Department of Textile Technology

Vision

To bring forth world class human resources to Textile Industry by offering *curriculum of International standard* and by undertaking *research in frontier areas* of Textile Technology

Mission

The Department is committed to *set standards of excellence* in its academic programmes by enabling its students to achieve a blending of knowledge acquisition and applications of such knowledge in real life situations. It is also aimed to equip them to adapt themselves to changing global and local needs by *team work, leadership, upholding professional ethics* and to contribute their might in *transforming India into a world leader* in technological advancement and prosperity.

Programme Educational Objectives

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

PEO-2-Graduates of B.Tech Textile Technology programme will become successful entrepreneurers/business partners in Textile and related field, by starting new ventures/expansion of existing family business/product diversification, and participating in efforts to deal with societal, technological and industry development.

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

Program Outcomes

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

PO-2: Collect data, Analyze and Specify the root cause for quality problems, design and process issues and able to find out concrete solutions to textile, and other related fields.

P0-3: Architect new/or modified process, design and development of workaids, tools and attachments to improve the productivity and solve the quality problems in textile manufacturing and other related field.

PO-4: Apply statistical tools to conduct experiments, analysis and interpretation of results to evaluate the textile product quality and to prove the hypothesis of the selected projects.

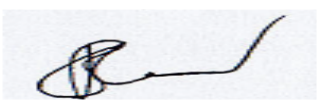
PO-5: Demostrate learned techniques, experiments, modern engineering tools and softwares to estimate the optimum resources such as raw materials, machineries and manpower and to predict the properties of fibre,yarn,fabric and garments as per the end use applications.

PO-6: Recognize their professional and personal responsibility in terms of safety, environmental and cultural issues to the community and to demonstrate the knowledge for environmental sustainable development.

PO-7: Work in a team/or an individual and appreciate the value of diversity in team-based problem solving, and using common tools and environments to achieve project/assignment objectives.

PO-8: Practice soft skills, professional ethics and integrity in his/her day to day activities as well as in engineering practice.
PO-9: Able to practice effective oral and written communication by comprehend reports, documentation, presentation and mails.

PO-10: Prepare project feasibility reports for textile mills and garment industries and able to start own entrepreneurship.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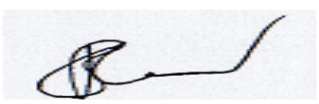
PO-11: Internalize the life-long learning principle, consciousness of updating itself continually to enhance the knowledge and skills.



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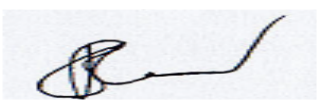
KUMARAGURU COLLEGE OF TECHNOLOGY
COIMBATORE – 641 049
REGULATIONS 2014
CURRICULUM

SEMESTER III

Code No.	Course Title	L	T	P	C
Theory					
U14MA*T*305	Probability and Applied Statistics	3	1	0	4
U14EE*T*311	Basics of Electrical and Electronics Engineering	3	0	0	3
U14CE*T*311	Basics of Civil Engineering and Mechanics	3	0	0	3
U14TX*T*301	Manufactured Fibre Technology	3	0	0	3
U14TX*T*302	Yarn Manufacturing Technology I	4	0	0	4
U14TX*T*303	Woven Fabric Manufacturing Technology	4	0	0	4
Practical					
U14TX*P*301	Yarn Manufacturing Technology Laboratory I	0	0	2	1
U14TX*P*302	Woven Fabric Manufacturing Technology Laboratory	0	0	2	1
U14GH*P*301	Social values	1	0	1	1

Total Credits: 24



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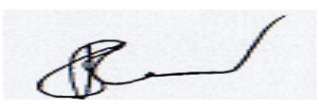
SEMESTER IV

Code No.	Course Title	L	T	P	C
Theory					
U14GS*T*001	Environmental Science and Engineering	3	0	0	3
U14MA*T*401	Numerical Methods	3	1	0	4
U14ME*T*406	Basics of Applied Mechanics and Thermal Engineering	3	1	0	4
U14TX*T*401	Yarn Manufacturing Technology II	4	0	0	4
U14TX*T*402	Shuttleless Weaving Technology	3	0	0	3
U14TX*T*403	Textile Pretreatment and Colouration Technology	4	0	0	4
Practical					
U14TX*P*401	Yarn Manufacturing Technology Laboratory II	0	0	2	1
U14TX*P*402	Textile Pretreatment and Colouration Technology Laboratory	0	0	2	1
U14TX*P*403	Technical Seminar	0	0	4	2
U14GH*P*401	National and Global Values	1	0	1	1

Total Credits: 27



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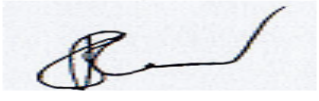
SEMESTER V

Code No.	Course Title	L	T	P	C
Theory					
U14TX*T*501	Physical properties of Textile fibres	4	0	0	4
U14TX*T*502	Knitting Technology	4	0	0	4
U14TX*T*503	Nonwoven Technology	3	0	0	3
U14TX*T*504	Woven Fabric Structure and Design	3	0	0	3
U14TX*T*505	Textile Printing and Finishing Technology	4	0	0	4
E1	Elective I	3	0	0	3
Practical					
U14ENG501	Communication skill laboratory	0	0	2	1
U14TX*P*501	Cloth Analysis Laboratory	0	0	2	1
U14TX*P*502	Textile Printing and Finishing Technology Laboratory	0	0	2	1
U14TX*P*503	In-Plant Training / Internship	0	0	4	2

Total Credits: 26

SEMESTER VI

Code No.	Course Title	L	T	P	C
Theory					
U14MCT605	Control And Instrumentation for Textile Technology	3	0	0	3
U14TX*T*601	Textile Quality Evaluation	4	0	0	4
U14TX*T*602	Mechanics of Textile Machinery	3	1	0	4
U14TX*T*603	Garment Manufacturing Technology	3	0	0	3
U14TX*T*604	Process Control in Textile Industry	3	1	0	4
E2	Elective II	3	0	0	3
Practical					
U14MCP603	Instrumentation and Automation Laboratory	0	0	2	1
U14TX*P*601	Textile Quality Evaluation	0	0	2	1



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	Laboratory				
U14TX*P*602	Knitting and Garment Laboratory	0	0	2	1
U14TX*P*603	Mini Project	0	0	4	2

Total Credits: 26

SEMESTER VII

Code No.	Course Title	L	T	P	C
Theory					
U14GS*T*007	Professional Ethics	3	0	0	3
U14TX*T*701	Textile Project Management & Finance	3	0	0	3
U14TX*T*702	Technical Textiles	3	0	0	3
U14TXT703	Textile and Apparel Costing	3	0	0	3
E3	Elective III	3	0	0	3
E4	Elective IV	3	0	0	3
Practical					
U14TX*P*701	Textile and Apparel CAD Laboratory	0	0	2	1
U14TX*P*702	Technical Textiles Laboratory	0	0	2	1
U14TX*P*703	Employability Skills	0	0	2	1
U14TX*P*704	Project work – Phase I	0	0	4	2

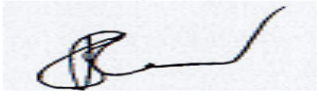
Total Credits: 23

SEMESTER VIII

Code No.	Course Title	L	T	P	C
Theory					
E5	Elective V	3	0	0	3
E6	Elective VI	3	0	0	3
E7	Elective VII	3	0	0	3
U14TX*P*801	Project Work – Phase II	0	0	12	6

Total Credits: 15

TOTAL CREDITS: 190



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ELECTIVE I

Code No.	Course	L	T	P	C
U14TX*T*E51	High Performance Fibres	3	0	0	3
U14TX*T*E52	Maintenance Management in Textile Mills	3	0	0	3
U14TX*T*E53	Pattern Making and Grading	3	0	0	3

ELECTIVE II

U14TX*T*E61	Instrumental Analysis of Textiles and Chemicals	3	0	0	3
U14TX*T*E62	Textile Composites	3	0	0	3
U14TX*T*E63	Garment Wet Processing	3	0	0	3

ELECTIVE III

U14TX*T*E71	Medical Textiles	3	0	0	3
U14TX*T*E72	Clothing Science	3	0	0	3
U14TX*T*E73	Marketing and Merchandising	3	0	0	3

ELECTIVE IV

U14TX*T*E74	Apparel Production Planning and Control	3	0	0	3
U14TX*T*E75	Entrepreneurship Development	3	0	0	3
U14TX*T*E76	Statistical Application in Textile Engineering	3	0	0	3

ELECTIVE V

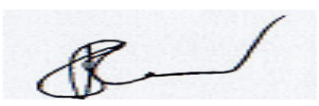
U14TX*T*E81	Industrial Engineering in Textile Industry	3	0	0	3
U14TX*T*E82	Project Preparation, Appraisal and Implementation	3	0	0	3
U14TX*T*E3	Environmental Management in Textile Industry	3	0	0	3

ELECTIVE VI

Code No.	Course	L	T	P	C
U14GS*T*002	Total Quality Management	3	0	0	3
U14GS*T*004	Operations Research	3	0	0	3
U14GS*T*005	Engineering Economics and Financial Management	3	0	0	3

ELECTIVE VII

U14MCE502	Textile Mechatronics	3	0	0	3
U14MCE603	Energy Conservation and Audit	3	0	0	3
U14AU*TE*28	Technical Textiles for Automobiles	3	0	0	3



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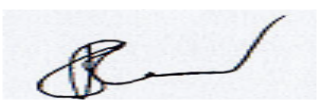
ONE CREDIT COURSE (Industry Based)

Sl.No.	Course Title	Industry that will offer the course
1.	U14TX*I N*01 – Work Study in Sewing Line	Garment Industry
2.	U14TX*I* N02 – Retail Management	Garment Industry
3.	U14TX*I* N03 – Fancy Yarns	Spinning Industry
4.	U14TX*I* N04 – Erection and Commissioning of Textile Machines	Spinning Industry
5.	U14TX*I* N05 – Workload and Work Assignments	All Textile Industry
6.	U14TX*I* N06 – ERP in Textiles	All Textile Industry
7.	U14TX*I* N07 – Export Documentation	All Textile Industry



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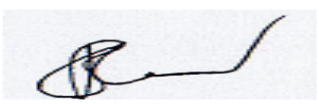
SEMESTER III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U14MA*T*305 Probability and Applied Statistics

L	T	P	C
3	1	0	4

Course Outcomes

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

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

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

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

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

CO5: Sketch the control charts and outline the process capability

Pre-requisites :

1. U14MAT101 / Engineering Mathematics – I
2. U14MAT201 / Engineering Mathematics – II

CO/PO Mapping

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

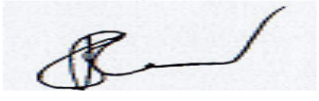
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S				W							
CO2	S	M										
CO3	M											
CO4		M		M								
CO5	M				W							

Course Assessment methods

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

STATISTICAL MEASURES **5+2 Hours**

Measures of central tendency: Mean Median and Mode – Measures of variation: Range, Mean deviation, standard deviation and coefficient of variation.



