencies.

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MARKET ANALYSIS AND PROJECT PLANNING **9 Hours**

Market and demand analysis: Key steps-Secondary information-Market survey-Characterization- Demand forecasting: Delphi and Trend Projection methods-Market planning.

Network analysis-CPM and PERT. Layout planning: Factors governing plant location-Types of layout. Calculation of machinery requirement of spinning (Spin plan) and weaving factories

PROJECT COSTING AND INVESTMENT CRITERIA **9 Hours**

Cost of project -Cost of production, calculations& Projections- Working capital requirement; Capital Investments: importance and types- Capital budgeting process-Investment criteria: Net present value, benefit cost ratio, internal rate of return, payback period, and accounting rate of return.

FINANCIAL ANALYSIS **9 Hours**

Contents and projections of balance sheet, profit & loss statement, cash flow statement. Break-even point; Projected cost of production of a spinning unit-Weaving unit- Textile Processing unit-Garment unit.

FINANCING OF PROJECTS **9 Hours**

Capital structure- menu of financing-equity capital-preference capital-internal accruals-Term loans: procedure, project appraisal-debentures-working capital advance-miscellaneous sources-raising venture capital, Indian Venture capital Industry-raising capital in international markets.

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

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 McGrawHill Puhlishing Company Ltd., New Delhi – 2006.

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U17TXE0012 ENTREPRENEURSHIP DEVELOPMENT IN TEXTILES

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

CO1: Develop knowledge on Entrepreneurship development skills.
CO2: Develop skills on production management.
CO3: Equip with the knowledge of marketing skills placement in both
CO4: Develop knowledge to setting up a garment unit.
CO5: Have knowledge of contemporary issues and modern practices.
CO6: Understand the export scenario in textile sector.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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							M				
CO2	M	S	S		M					M			M	
CO3	M	S	S											
CO4		S		S										M
CO5	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

Entrepreneurship **9 Hours**

Entrepreneurship development skills – concept of small scale industry – advantages of SSI units. Classification of Garment Units: Woven – knitted – lingerie – Leather garment – sports wear – outer wear –under garments – hospital wear. Costing: Garment cost elements – cost calculations (numerical problems).

Setting up a Garment unit **9 Hours**

Study of land – Norms of SA-8000 – capital – labour – market demand – preparing a project – large scale industry – advantages over SSI – Bank assistance.

Production Management **9 Hours**

Production planning and control – production systems – material flow control – optimization of work place arrangement for higher productivity

Labour Laws Labour – Study of labour laws – factory act – labour laws – welfare measures – safety act.

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Marketing **9 Hours**

Market – study of markets for raw materials and markets for finishing products – local markets – international markets. Spring /summer – Autumn /winter seasons.

Export Scenario **9 Hours**

Exports policy – trade documentation and quota policy – AEPC and its role in the garments industry. Advertising – different media – trade fare – display – exhibition – buyer – seller meet.

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

REFERENCES

1. R. K. Sharma, *Development Banks and Entrepreneurship Promotion in India*, Mittal Publications, New Delhi, 2001.
2. O. P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai Publications (p) Ltd., New Delhi, 1999.
3. Ruth E Glock, Grace I Kunz, *Apparel Manufacturing – Sewn Product Analysis – 3rd Edition*, Prentice Hall Inc., 2000.
4. Jacob Solinger, *Apparel Manufacturing Handbook – Analysis Principles and Practice*, Bobbin Blenheim Media Corp; 2nd edition (December 1988).

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U17TXE0013 TEXTILE MILL MANAGEMENT

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

CO1: Understand Indian textile policy.
CO2: Understand the Central and State Government Schemes in Indian textile sector.
CO3: Understand the textile mill organization and planning
CO4: Understand the Power requirements for textile mill.
CO5: Understand the Personnel and Marketing Management in textile mill.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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									
CO2	M		S											
CO3	M	M											S	
CO4			S		S								M	
CO5					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

Textile Industry **9 Hours**

Global scenario – Indian textile Industry – Indian Textile Policy – Trade policy – Fiscal policy – NTC – STC – Textile committee – National Hand loom Development Corporation – Mills association – Research institutions – Technical Textile Units – Current five year Plan: Targets and achievements; statistics on global and national fibre, yarn and fabric production, consumption, exports and imports; government policies; taxes and tariff structure; power scenario and energy management in textile mills.