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CORRELATION AND REGRESSION **4+1 Hours**

Karl Pearson's coefficient of correlation – Spearman's Rank Correlation – Regression lines.

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

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

STANDARD DISTRIBUTIONS **9+3 Hours**

Binomial, Poisson and Normal distributions – Moments, Moment Generating functions and properties for the above distributions - Fitting of Binomial, Poisson and Normal distributions.

TESTING OF HYPOTHESIS **9+3 Hours**

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

DESIGN OF EXPERIMENTS **4+1 Hours**

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

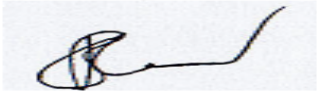
STATISTICAL QUALITY CONTROL **5+2Hours**

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

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

REFERENCES

1. Veerarajan T., "Probability and Statistics", Tata McGraw-Hill, New Delhi, 2007 &
   2nd Reprint 2004.
2. Gupta S. P, "Statistical Methods", Sultan Chand & Sons Publishers, 2004.
3. Johnson R. A., "Miller & Freund's Probability and Statistics for



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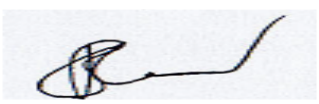
Engineers", Sixth Edition, Pearson Education, Delhi, 2000.
4. Gupta S.C, and Kapur, J.N., "Fundamentals of Mathematical Statistics", Sultan Chand, Ninth Edition, New Delhi, 1996
5. Walpole R. E., Myers S.L. & Keying Ye, "Probability and Statistics for Engineers and Scientists", Pearson Education Inc, 2002



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U14EET311 **Basics of Electrical and Electronics Engineering**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: The learners will acquire the knowledge of fundamental laws of electrical and electronics engineering.

CO2: The students can state the definition of magnetic circuits

CO3: Students can choose suitable motor for desired application.

CO4: The students have the ability to apply the fundamental laws of magnetic circuits to electrical machines.

CO5: The learners can verify the truth table of digital logic gates.

Pre-requisites :

1. HSC Subjects

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

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

Course Assessment methods

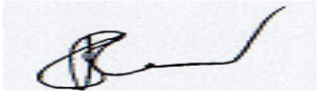
Direct	Indirect
1. Internal test I 2. Internal test II 3. Internal test III 4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	1. Course end survey

ELECTRIC CIRCUITS FUNDEMENTALS **9 Hours**

Electric current and Ohm's law – Resistance and Resistivity – Relation between Voltages, Current, Resistance and Power - Capacitance – Parallel plate capacitor – Energy stored in a capacitor.

ELECTROMAGNETISM **9 Hours**

Magnetic field - Field intensity, magnetic flux , Flux density – Permeability – Magnetic effects of electric current – Magnetic circuit – Faraday's laws of Electromagnetic Induction – Self-inductance and Mutual inductance – Energy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stored in magnetic field – Magnetic Hysteresis.

AC-CIRCUITS **9 Hours**

Alternating voltages and current – Sinusoidal waveform – cycle and frequency – RMS value – vector diagram of sine waves of same frequency – Alternating current through Resistance, Inductance and Capacitance – current through series circuits – Power factor – Active and Reactive power – Generation of three phase voltage – Voltages, Currents and Power in Star and Delta connected loads.

ELECTRICAL MACHINES (Qualitative Treatment Only) **9 Hours**

DC motor – Principle of operation – Back-emf and voltage equation – Torque and speed Characteristics of Series and Shunt connected motors – Transformer – Ideal Transformer relationship – Three phase induction motor – Cage rotor and Wound rotor – Principle of operation – Slip – Torque – Slip characteristics – Single phase induction motors.

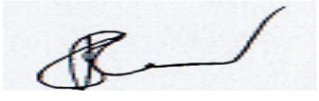
ELECTRONIC CIRCUITS **9 Hours**

Semiconductor diode – Half wave and Full wave rectifier – Bipolar Polar Junction transistors – circuit configurations – static characteristics – load line and biasing – simple introduction to amplifiers – Introduction to Binary logic gates – AND, OR, NOT, NAND, NOR, EX-OR & EX-NOR.

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

REFERENCES

1. B.L. Theraja, "Fundamentals of Electrical Engineering and Electronics" S.Chand Publishing, 2012.
2. Thomas L Floyd, "Electronic devices", 6th edition, Pearson education, 2003.
3. Muthusubramanian. R, Salivahanan. S, and Muraleedharan .K.A, "Basics of Electrical, Electronics and Computer Engineering", Tata Mcgraw Hill, 2nd edition, 2006.
4. Thyagarajan.T, Sendur Chelvi. K.P, Rangasamy T.R, "Engineering Basics", Revised 2nd edition, New age International P.Ltd publisher.



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U14CE*T*311 **Basics of Civil Engineering and Mechanics**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Understand the principle of Surveying methods

CO2: have knowledge on properties of building materials and identify good quality materials for construction.

CO3: Acquire knowledge on stress, strain and elastic constants.

CO4: Analyze determinate structures and find the bending moment and shear force under the system of loads.

CO5: Analyze determinate structures and find the bending moment and shear force under the system of loads.

CO6: Solve bending and torsion problems

Pre-requisites : Nil

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

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

Course Assessment methods

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

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SURVEYING AND CIVIL ENGINEERING MATERIALS **9 Hours**

Surveying: Objects – types – classification-principles – measurements of distances –Angles - leveling – determination of areas – illustrative examples.

Civil Engineering materials: Bricks, stones, sand, cement, concrete and steel sections – Properties and tests.

BUILDING COMPONENTS AND STRUCTURES **9 Hours**

Foundations: Types, bearing capacity – Requirement of good foundations.

Superstructure: Brick masonry – stone masonry – beams – columns – lintels – roofing –flooring – plastering – Types of bridges and dams – Basics of interior design and landscaping.

SIMPLE STRESS AND STRAIN **9 Hours**

Axial and shear stresses and strain – elasticity, Hook's law, factor of safety, lateral strain, Poisson's ratio, volumetric strain. Elastic constants and their relationships – Stresses in composite bars due to axial loading – Temperature stresses.

SHEAR FORCE AND BENDING MOMENTS **9 Hours**

Relationship between loading, shear force and bending moment – shear force and bending moment diagrams for cantilever, simply supported and overhanging beams subjected to concentrated load and uniformly distributed load maximum bending moment and point of contra-flexure.

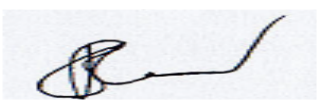
THEORY OF BENDING, TORSION& SHEAR STRESS DISTRIBUTION **9 Hours**

Theory of simple bending and assumptions – Derivation of Bending equation and its application to Engineering problems. Theory of torsion and assumptions – derivation of Torsion equation, polar modulus, stresses in solid and hollow circular shafts, power transmitted by a shaft. Shear stress distribution in rectangular and flanged sections.

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

REFERENCES

1. J.Premalatha and S. Sridhar, " Basic Civil and Mechanical Engineering ", Inder publications, 2008.
2. R.K.Rajput, "Strength of Materials (Mechanics of Solids) SI Units",



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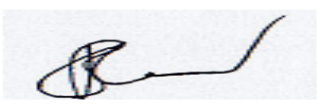
S.Chand& Company Ltd, New Delhi, 2012.
3. S Ramamruthum, “Basic Civil Engineering”, DhanpatRai Publishing Co. (P) Ltd., New Delhi,2010.
4. R.K. Bansal, “A Text Book of”, Laxmi Publications, New Delhi, 2010.
5. Sadhu Singh, “Strength of Materials”, Khanna Publishers, New Delhi, 2012.



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U14TX*T*301 Manufactured Fibre Technology

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Discuss the fundamental concepts of polymerization techniques

CO2: Explain the manufacturing process of various regenerated fibres

CO3: Explain the manufacturing process of various synthetic fibres

CO4: Outline the characterization techniques of manmade fibres

CO5: Summarize various post spinning operations preferred in manmade fibres

Pre-requisites :

1. U14TXT201 Textile Fibers
2.

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

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

Course Assessment methods

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

INTRODUCTION **9 Hours**

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

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Cellulose derivative fibre, Soya bean fibre and bicomponent fibre with different cross section and super absorbent fibre. Encapsulation technique in fibre formation.

POLYESTER, NYLON AND POLYOLEFIN FIBRES 9 Hours

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

ACRYLIC, ELASTOMERIC FIBRES AND CHARACTERIZATION 9 Hours

Manufacturing process of Acrylic fibre. Manufacturing process of Elastomeric fibres. Characterization at molecular level: molecular weight averages, end group analysis, membrane osmometry, and viscometry– thermal characterization: differential thermal calorimetry analysis, thermogravimetry and thermomechanical analysis.

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.

Theory: 45 Hours Total: 45 Hours

CASE STUDY (any two)

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

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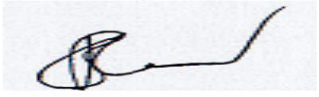
2. A Vaidya, “Production of synthetic fibres”, Prentice Hall of India Pvt. Ltd., New Delhi, 1988.



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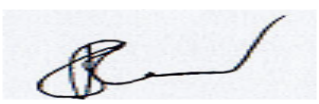

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U14TX*T*302 **Yarn Manufacturing Technology – I**

L	T	P	C
4	0	0	4

Course Outcomes

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

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

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

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

CO 4: Discussion the concept & mechanism in comber process

CO 5: Explain the principle and working of speed frame

Pre-requisites :

1. U14TXT201 Textile Fibers

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

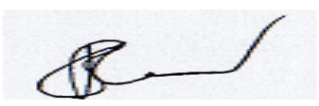
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S											
CO2			S									
CO3				S								
CO4					S							
CO5				S								

Course Assessment methods

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

GINNING AND BLOW ROOM **12 Hours**

Process flow chart – short staple, long staple spinning. Study of different types of gins –Effect of ginning performance on yarn quality. Objectives of blow room –UNI Blending machine-Types of beaters in Blowroom, degree of blending- IBI, Opening of machine for coarse, fine& super fine machine, Concepts of opening intensity and cleaning efficiency. Contamination sorters, Chute feed system. Fire/metal detector in blow room, Automatic waste evacuation system (AWES). Use of air current, modern developments in blow room.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CARDING **12 Hours**

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

DRAWFRAME **12 Hours**

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

COMBING **12 Hours**

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

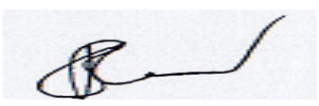
SPEED FRAME **12 Hours**

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

Theory: 60 Hours **Total: 60 Hours**

CASE STUDY (any two)

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



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6. Fly generation and NRE

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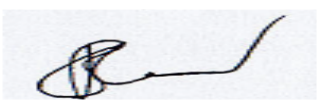

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U14TX*T*303 **Woven Fabric Manufacturing Technology**

L	T	P	C
4	0	0	4

Course Outcomes

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

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

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

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

CO4: Select and control the process variables at loom

CO5: Create the new designs in woven fabric manufacturing

Pre-requisites :

1. U14TXT201 Textile Fibers

CO/PO Mapping

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

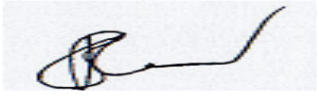
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	M											
CO2	S	S										
CO3	M	M	S									
CO4	S	M		S								
CO5	S	S	S	M	M							

Course Assessment methods

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

WINDING **12Hours**

Objectives of winding, Geometry of cone winding. Classification of winders. Working principles of automatic winders-Electronics yarn clearer -knotters and splicers. Winding drums - anti-ribboning device - Package



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defects, causes and remedies. Types and working principles of pirn winding machines. Pirn types and dimensions. Pirn bunching. Pirn winding defects causes and remedies. Production calculations of cone and pirn winders.

WARPING & SIZING **12Hours**

Types of creels. Working principles of beam and sectional warpers. Warping beam defects causes and remedies. Objectives of sizing - Working principles of multicylinder and single end sizing machines. Size ingredients, Size preparation, size add-on % and stretch control. Sizing faults, causes and remedies. Production calculation in warping and sizing.

WEAVING – INTRODUCTION **12Hours**

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

PRIMARY MOTIONS **12Hours**

Shedding- tappet, dobby, jacquard. Card punching device. Picking - Classification - Cone over pick, side lever under pick and cone under pick –swell checking devices. Beat-up- 4 bar linkage beat up mechanism, cam beat up mechanism. Speed and production calculations in power loom.

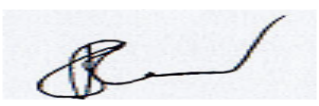
SECONDARY AND TERTIARY MOTIONS **12Hours**

Negative let-off and positive let-off, five and seven wheel take-up motions. Loose reed and fast reed mechanisms. Warp and weft stop motion - drop wires. Weft feelers-different types. Pirn changing mechanism. Drop box motions, pick-at-will motion.

Theory: 60 Hours **Total: 60 Hours**

CASE STUDY (any two)

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



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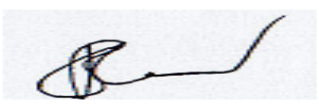

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U14TX*P*301 **Yarn Manufacturing Technology Laboratory I**

L	T	P	C
0	0	2	1

Course Outcomes

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

CO 1: Prepare gearing diagram for various spinning machine

CO 2: Calculate the speed of various beaters in preparatory machine

CO 3: Calculate the production of various spinning machine

Pre-requisites :

CO/PO Mapping

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

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

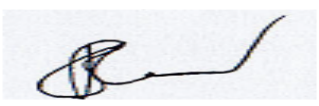
Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. Determination of speed & settings in ginning machine.
2. Determination of speeds of beaters in mono cylinder and ERM cleaner along with belt slippage %.
3. Determination of speeds of various rotating elements in bale opener and calculation of belt slippage % at beater.
4. Working of chute feed system and calculation of speed of rotating elements
5. An analysis of Working mechanism and calculation of draft distribution & production calculation in carding machine.
6. Setting between various zone of carding zone & find out the nep content in the web.
7. Determination of speed, draft distribution & setting in draw frame.
8. Determination of speed, draft, production & combing cycle of



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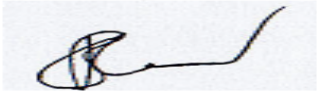
comber.

9. Estimation of head to head variation in noil level.
10. Determination of speed, draft distribution, twist & production calculation in speed frame.
11. Determination of bobbin speed at various belt positions on cone drums & plot the graph.
12. Analysis of speed frame builder motion & calculation of coils / inch.

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

CREATIVE EVALUATION (any two)

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



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U14TX*P*302 **Woven Fabric Manufacturing Technology Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

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

CO1: Operate the winding machine by altering the process variables

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

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

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

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

Pre-requisites :

Nil

CO/PO Mapping

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

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

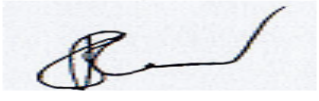
Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. Determination of package density, winding angle, wind and traverse ratio in conventional and automatic cone winders and production



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calculation.

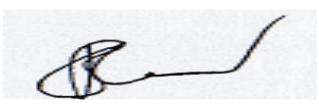
2. Mechanisms for regulating pirn dimensions and characteristics.
3. Preparation of single end sized warp beam for given fabric particulars and determination of size pick-up % and tensile properties.
4. Dismantling and assembling of negative Tappet shedding.
5. Dismantling and assembling of over picking mechanisms.
6. Dismantling and assembling of under picking mechanisms.
7. Study of positive let-off motion.
8. Dismantling and assembling of seven wheel take-up motion and dividend calculation.
9. Dismantling and assembling of warp stop motions.
10. Dismantling and assembling of weft stop motions.
11. Study of loose reed and fast reed mechanisms.
12. Preparation of card for 4x1 drop box mechanism and study of 4 x 1 drop box motion.

Study of automatic pirn changing mechanism and weft feeler mechanism.

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

CREATIVE EVALUATION (any two)

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



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U14GHP301 **Social Values**

L	T	P	C
1	0	1	1

Course Outcomes

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

CO1: Adopt and practice social values as his regular duties.

CO2: Take over the social responsibilities.

CO3: Give solutions and to manage the challenging social issues.

CO4: Voluntarily participate and organize social welfare programmes.

CO5: Explore his ideology of techno social issues and provide the best solution.

Pre-requisites :

Nil

CO/PO Mapping

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

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

Course Assessment methods

Direct	Indirect
1. Presentation 2. Role Play 3. Case Study 4. Group Discussion	1. Course end survey

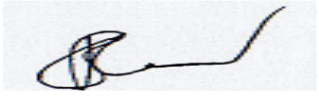
ORIGIN OF SOCIETY **5 Hours**

Evolution of universe: Creation theory, Big bang theory, Evolution theory, Permanence theory – Mithya, Maya – Evolution of living being – Evolution of Man – Formation of society and social values.

Practical: Group Discussion on Evolution of Man and formation of society, Panel discussion on Social values – Pancha Bhoodha Navagraha Meditation.

SELF AND SOCIETY **2 Hours**

Duty to self, family, society and world – Realization of Duties and Responsibilities of individuals in the society (Five fold cultures) – impact of social media on present day youth and correction measures.



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Practical: Case study – interaction with different professionals.

EDUCATION AND SOCIETY **3 Hours**

Education: Ancient and Modern Models.

Practical: Making Short film on impact of education in social transformation.

DISPARITY AMONG HUMAN BEINGS **3 Hours**

Wealth's for humans, Factors leading to disparity in human beings and Remedies.

Practical: Debate on disparity and social values.

CONTRIBUTION OF SELF TO SOCIAL WELFARE **3 Hours**

Participation in Social welfare – Related programmes – Recognized association – Activities for social awareness – Programme by Government and NGOs – Benefits of social service – Balancing the family and social life.

Practical: In campus, off campus projects.

GENERAL PRACTICAL **14 Hours**

Ashtanga Yoga: Pathanjali maharishi and Yoga – Involvement – Rules of Asanas –Suryanamaskara (12 Steps) – Meditation.

Standing: Pada Hastasana, Ardha Cakrasana, Trikonasana, Virukchsana (Eka Padaasana).

Sitting : Padmasana, Vakrasana, Ustrasana, Paschimatanasana.

Prone : Uthanapathasana, Sarvangasana, Halasana, Cakrasana.

Supine : Salabhasana, Bhujangasana, Dhanurasana, Navukasana.