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Central and State Government Schemes **9 Hours**

Technology Up-gradation Fund Scheme (TUFS) – Textile Workers Rehabilitation Fund Scheme – Technology Mission on cotton – Group Work Shed Scheme – Integrated Scheme for Power loom Development – Group Insurance scheme – Scheme for Integrated Textile Parks – Hank Yarn Obligation (HYO) Tamil Nadu Industrial Investment Corporation: Small and Medium Enterprises fund.

Mill Organization and Planning **9 Hours**

Organizational Structure and Functioning of Centralized and Decentralized Sectors: Spinning – Weaving – Composite mill – Chemical processing Units. ERP – MIS – Cotton Purchase Practices – Inventory control – Spin plan – Weave plan – Product costing – Managerial responsibilities. Selection of site for textile mills – Various types of buildings. Selection and balancing of machinery – Machinery layout – Technical specifications.

Utilities **9 Hours**

Power requirements for spinning, weaving, Knitting and Garment machinery – Amenities required – Ventilation, Humidification systems – RH and temperature of various departments.

Lighting types – Intensity requirements

Personnel and Marketing Management **9 Hours**

Planning – Selection – Training – Welfare safety – Factory act – Industrial dispute act – Trade union act – Bonus act – ESI, wage structure in textiles and apparel industry – Categories of operatives in textile mills – HOK – OHS. Marketing channel – Physical distribution – Global markets centre of textile – International trade and documentation processes.

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

References

1. A. Ormerod, Textile Product Management, The Textile Institute, Manchester 1992.
2. Handbook of Import and Export Procedures, Textile Commissioner's Office Reports, Government of India, Ministry of Textiles, Government of India Publications (2005 – 2010).
3. V. D. Dudeja, Management of Textile Industry, Textile Trade Press, Ahmedabad 1990.
4. Naresh Grover "Textile Mill Management : Theory And Practice" Random Publications,Delhi,2013.

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U17TXE0014 INDUSTRIAL ENGINEERING FOR TEXTILE AND APPAREL INDUSTRY

L	T	P	J	C
3	0	0	0	3

Course Outcomes (COs)

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

CO1: Discuss the relationship between productivity and work-study.

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 department of garment unit.

CO6: Elaborate of IE techniques.

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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									M		S	
CO2	S	M									M		S	
CO3	S	M									M		S	
CO4	S	M									M		S	
CO5	S	M			M						M		S	
CO6	S	M							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

PRODUCTIVITY AND WORK STUDY PRODUCTIVITY

9 Hours

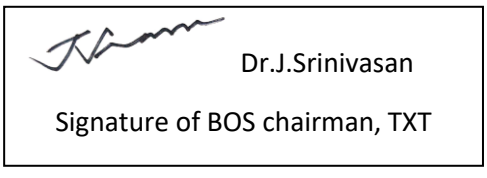
Productivity in textile and apparel industry: units of productivity - total time to do a job – factors affecting productivity – work content and total time – reducing work content due to the product and process method – reducing ineffective time due to worker and supervision.

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 Hours

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 Hours**

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 **9Hours**

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 Hours**

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	**Total: 45 Hours**

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
6. Kjell zondin, “Maynard’s Industrial Engineering Handbook”, 5th edition, Mcgraw Hill, 2001.
7. Sheth vijay, “Industrial engineering methods and practices”, penram international, publishing, India, 2005.

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ONE CREDIT COURSE

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U17TXC001 **WORK STUDY IN SEWING LINE**

L	T	P	J	C
1	0	0	0	1

Course Outcomes (COs)

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

CO1: Describe the basic techniques and procedures of work study.

CO2: Apply the Method study and Motion analysis for various garment manufacturing.

CO3: Calculate the SAM for different styles.

Pre-requisite : Nil

CO-POs & PSOs Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	**Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)**													
	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	M			S										
CO3		S												

Course Assessment methods

Direct	Indirect
1. Examination	1. Course end survey

WORK STUDY: Procedure, techniques.

METHOD STUDY: Applications for a basic garment style – case studies from different garment styles.

MOTION ANALYSIS: Applications for a basic garment style – case studies from different garment styles.

MICRO MOTION ANALYSIS: Applications for a basic garment style - case studies from different garment styles.

WORK MEASUREMENT: Calculation of standard allowable minutes (SAM) for a basic garment style using time study, PMTS, work sampling and standard data techniques. Case studies from different garment styles.