Theory: 16 Hours **Practical: 14 Hours** **Total: 30 Hours**

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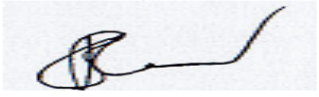

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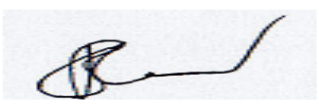

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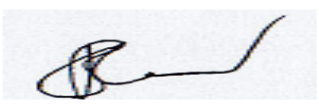
SEMESTER IV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U14GS*T*001 Environmental Science And Engineering

L	T	P	C
3	0	0	3

(Common to all branches of Engineering and Technology)

Course Outcomes

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

CO1: Play a important role in transferring a healthy environment for future generations

CO2: Analyse the impact of engineering solutions in a global and societal context

CO3: Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems

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

CO5: Highlight the importance of ecosystem and biodiversity

CO6: Paraphrase the importance of conservation of resources

Pre-requisites :

1. HSC

CO/PO Mapping

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

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

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II 3. Internal test III	1. Course end survey

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4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	

INTRODUCTION TO ENVIRONMENTAL STUDIES AND NATURAL RESOURCES **10 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, floods, drought, conflicts over water, dams benefits and problems – Mineral resources: Use and exploitation, environmental effects of extracting and using mineral resources, case studies – Food resources: World food problems, changes caused by agriculture and overgrazing, effects of modern agriculture, fertilizer-pesticide problems, water logging, salinity, case studies – Energy resources: Growing energy needs, renewable and non renewable energy sources, use of alternate energy sources. Case studies – Land resources: Land as a resource, land degradation, man induced landslides, soil erosion and desertification – Role of an individual in conservation of natural resources – Equitable use of resources for sustainable lifestyles.

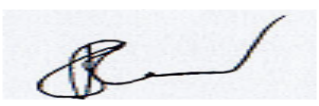
ECOSYSTEMS AND BIODIVERSITY **14 Hours**

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

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

ENVIRONMENTAL POLLUTION **8 Hours**

Definition – Causes, effects and control measures of: (a) Air pollution (b)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Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – Solid waste Management: Causes, effects and control measures of urban and industrial wastes – Role of an individual in prevention of pollution – Pollution case studies – Disaster management: floods, earthquake, cyclone and landslides.

SOCIAL ISSUES AND THE ENVIRONMENT **7 Hours**

From Unsustainable to Sustainable development – Urban problems related to energy – Water conservation, rain water harvesting, watershed management – Resettlement and rehabilitation of people; its problems and concerns, case studies – Environmental ethics: Issues and possible solutions – Climate change, global warming, acid rain, ozone layer depletion, nuclear accidents and holocaust, case studies. – Wasteland reclamation – Consumerism and waste products – Environment Production Act – Air (Prevention and Control of Pollution) Act – Water (Prevention and control of Pollution) Act – Wildlife Protection Act – Forest Conservation Act – Issues involved in enforcement of environmental legislation – Public awareness

HUMAN POPULATION AND THE ENVIRONMENT **6 Hours**

Population growth, variation among nations – Population explosion – Family Welfare Programme – Environment and human health – Human Rights – Value Education – HIV / AIDS – Women and Child Welfare – Role of Information Technology in Environment and human health – Case studies.

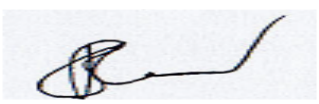
FIELD WORK

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

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

REFERENCES

1. Miller T.G. Jr., Environmental Science, Wadsworth Publishing Co., 2013
2. Masters G.M., and Ela W.P., Introduction to Environmental Engineering and Science, Pearson Education Pvt., Ltd., Second



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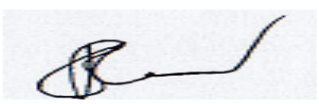
3. BharuchaErach, The Biodiversity of India, Mapin Publishing Pvt. Ltd., Ahmedabad India., 2002
4. Trivedi R.K and Goel P.K., “Introduction to Air pollution” Techno-science Pubications. 2003
5. Trivedi R.K., Handbook of Environmental Laws, Rules, Guidelines, Compliances and Standards, Vol. I and II, Enviro Media. 1996
6. Cunningham, W.P., Cooper, T.H.., &Gorhani E., Environmental Encyclopedia, Jaico Publ., House, Mumbai, 2001
7. Wager K.D., Environmental Management, W.B. Saunders Co., Philadelphia, USA, 1998
8. Townsend C., Harper J and Michael Begon, “Essentials of Ecology”, Blackwell science Publishing Co., 2003
9. Syed Shabudeen, P.S. Environmental chemistry, Inder Publishers, Coimbatore. 2013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U14MA*T*401 **Numerical Methods**

L	T	P	C
3	1	0	4

Course Outcomes

After successful completion of this course, the students should 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 and summary information through numerical integration

CO4: Predict the system dynamic behaviour through solution of ODEs modeling the system

CO5: Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.

CO6: Have the necessary proficiency of using MATLAB for obtaining the above solutions.

Pre-requisites :

1. U14MAT101 / Engineering Mathematics – I
2. U14MAT201 / Engineering Mathematics – II

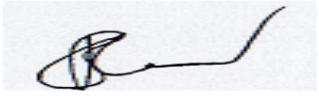
CO/PO Mapping

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

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

Course Assessment methods

Direct	Indirect
1. Internal test I 2. Internal test II	1. Course end survey



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3. Internal test III 4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	

INTRODUCTION **2 Hours**

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

NUMERICAL SOLUTION OF ALGEBRAIC EQUATIONS **5 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.

CURVE FITTING AND INTERPOLATION **5 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 **5 Hours**

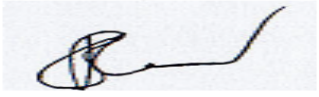
Numerical differentiation by using Newton's forward, backward and divided differences – Numerical integration by Trapezoidal and Simpson's 1/3 and 3/8 rules – Numerical double integration.

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

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

NUMERICAL SOLUTION OF PARTIAL DIFFERENTIAL EQUATIONS (PDEs) **18 Hours**

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



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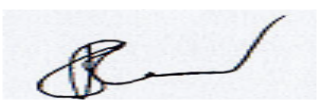
Use of MATLAB Programs to workout solutions for all the problems of interest in the above topics.

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

REFERENCES

1. Steven C.Chapra and Raymond P. Canale, " Numerical Methods for Engineers with Programming and Software Applications", SixthEdition, WCB/McGraw-Hill, 1998.
2. John H. Mathews and Kurtis D. Fink, "Numerical Methods using Matlab", Fourth Edition, Prentice Hall of India, 2004.
3. Gerald C. F. and Wheatley P.O, "Applied Numerical Analysis", Sixth Edition, Pearson Education Asia, New Delhi, 2002.
4. Sastry S.S, "Introductory Methods of Numerical Analysis", Third Edition, Prentice – Hall of India Pvt Ltd, New Delhi, 2003.
   Kandasamy P., Thilagavathy K. and Gunavathy K., "Numerical Methods", S.ChandCo. Ltd., New Delhi, 2007.



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U14ME*T*406 **Basics of Applied Mechanics and Thermal Engineering**

L	T	P	C
3	1	0	4

Course Outcomes

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

CO1: Define various components of mechanisms and construct CAM profile for the specific follower motion.

CO2: Calculate the speed and number of teeth in gear trains and explain the working principle of IC engines.

CO3: Describe the working principle of refrigeration and air conditioning systems.

Pre-requisites :

Nil

CO/PO Mapping

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

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

Course Assessment methods

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

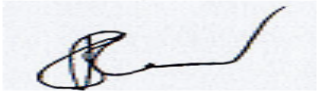
BASICS OF MECHANISMS **9 Hours**

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

KINEMATICS OF CAM AND GEARS **9 Hours**

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

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



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GEAR TRAINS **9 Hours**

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

HEAT ENGINES **9 Hours**

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

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

REFRIGERATION AND AIR CONDITIONING SYSTEM **9 Hours**

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

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

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

REFERENCES

1. Rattan S.S, "Theory of machines", Tata MC Graw-Hill publishing company Ltd., New Delhi, 2005.
2. R.S Khurmi and J.K.Gupta, "Theory of machines", S.Chand , 2008.
3. Venugopal K and Prahu Raja V, "Basic Mechanical engineering", Anuradha publishers, Kumbakonam, 2000.
4. Shanthakumar S R J., "Basic Mechanical engineering ", Hi- tech publications, Mayiladuthurai,2000.
5. Shigley J.E and Uicker J.J. "Theory of machines and mechanisms", McGraw- Hill, Inc. 1995.
6. Thomas Bevan, "Theory of machines", CBS publishers and distributors, 1984.
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8. MohanSen, "Basic mechanical engineering", Lakshmi publications, New Delhi, 2006
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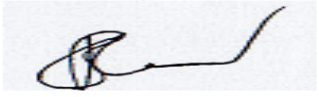

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U14TX*T*401 Yarn Manufacturing Technology II

L	T	P	C
4	0	0	4

Course Outcomes

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

CO1: Explain the basic principles of different spinning system

CO2: Compare the basis principle of different spinning system

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

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

Pre-requisites :

1. U14TXT302 Yarn Manufacturing Technology I

CO/PO Mapping

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

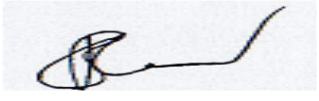
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S											
CO2			S									
CO3					S							
CO4				S								
CO5												

Course Assessment methods

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

RING FRAME **12Hours**

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



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COMPACT SPINNING **12Hours**

Introduction - spinning triangle- working principles of different compact spinning systems-Elitwist-Comfortwin, structure and properties of compact yarns, applications of compact yarn - Techno economics of compact spinning.

ROTOR SPINNING **12Hours**

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

OTHER SPINNING SYSTEMS **12Hours**

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 **12Hours**

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.

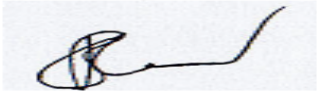
Theory: 60 Hours **Total: 60 Hours**

CASE STUDY (any two)

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

REFERENCES

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



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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
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.
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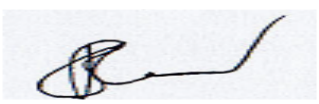

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U14TX*T*402 **Shuttleless Weaving Technology**

L	T	P	C
3	0	0	3

Course Outcomes

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

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

CO2: Discuss the concept and mechanism of projectile weaving machine

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

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

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

Pre-requisites :

U14TXT303 / Woven Fabric Manufacturing Technology

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

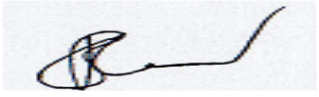
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	S		M								
CO2	S	S		M								
CO3	S	S		M								
CO4	S	S		M								
CO5	S	S		M								

Course Assessment methods

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

INTRODUCTION **9 Hours**

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

PROJECTILE LOOMS **9 Hours**

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

RAPIER LOOMS **9 Hours**

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

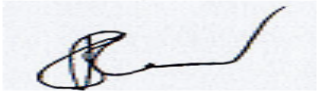
JET LOOMS **9 Hours**

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

MULTIPHASE LOOMS **9 Hours**

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

Theory: 45 Hours **Total: 45 Hours**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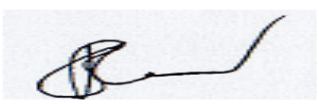
CASE STUDY (any two)

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

REFERENCES

1. Sabit Adanur, “Hand book of weaving”, CRC Press Co. ISBN No. 1-58716-013-7, 2001.
2. Talukdar M K, Sriramulu P K and Ajgaonkar D B, “Weaving: Machines, Mechanisms and Management”, Mahajan publishers, Ahmedabad, 1981.
3. Talavasek O & Svaty V, “Shuttleless weaving machines”, Elsevier science publications, Newyork, 1981.
4. Ormerod A, “Modern preparation and weaving”, Butterworths, London, 1983.
5. “Techno economics of modern weaving machines”, Textile Association (India), Bombay, 1982.
6. “Woven Fabric Production I” – Quality CBT & Course material from NCUTE, 2002.
7. “Woven Fabric Production II” – Quality CBT & Course material from NCUTE, 2002.



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U14TX*T*403 **Textile Pretreatment and Colouration Technology**

L	T	P	C
4	0	0	4

Course Outcomes

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

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

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

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

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

CO5: Explain the working principles of various dyeing machines

Pre-requisites :

1. U14CHT101 Engineering Chemistry
2. U14CHT204 Chemistry for Textiles
3. U14TXT201 Textile Fibers
4. U14TXT303 Woven Fabric Manufacturing Technology

CO/PO Mapping

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

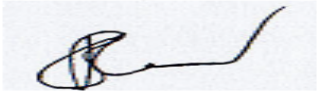
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	S	S	W	W	W					M	
CO2	S											
CO3		M			W							
CO4				M			W					
CO5	S										W	

Course Assessment methods

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

SINGEING, DESIZING AND SCOURING **12 Hours**

Wet process sequences for cotton fabrics -Singeing: Objective of the process, types, various singeing methods, drawbacks and advantages, Process and quality control aspects involved.Desizing: Objectives, classification and mechanism of removal of starch in various methods.



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Efficiency of desizing. Scouring: Objectives, classification, Saponification, Emulsification. Scouring of coloured textiles, natural, manmade and blended textiles. Kier and J-Box. Evaluation of scouring efficiency. Wet processing sequence for wool - Wool carbonizing. Wet processing sequence for silk- Degumming of silk.

BLEACHING AND MERCERIZATION 12 Hours

Bleaching: Objectives of bleaching. Hypochlorite, peroxide, chlorite and per acetic acid bleaching methods and their effectiveness on various textiles. Bleaching of cotton/viscose and polyester/cotton blends. Controlling parameters and mechanism involved in each method. Efficiency of bleaching. **Mercerization:** Objectives, physical and chemical changes in cotton. Methods; Yarn mercerization,Fabric Mercerization-Chain and Chainless mercerization,Cold and Hot mercerization. Ammonia treatment of cotton. Assessment of efficiency of mercerization.

DYEING OF CELLULOSE AND PROTEIN FIBRES 12 Hours

Colorants: Classification of Colorants, 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. Eco friendly chemicals and banned dyes.

DYEING OF MAN-MADE FIBRES AND BLENDS 12 Hours

Dyeing of polyester: Carrier, High Temperature High Pressure (HTHP), Thermosol methods. Heat setting: Objectives and Influence on dye absorption. Mass coloration-Dyeing of polypropylene and nylon. Blends Dyeing: Polyester/cotton, Polyester/ Wool. Theory of dyeing: free volume theory. Dye uptake on textiles. Assessment of fastness properties of dyed material.

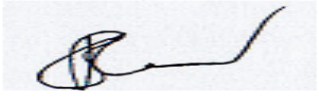
DYEING MACHINERIES 12 Hours

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

Theory: 60 Hours Total: 60 Hours

CASE STUDY (any two)

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



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Finishing industry

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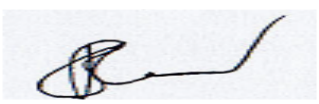

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U14TX*P*401 **Yarn Manufacturing Technology Laboratory II**

L	T	P	C
0	0	2	1

Course Outcomes

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

CO1: Calculate the production and speed of all the machine

CO2: Outline the main gearing diagram of all the machine

CO3: Identify the key components of the machine

Pre-requisites :

1. U14TXP301 Yarn Manufacturing Technology Laboratory I

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

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

Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. Determination of draft distribution & production calculation in ring 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.

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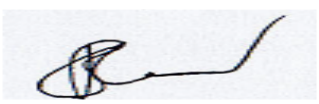
8. Calculate of production & twist calculation in rotor spinning.
9. Production of yarn using rotor spinning with given specification.
10. Production of different types of double yarns using ring doubler and calculate of resultant count.
11. Production of different types fancy yarn using fancy doubler and calculation of resultant count.
12. Production & twist calculation in TFO with 3 positions and its effect on yarn strength.

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

CREATIVE EVALUATION (any two)

1. Production of different counts of yarns by varying the draft keeping the hank of roving constant.
2. Full doff study in ring frame.
3. Design and development of ring frame builder motion cam using wooden block.
4. Production of different types of fancy yarns in fancy doubler.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U14TX*P*402	**Textile Pretreatment and Colouration Technology Laboratory -I**	L	T	P	C
		0	0	2	1

Course Outcomes

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

CO1: Perform the pretreatment of grey fabric processing

CO2: Prepare the dye recipe for colouring the various fibre/ fabric

CO3: Examine the colour fastness of the dyed fibre/ fabric

Pre-requisites :

U14CHT204 Chemistry for Textiles

U14CHP101 Chemistry Laboratory

U14TXT201 Textile Fibers

U14TXP201 Fiber Analytical Laboratory

CO/PO Mapping

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

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

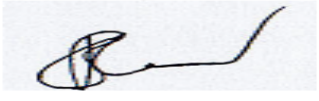
Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. esizing of grey fabric with enzyme and determine the desizing efficiency / Tagawa method
2. Scouring of desized cotton fabric and determine the scouring loss%, drop absorbency and degree of impurities.
3. Bleaching of cotton fabric with hypochlorite agent and measurement of the whiteness index, and change in mechanical properties.



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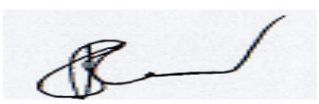
4. Bleaching of cotton fabric with hydrogen peroxide agent and measurement of the whiteness index, and change in mechanical properties.
5. Cold and Hot mercerization of cotton yarn and measurement of the BAN, and change in mechanical properties.
6. Dyeing of cotton using direct dyes and studying the influence of Temperature, Time and Electrolyte on dye adsorption.
7. Dyeing of cotton using vat dyes and assessment of fastness properties of dyed material.
8. Dyeing of cotton using hot and cold brand reactive dyes and determine dye exhaustion % on dye bath.
9. Dyeing of cotton using naphthol dyes and assessment of fastness properties of dyed material.
10. Dyeing of polyester using disperse dye with carrier and assessment of fastness properties of dyed material.
11. Dyeing of silk using acid dyes and assessment of fastness properties of dyed material.
12. Dyeing of cotton/polyester blended material with reactive/disperse dye and assessment of fastness properties of dyed material.

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

CREATIVE EVALUATION (any two)

1. Carbonization of P/C blends.
2. Shade card preparation for Cotton, Polyester and Silk with varying dye shade%, temperature and auxiliary chemicals.
3. Dyeing of cellulosic material with tie & dye method.
4. Dyeing of Cotton/ Silk/ Wool with natural dye.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L	T	P	C
0	0	4	2

Technical Seminar

U14TX P403

Course Outcomes

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

CO1: Present the technical presentation confidentially

CO2: Prepare the presentation contents for tender or contracts

CO3: Communicate with the clients fluently

Pre-requisites :

Nil

CO/PO Mapping

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

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

Course Assessment methods

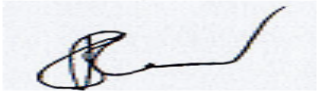
Direct	Indirect
1. Seminar 2. End Semester Examination	1. Course end survey

It is mandatory that each student will give individually a seminar on exclusive topic. During the seminar session each student is expected to prepare and present a topic on engineering/ technology, for duration of not less than 30 minutes.

Also, the student has to submit a hard copy of the technical topic, in the form of a report consisting of a title page, Introduction, body chapters and a conclusion with references, running to not less than 20 pages; this will be evaluated by the faculty coordinator/guide.

In a session of three periods per week, 5 students are expected to present the seminar.

In 15 weeks all students of the class would have completed giving the



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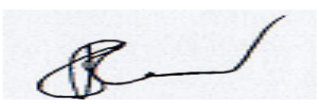
seminar. For every 10 students or for different area of their branch specialization, a faculty guide is to be allotted and he / she will guide and monitor the progress of the student and maintain attendance also.

Students are encouraged to use various teaching aids such as overhead projectors, power point presentation and demonstrative models.

Practical: 45 Hours **Total: 45 Hours**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U14GH*P*401 **Global Values**

L	T	P	C
1	0	1	1

(Common to all branches of Engineering and Technology)

Course Outcomes(COs)

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

CO1: Act as a good and responsible citizen.

CO2: Conserve and protect eco cycle.