Theory 15 Hours **Total: 15 Hours**

REFERENCES

1. George Kanawaty, ILO, "Introduction to Work study", Universal Publishing Corporation, Mumbai, 2005.
2. Chuter A J "Introduction to Clothing Production Management", Blackwell Publishing, Oxford, UK, 2007.
3. Jacob Solinger, "Apparel Manufacturing Handbook, Analysis, Principles and Practice" Boblin Media Corp, Columbia, 2000.
4. Ruth E Glock, Grace I Kunz, "Apparel manufacturing – Sewn production Analysis", Prentice hall Inc, New Delhi, 2000.

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5. Kiell B.Zandin, “Maynard’s “Industrial Engineering Hand Book”,Mc Graw Hill, Inc. New York, 2001
6. Ralph M Barnes, “Motion and Time Study Design and Measurement of Work”,John Wiley & Sons, New York, 1992
7. V.Ramesh babu, “Industrial engineering in apparel production”, Woodhead publishing India Pvt Ltd, New Delhi 2011. 71

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U17TXC002 **RETAIL MANAGEMENT**

L	T	P	J	C
1	0	0	0	1

Course Outcomes (COs)

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

CO1: Discuss on retail marketing, retail markets in India, franchising and recent trends in retailing.

CO2: Explain the merchandise management, location strategy, logistics, SCM and Retail operations.

CO3: Classify the types of retail formats and suitable visual merchandising techniques in Mall management.

Pre-requisite : Nil

CO-POs & PSOs Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	**Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)**													
	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									
CO2	M	M					S							
CO3		M												

Course Assessment methods

Direct	Indirect
1. Examination	1. Course end survey

MARKETING: Retailing – Role, relevance & trends, Retail customer, Retail Market Segmentation & franchising, Retail in India, advertising & sales promotion.

RETAIL OPERATIONS: Retail location strategy, product and Merchandise management, EDP/MIS, Logistics & SCM, Security measures, Footfalls / computerized methods & non computerized methods, Merchandising & Management - Fashion designing.

MALL MANAGEMENT : Types of various retail formats, concepts in mall design, Store layout and Visual merchandising, factors influencing malls establishment, Visual / display methods.

Theory 15 Hours **Total: 15 Hours**

REFERENCES

1. Chetan Bajaj, Rajnish tuli , “Retail Management”, Oxford University Press, 2005.
2. Ellen Diamond, “Fashion Retailing: Multi Channel Approach”, Prentice Hall, 2006.
3. James B Ayers, Mary, Ann Odegaard , “Retail Supply Chain Management”, Auer Bach Publishers,USA, 2008.

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U17TXC003 **FANCY YARNS**

L	T	P	J	C
1	0	0	0	1

Course Outcomes (COs)

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

CO1: Classify the various types of fancy yarns with their applications.

CO2: Describe the production methods for manufacturing various fancy yarns.

CO3: Explain the various factors influencing fancy effects.

Pre-requisite : Nil

CO-POs & PSOs Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	**Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)**													
	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		M	M											
CO3		M		M										

Course Assessment methods

Direct	Indirect
1. Examination	1. Course end survey

Characteristics features, technology of production and end uses of: Slub Yarns – Crimp Yarn – Diamond Yarn – Boucle Yarn – Loop Yarn – Snarl Yarn – Mock Chenille Yarn – Knop Yarn – Stripe Yarn – Grandrelle yarn – Neppy yarn or Flaggy yarn – Button Yarn – Fasciated yarn – melange yarn. Production Methods for the manufacturing of fancy yarns – Production of Fancy yarns in short staple spinning systems – Factors influencing the fancy effects. Applications: Manufacturing of apparel fabric & home furnishing using fancy yarns.

Theory 15 Hours **Total: 15 Hours**

REFERENCES

1. R. H. Gong and R. M. Wright,Fancy yarns – Their manufactures and applications , Wood head Publishing Limited, 2002

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U17TXC004 ERECTION AND COMMISSIONING OF TEXTILE MACHINERY

L	T	P	J	C
1	0	0	0	1

Course Outcomes

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

CO1: Explain the various steps in erection of machineries

CO2: Calculate the manpower and space requirements with respect to the layout

CO3: Elaborate the training procedures of operators and maintenance persons

Pre-requisite : Nil

CO-POs & PSOs Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	**Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)**													
	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												
CO2		M		M										
CO3					S									

Course Assessment methods

Direct	Indirect
1. Examination	1. Course end survey

Floor levelling using U tube water level – Machine case handling while shifting machines – packing list and physical stock verification – arranging components for erection – storing sensitive and expensive components – work table arrangement – special tools – provisions for power and pneumatic lines – manpower: skilled and un-skilled manpower requirement – machine layout line marking – positioning the base machine – machine levelling – erection sequence – erection schedule – trial run – commissioning procedure – training to operators & maintenance personnel – reports and sign off.