CO3: Voluntarily work with global welfare organization and provide solution for global peace.

CO4: Invent his Technical design by considering humanity and nature

Pre-requisites:

Nil

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

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

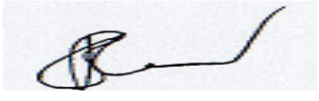
Course Assessment methods:

Direct	Indirect
1. Presentation 2. Role Play 3. Case Study 4. Group Discussion	1. Course end survey

ROLE OF A RESPONSIBLE CITIZEN **4 Hours**

Citizen – its significance–National and Global perspectives.

Practical: Group discussion on National and Global values.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GREATNESS OF INDIAN CULTURE **2 Hours**

Emerging India – past and present, about Culture, Morality and spirituality– Beauty of Unity in diversity – Impact of western culture in India and Indian culture over other countries.

Practical: Demonstration and impact measurements of simple and good actions.

GLOBAL WELFARE ORGANISATIONS **2 Hours**

Education – Health – Nature – Peace
Practical: Organizing an event linking with one of the Organizations In campus /off campus.

PRESERVING NATURE **2 Hours**

Appreciating the flora and fauna on Earth – Importance ofEcological balance – Conservation.

Practical: Trekking, field visit.

Practical: Debate on disparity and social values.

GLOBAL PEACE **4 Hours**

One World and One Humanity – Global Peace.
Global personalities: Thiruvalluvar, Vallalar, Vivekanadar, Mahatma Gandhi,Vethathiri Maharishi – Plans for world peace.
Practical: Group discussion on individual plans for world peace.

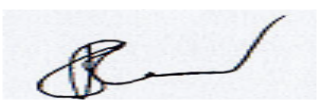
GENERAL PRACTICAL **16Hours**

Simplified physical Exercise – Kayakalpa practice (Follow up practice) – Meditatyion -

Theory & Practice

Pranayama : Bhastrika, Kapala Bhati, Nadi suddhi, Sikari, Sitali.

Mudhra : Chin Mudhra, Vayu Mudhra, Shunya Mudhra, Prithvi Mudhra, Surya Mudhra, Varuna Mudhra, Prana Mudhra, Apana Mudhra, Apana Vayu Mudhra, Linga Mudhra, Adhi Mudhra, Aswini Mudhra.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Theory :14 Hr **Tutorial: 16 Hr** **Total: 30 Hours**

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2. Dr.M. B. Gurusamy, "Globalisation – Gandhian Approach" Kumarappa Research Institution, 2001.
3. Vethathiri's Maharishi's, *"Karma Yoga: The Holistic Unity"* The World Community Service Centre, Vethathiri Publications, 1994.
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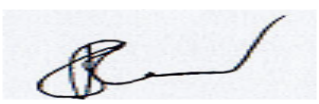

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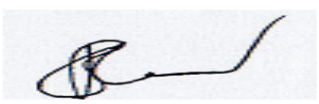
SEMESTER V



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U14TX*T*501 **Physical Properties of Textile Fibres**

L	T	P	C
4	0	0	4

Course Outcomes

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

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

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

CO3: Explain about the concepts of mechanical properties of fibres

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

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

Pre-requisites :

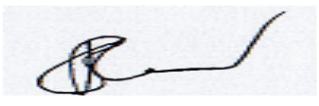
1. U14TX*T*301/Manufactured Fibre Technology

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

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

Course Assessment methods

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



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STRUCTURE OF FIBRES **12 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.

MOISTURE ABSORPTION PROPERTIES OF FIBRES **12 Hours**

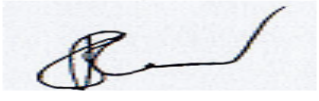
Absolute humidity and relative humidity- moisture content and regain of different fibres- Moisture regains curves, Hygroscopic nature of fibres. Hysteresis in moisture absorption. Equilibrium absorption - Effect of fibre structure – hydrophilic groups and non-crystalline regions on Moisture absorption.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

MECHANICAL PROPERTIES OF FIBRES **12 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 **12 Hours**

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



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ELECTRICAL AND THERMAL PROPERTIES **12 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: 60 Hours **Total: 60 Hours**

CASE STUDY (any two)

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

REFERENCES

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.
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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.
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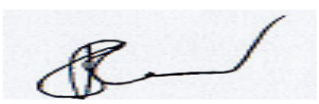

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U14TX*T*502 **KNITTING TECHNOLOGY**

L	T	P	C
4	0	0	4

Course Outcomes

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

CO1: Describe the concept of knitting

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

CO3: Illustrate the Weft knitted structures

CO4: Describe the fundamentals and working of warp knitting machine

CO5: Illustrate the basic warp knitted structures

Pre-requisites :

1. U14TXT401 Yarn Manufacturing Technology II

CO/PO Mapping

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

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

Course Assessment methods

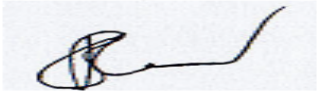
Direct	Indirect
1. Internal test I 2. Internal test II 3. Internal test III 4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	1. Course end survey

INTRODUCTION **12 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.

WEFT KNITTING **12 Hours**

Knitting Elements: Cylinder, knitting cam, sinker, feeder, stop motions. Working of plain, rib and interlock knitting machine. Pattern wheel,



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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 **12 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 **12 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 **12 Hours**

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

Theory: 60 Hours **Total: 60 Hours**

CASE STUDY (any two)

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

REFERENCES

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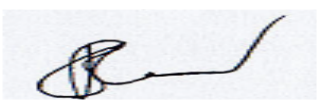

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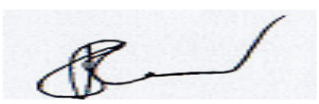

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U14TX*T*503 **NONWOVEN TECHNOLOGY**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Discover the nonwoven technology

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

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

CO4: Review the various finishing process on nonwoven fabrics

CO5: Summarize the various nonwoven fabric characterization techniques.

Pre-requisites :

U14TXT402 Shuttleless Weaving Technology

CO/PO Mapping

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

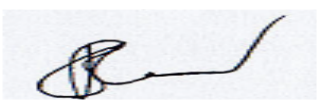
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	M	M		S					M		
CO2	S	M	M		S							
CO3	M		M		S					M		
CO4	S	S	S		S					S		
CO5			M		S					M		

Course Assessment methods

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

INTRODUCTION TO NONWOVEN **9 Hours**

Nonwovens: Introduction, Definition as per INDA and EDANA, Market structure and development, key companies, Fibres used in nonwovens, Production rate of Nonwovens and other Fabric manufacturing systems,



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Classification of web laying and web bonding systems, Comparison of woven, knitted and nonwoven structures. Nonwoven properties including environmental considerations. Nonwoven applications in technical textiles sector.

WEB FORMATION SYSTEMS **9 Hours**

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

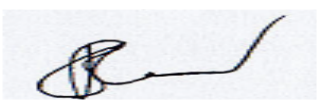
WEB BONDING SYSTEMS **9 Hours**

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

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

FINISHING OF NONWOVENS **9 Hours**

Wet Finishing: Washing, coloration – dyes, dyeing machines; printing. Application of Chemical Finishes- antistatic agents, antimicrobial finishes, softening, flameproof, waterproof, stiffeners, UV stabilizers; Methods for applying chemical finishes-padding, coating, lamination. Mechanical Finishing-splitting and winding, perforating, drying, compressive finishes, calendaring; Surface finishing- singeing, shearing, flocking, raising, polishing, softening. Developing technologies – Plasma, microencapsulation, laser etching, biomimetic finishes and electrochemical finishes.



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

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

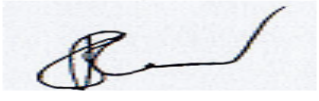
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

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

REFERENCES

1. Hand Book of Nonwovens – Edited by S.J.Russell, Wood head publications Ltd., ISBN- 13: 978-1-85573-603-0, 2007.
2. Nonwoven Fabrics: Raw Materials, Manufacture, Applications, Characteristics, Testing Processes, Edited by Wilhelm Albrecht , Hilmar Fuchs and Walter Kittelmann, WILEY-VCH Verlag GmbH & Co. KGaA, Weinheim,, ISBN: 3-527-30406-1, 2003.
3. The Nonwovens by Govianni Tanchis, ACIMIT,2006
4. Hand Book of Technical Textiles – Edited by S.C.Anand & A.R.Horrocks, Wood head publications Ltd., ISBN 1 85573 385 4, 2000.
5. Applications of Nonwovens in Technical textiles, Edited by R.A.Chapman, CRC press, 2010.



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U14TX*T*504 **Woven Fabric Structure and Design**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Design various weave structures
CO2: Analyze colour and weave effects
CO3: Draw pile and corded structures
CO4: Illustrate special weaves
CO5: Learn to create new structures

Pre-requisites :

1. U14TXT402 Shuttleless Weaving Technology
2. U14TXT502 Knitting Technology

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

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

Course Assessment methods

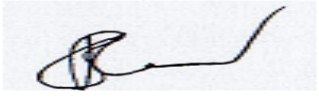
Direct	Indirect
1. Internal test I 2. Internal test II 3. Internal test III 4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	1. Course end survey

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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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.

PILE AND DOUBLE CLOTH **9 Hours**

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

SPECIAL WEAVES **9 Hours**

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

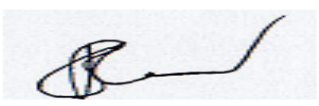
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

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

REFERENCES

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



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6. B.K.Behra and P.K.Hari, “Woven Textile Structure (Theory and Application), Woodhead Publishing Limited, 2010.
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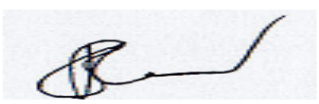

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U14TX*T*505 **Textile Printing and Finishing Technology**

L	T	P	C
4	0	0	4

Course Outcomes

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

CO1: Discuss the style and methods of printing

CO2: Explain the working principle of various printing machines

CO3: Contrast the mechanism of various finishes

CO4: Explain the mechanism of functional finishes

CO5: Summarize the pollution control measures in textile processing industry

Pre-requisites :

1. U14TXT403 Textile Pretreatment and Colouration Technology

CO/PO Mapping

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

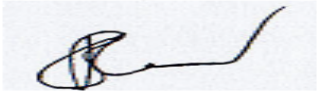
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S		M			W						
CO2	S											
CO3				M								
CO4		S		S	W							
CO5	S		W		M	M						

Course Assessment methods

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

CHEMICAL CONCEPTS OF PRINTING **12Hours**

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



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complex, acid dye and pigments for different styles.

PRINTING MACHINES **12Hours**

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 **12Hours**

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

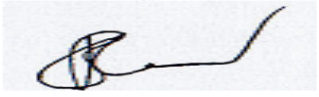
FUNCTIONAL FINISHES **12Hours**

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 **12Hours**

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: 60 Hours **Total: 60 Hours**



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CASE STUDY (any two)

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

REFERENCES

1. Shenai, V.A., "Technology of Printing", Sevak Publications, Bombay, 1996.
2. Shenai, V.A., "Technology of Textile Finishing", Sevak Publications, Bombay, 1995.
3. Marsh, J.T., "An Introduction to Textile Finishing", Chapman and Hall Ltd., London, 1979.
4. W.D.Schindler and P.J.Hauser, Chemical finishing of Textiles, CRC Pr LIC Publication, 2004.
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8. From waste to profits, technical manual series III, National productivity council, new Delhi, 1998
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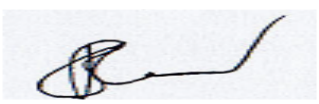

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U14ENP501 **Communication Skills Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

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

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

CO2: Developing communicative ability and softskills needed for placement

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

Pre-requisites :

1. U14ENT101 / Functional English – I
2. U14ENT201 / Functional English – II

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

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

Course Assessment methods

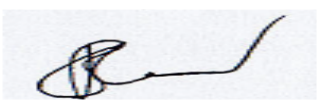
Direct	Indirect
1. Presentation 2. 2. Role Play 3. 3. Mock interview 4. 4. Group Discussion	1. Course end survey

GRAMMAR IN COMMUNICATION **9 Hours**

Grammar and Usage – Building Blocks, Homonyms, Subject and Verb Agreement, Error Correction – Grammar Application, Framing Questions – Question words, Verbal Questions, Tags, Giving Replies – Types of Sentences, Listening Comprehension – Listening and Ear training.

ASSERTIVE COMMUNICATION **9 Hours**

Listening Comprehension in Cross-Cultural Ambience, Telephonic



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Conversations/Etiquette, Role Play Activities, Dramatizing Situations – Extempore – Idioms and Phrases.

CORPORATE COMMUNICATION **9 Hours**

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

PUBLIC SPEAKING **9 Hours**

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

INTERVIEW AND GROUP DISCUSSION TECHNIQUES **9 Hours**

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

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

REFERENCES

1. Bhatnagar R.P. and Rahul Bhargava, 'English for Competitive Examinations', Macmillan Publishers, India, 1989.
2. Devadoss K. and Malathy P., 'Career Skills for Engineers', National Book Publishers, Chennai, 2013.
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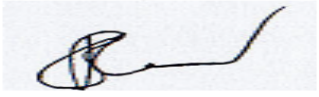

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U14TX*P*501 **Cloth Analysis Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

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

CO1: Analyze of Plain / Twill / Satin / Sateen fabric
CO2: Analyze of Honey comb fabric.
CO3: Analyze of Huck-a-Back fabric
CO4: Analyze of Extra Warp / Extra Weft fabric
CO5: Analyze of Pile Fabrics (Warp & Weft)

Pre-requisites :

1. U14TXT402 Shuttleless Weaving Technology
2. U14TXT502 Knitting Technology

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

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

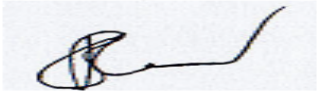
Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

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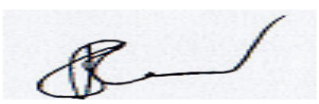
7. Analysis of Backed Fabrics.
8. Analysis of Double cloth.
9. Analysis of Crepe fabric.
10. Analysis of Mock Leno fabric.
11. Analysis of Single jersey knitted fabric.
12. Analysis of Double jersey knitted fabric.
13. Production of cloth using desk loom for the given cloth particulars.

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

CREATIVE EVALUATION (any two)

1. Collection of different variety of fabric samples & making an album
2. Making prototype model of weave structure
3. Developing a jacquard design for ornamental fabrics
4. Making prototype model for colour and weave effects
5. Calculation of yarn requirement based on the given cloth particulars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U14TX*P*502 **Textile Printing and Finishing Technology Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

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

CO1: Prepare the print paste and screen for printing the various fabric

CO2: Carryout the hands-on-training of various finishing of textile materials

CO3: Examine the quality of printed and finished fabric

Pre-requisites :

1. U14TXT403 Textile Pretreatment and Colouration Technology
2. U14TXP402 Textile Pretreatment and Colouration Technology Laboratory

CO/PO Mapping

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

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

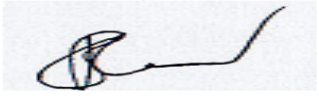
Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. 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.



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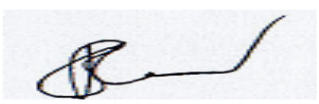
3. Printing of cotton fabric with resist style printing and assessment of fastness properties of printed material.
4. Finishing of cotton fabric using starch and evaluation of stiffness and add-on%.
5. Finishing of cotton fabric using softeners and evaluation of drape and add-on%.
6. Crease Proofing 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: 45 Hours **Total: 45 Hours**

CREATIVE EVALUATION (any two)

1. Swatches collection for various printing style and methods.
2. Printing of cotton with batik style and printing of polyester with transfer printing.
3. Preparation and imprint of various block design into cotton fabrics.



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U14TX*P*503 **In-Plant Training**

L	T	P	C
0	0	4	2

Course Outcomes

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

CO1: Demonstrate the working of the factory

CO2: Categorize the machines, products and work force

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

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

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

Pre-requisites :

1. U14TXT401/Yarn Manufacturing Technology II
2. U14TXP401/Yarn Manufacturing Technology LAB II
3. U14TXT303/ Woven Fabric Manufacturing Technology
4. U14TXP302/Woven Fabric Manufacturing Technology Lab

CO/PO Mapping

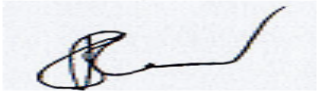
(S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak

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

Course Assessment methods

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

The wish list of 4th semester students will be collected by the Co-ordinator for In plant Training before few weeks end of the semester. The factory of In plant training should be according to the Profiling (Interested Domain Area) of the respective student. The students should submit the Undertaking Letter from their Parents before the end of the semester. The



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permission from factory will be requested and the students will be undergoing training for 2 to 4 weeks after the end semester exams. They will be monitored by respective domain internal experts. The report format and request letter from the Department should be collected by the students from the Department before the start of the IPT.

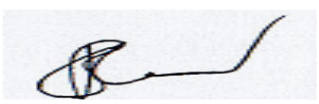
The students should submit the In Plant Training Report and IPT letter from the factory in the first week of the starting of the next semester. The students will be assessed based on their IPT report, Viva-Voce examination and the PPT presentation by the Internal Domain Experts and an external expert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

The Evaluation Pattern as Follows:

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

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

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



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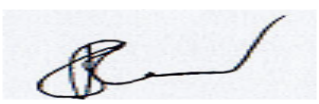
SEMESTER VI



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U14MCT605	Control and Instrumentation for Textile Technology	L	T	P	C
		3	0	0	3

Course Outcomes

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

CO1: Classify the measuring instruments by explaining their static characteristics and use basic statistical methods for measurements. (K2, K3)

CO2: Describe the working principle, characteristics of non electrical transducers Such as displacement, velocity, temperature, pressure, humidity, force and light. (K2)

CO3: Explain the working principles of fiber testing methods and machines.

CO4: Choose appropriate transducer for a given textile application. (K3)

CO5: Distinguish manual systems and automation. (K2)

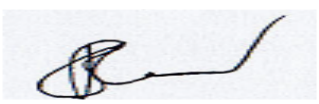
CO6: Summarize various components of automatic control system and write process equation for simple operations related to material handling and feeding systems. (K2, K3)

CO7: Distinguish and describe the architecture, I/O and memory of PLCs with conventional controllers. (K2)

CO8: Write simple PLC program by using logic and special functions. (K3, K5)

Pre-requisites :

1. U14TXT401/Yarn Manufacturing Technology II
2. U14TXT303/ Woven Fabric Manufacturing Technology



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CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S											
CO2	S	S										
CO3	S	S										
CO4	S	S										
CO5												
CO6			M									
CO7				M	M							
CO8				M	M							

Course Assessment methods

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

INTRODUCTION TO MEASUREMENT SYSTEMS 5 Hours

Functional Elements of Measuring Instruments – Classification of measuring instruments and transducers- Static Characteristics of instruments – General working principles of Resistive, capacitive and inductive type transducers with governing equations.

MEASUREMENT OF NON ELECTRICAL PARAMETERS-1* 8 Hours

Linear and angular displacement : Resistive, capacitive, inductive types and Optics (encoders), proximity sensors

Velocity measurement: tachometers and resolvers

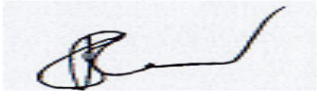
Temperature measurement : only contact type : Bimetallic, RTD, Thermocouple and Thermistor

Humidity: Capacitive and resistive and hot and wet bulbs.

Self study: Fire, smoke and metal detectors.