Theory 15 Hours **Total: 15 Hours**

REFERENCES

1. LMW erection manuals and handouts

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U17TXC005 WORKLOAD AND WORK ASSIGNMENTS

L	T	P	J	C
1	0	0	0	1

Course Outcomes (COs)

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

CO1: Define work load and work assignments

CO2: Assign the workload in spinning, weaving, chemical processing, knitting and garment industries.

CO3: Calculate the productivity in spinning, weaving and chemical processing

Pre-requisite : Nil

CO-POs & PSOs Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	**Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)**													
	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													
CO2		M												
CO3		M		M										

Course Assessment methods

Direct	Indirect
1. Examination	1. Course end survey

Definitions of Workload and Work assignment – multi-machine work assignment – interference.

Workloads and assignments in Spinning, Weaving, Chemical Processing, Knitting and Garment industries – Factors influencing work assignments – measures for increasing productivity. Calculation of Productivity Measures in Spinning, Weaving and Chemical Processing.

Theory 15 Hours **Total: 15 Hours**

REFERENCES

1. T. V. Ratnam et al, SITRA Norms for Spinning Mills, The South India Textile Research Association, Coimbatore, 2004.

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U17TXC006

ERP IN TEXTILES

L	T	P	J	C
1	0	0	0	1

Course Outcomes

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

CO1: Discuss the importance, merits, demerits and limitations of ERP.

CO2: Explain the various modules in ERP.

CO3: Describe the implementation methods of ERP and training procedures.

Pre-requisite : Nil

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

COs	Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)													
	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		M												
CO3		M		M										

Course Assessment methods

Direct	Indirect
1. Examination	1. Course end survey

Fundamentals – Definitions and overview of ERP – advantages and limitations of ERP; Modules Major features, reports and uses of the ERP Modules with special focus on textile enterprises: Production Management, Quality Management, Plant Maintenance, Materials Management, Human Resources, Sales and Marketing, Finance and Accounting. Implementation – ERP implementation cycle – team training, testing, going live, end-user training, post implementation; in-house implementation – pros and cons; faster implementation methodologies; future directions in ERP; issues in implementation and solutions for textile industry.

Theory 15 Hours **Total: 15 Hours**

REFERENCES

1. Mahadeo Jaiswal and Ganesh Vanapalli, Textbook of Enterprise Resource Planning (ERP), Macmillan Publishers India, 2005.
2. L. M. Applegate, R. D. Austin and F. W. McFarlan, Creating Business Advantage in the
3. Information Age. New York: McGraw-Hill, 2002.
4. E. Monk and B. Wagner,Concepts in Enterprise Resource Planning (2nd ed.), Thomson Course Technology, Boston, 2006.
5. D. L. Olson, Managerial Issues of Enterprise Resource Planning Systems, New York: McGraw- Hill, 2004.
6. K. Sandoe, G. Corbitt and R. Boykin, Enterprise integration,Hoboken, NJ: John Wiley & Sons Inc., 2001

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U17TXC007 **EXPORT DOCUMENTATION**

L	T	P	J	C
1	0	0	0	1

Course Outcomes

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

CO1: List out various export documents and their importance.

CO2: Discuss on pre-shipment and post shipment documents.

CO3: Describe the various terms of payment in international marketing.

Pre-requisite : Nil

CO-POs & PSOs Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak														
COs	**Programme Outcomes (POs) & Programme Specific Outcomes (PSOs)**													
	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		M								M				
CO3		M								M				

Course Assessment methods

Direct	Indirect
1. Examination	1. Course end survey

Export credit – Short term – Medium term – Long term – Anticipatory letter of credit – Packing Credit – Negotiation of bills – Terms of payment in international marketing. Export Documents: International codes for products and services – Principal documents – Auxiliary documents – Documents for claiming export assistance.

Theory 15 Hours **Total: 15 Hours**

REFERENCES

1. V. R. Sampath, R. Perumalraj and M. Vijayan, Apparel Marketing and Merchandising, Kalaiselvam Pathippakam, Coimbatore, 2007.

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