MEASUREMENT OF NON ELECTRICAL PARAMETERS-2* 7 Hours

Force measurement: Resistive type strain gauges, Load cells, Universal testing machine and Fiber optic strain gauge- Piezo electric transducers



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Pressure measurements : Bellows, diaphragms, capsules and pressure switches
Light : UV, IR, Light emitter and detector
Self Study: Fiber testing : Volume, Evenness, strength (single yarn and fabric) and density

CONTROL SYSTEMS **8 Hours**

Elements of automated control system - Open loop and closed loop systems- process parameter definition- discontinuous controller and continuous controller (P, PID) Comparison of controllers based on relays, electronic circuits and computers- Integration of simple mechanical systems and electrical systems with computer : Material handling Systems, automatic feeding assembly and transfer lines for textile.

PROGRAMMABLE LOGIC CONTROLLERS **8 Hours**

Digital Logic gates - History of PLCs- Types of PLCs - Architecture of PLC - Processor- Memory Units- I/O modules : I/O processing and module selection – Signal processing – Power supply

PLC PROGRAMMING **9 Hours**

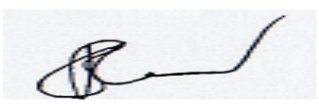
Introduction to IEC 61131 - System functions – sequence control – ladder logic – programming sequences – limitation of ladder programming – logic instruction sets – standard PLC functions – special function relays – data handling instructions – arithmetic instructions – data manipulation – program subroutines – simple programming examples with respect to textile process.

*****Emphasis to be given on how these sensors are used in textile industry along with their principles, characteristics and selection.

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

REFERENCES

1. Doebelin E O, “Measurement System: Application and Design”, McGraw Hill Pub., New York, 1995.
2. Sawhney.A.K, “A course in Electrical and Electronics Measurements and Instrumentation, DhanpatRai and Sons, New Delhi, 2005.
3. Curtis D. Johnson, “Process Control: Instrumentation Technology,”



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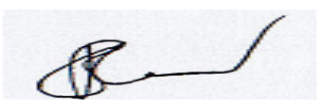
Prentice Hall, 2006
4. Frank D. Petruzella, “Programmable Logic Controllers”, McGraw-Hill Companies, 3rd Edition, 2013.
5. Krishna Kant, “Computer – Based Industrial Control”, PHI Learning Pvt Ltd, 2nd edition, New Delhi, 2011.
6. Venkatachalam. A and Ashok Kumar L, Monograph on “ Instrumentation & Textile Control Engineering” – Nov 05
7. Nalura B C. “Theory and Applications of Automation Controls”, New Age International (P) Ltd Pub, 1998.



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U14TX*T*601 **Textile Quality Evaluation**

L	T	P	C
4	0	0	4

Course Outcomes

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

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

CO2: Explain the measurement of fibre properties

CO3: Explain the measurement of yarn properties

CO4: Generalize the advanced testing instruments

CO5: Summarize the working Principle of fabric testing instruments

Pre-requisites :

1. U14TXT401 Yarn Manufacturing Technology II
2. U14TX*T*303 / Woven Fabric Manufacturing Technology

CO/PO Mapping

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

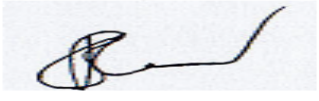
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	S		S								
CO2	S	S	S	M	S							
CO3	S	S	M	S	S							
CO4	S	S	S	S								
CO5	S	S	S	S	S							

Course Assessment methods

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

INTRODUCTION TO QUALITY **12 Hours**

Definition of Quality, Quality Concepts: Quality of Design, Quality of Conformance, Quality of Performance; Types of quality – Manufactured based, User based, Value based, and Transcendent based; Factors



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influencing quality, Quality control and Quality assurance. Quality control tools and its application-concepts of six sigma. Objectives of textile testing. Standard test conditions: Accuracy, precision and calibration. Statistical Applications in Textiles: Sampling methods, Determination of sample size,'t', 'F', 'χ^2' test, ANOVA, Control charts.

FIBRE TESTING **12 Hours**

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

YARN TESTING **12 Hours**

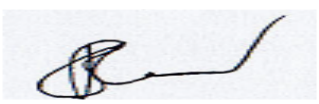
Yarn numbering systems: Direct system, indirect system and count conversion calculations - Count Determination, Measurement of yarn and thread diameter. Twist and its measurement- Twist construction, principle of twist measurement for single-Ring and OE, Ply and corded yarns. Tensile testing of yarn: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

ADVANCED FIBRE AND YARN TESTING **12 Hours**

Fibre: High Volume Instruments (HVI): length, strength, maturity, trash & color modules- analysis and interpretation of results. Advanced Fibre Information System (AFIS): length, nep and trash modules - analysis and interpretation of results. Spinning consistency index (SCI)-meaning and its siginificance. Yarn: Evenness – principle of measurement, Uster standards, Imperfections, irregularity charts, Periodic Variation and Spectrogram calculations. Tensorapid and Tensojet tensile tester. Dynamic Yarn Tester: Constant Tension Transport (CTT): Vibroscope, Vibrodyn and Vibrotex. Scatter plot diagram and its interpretation.

FABRIC TESTING **12 Hours**

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

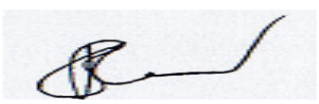
Theory: 60 Hours **Total: 60 Hours**

CASE STUDY (any two)

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

REFERENCES

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



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U14TX*T*602 **Mechanics of Textile Machinery**

L	T	P	C
3	1	0	4

Course Outcomes

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

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

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

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

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

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

Pre-requisites :

1. U14TX*T*401 / Yarn Manufacturing Technology II
2. U14TX*T*303 / Woven Fabric Manufacturing Technology
3. U14CE*T*311 / Basics of Civil Engineering and Mechanics

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

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

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Course Assessment methods

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

DRIVES **9 +3 Hours**

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

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

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

MOTION **9 +3 Hours**

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

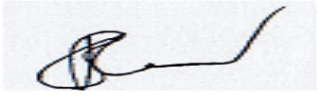
PRINCIPLE OF MOMENTS **9 +3 Hours**

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

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

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

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



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CASE STUDY (any two)

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

REFERENCES

1. Slater K., "Textile Mechanics, Vol. I & II", Textile Institute, Manchester, UK, 1987.
2. Booth J E., "Textile Mathematics, Vol. I, II & III", Textile Institute, Manchester, UK, 1977.
3. Rengasamy R.S, "Mechanics of Spinning Machines", NCUTE, Ministry of Textiles, Govt. of India, 2000.
4. Faires V.M., "Design of Machine Elements", Macmillan & Co, London, 1967.
5. Grosberg P, "Introduction to Textile Mechanics", Ernest Benn Ltd, London, 1968.
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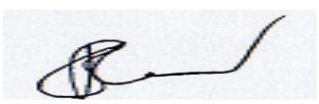

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U14TX*T*603 Garment Manufacturing Technology

L	T	P	C
3	0	0	3

Course Outcomes

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

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

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

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

CO4: Compare different production systems used in garment industry

CO5: Explain different types of pressing and packing methods

Pre-requisites :

1. U14TXT303-Woven fabric Manufacturing Technology
2. U14TXT502-Knitting Technology

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

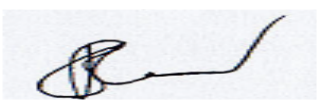
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	S	S		M							
CO2	M	S	S		S							
CO3	M											
CO4	M											
CO5	S	S	S							M		
CO6	M	W			M							

Course Assessment methods

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

PATTERN MAKING **9 Hours**

Introduction to garment manufacturing-Pattern making: Definition- Head theory- Measuring of sizes and Size chart-Seam allowances- Drafting,



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Grading and Draping- Grain lines- Dart. Development of patterns: Kids wear: Baby's frock- Men's wear: Shirt and Trouser- Women's wear: Plain skirt. Pattern making using CAD.

CUTTING **9 Hours**

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

SEWING **9 Hours**

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

PRODUCTION SYSTEMS **9 Hours**

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

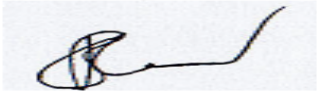
FUSING, PRESSING AND PACKING **9Hours**

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

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

CASE STUDY (any two)

1. Catalogue on threads and its ticket for different types of fabrics with needle number.
2. Consumption reduction in marker making with different width of fabrics.



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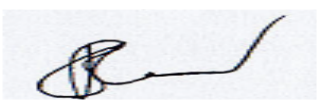
3. Comparative study of PBS and Other production system.

REFERENCES

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



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U14TX*T*604 Process Control in Textile Industry

L	T	P	C
3	1	0	4

Course Outcomes

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

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

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

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

CO4: Solve the productivity calculations

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

Pre-requisites :

U14TXT401 / Yarn Manufactuing Technology II

U14TXT402 / Shuttleless Weaving Technology

CO/PO Mapping

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

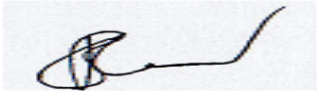
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	S		S	M							
CO2	S	S	S	S	S	M						
CO3	S	S	S	S	S							
CO4	S	S	S	S	M							
CO5	S	S	S	S	M							

Course Assessment methods

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

CONTROL OF FIBRE QUALITY **9+3Hours**

Quality control of mixing through fibre quality characteristics –Linear programming in optimizing mixing-- Fibre Quality Index – Blending



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Irregularity – Fibre Rupture Analysis – Causes of nep generation – nep removal in carding and combing machines – On line nep monitoring, hooks & hooks removal. Levelling in Blow room, carding and drawing, - Contamination & its control-Online monitoring of contamination – Stickiness: causes, effect & control strategies. Process control strategies for organic cotton processing.

CONTROL OF YARN REALIZATION & WASTE 9+3Hours

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+3Hours

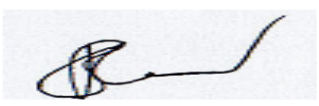
Cleaning efficiency in blow room & carding: Definition – Importance - Cleaning efficiency of the various beaters - various factors are influencing cleaning efficiency – Norms. RH% and its importance- Productivity calculations: HOK, OHS, Spindle Utilization & Productivity Index (PI).Units per Kilogram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

YARN QUALITY CONTROL 9+3Hours

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+3Hours

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

CASE STUDY (any two)

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

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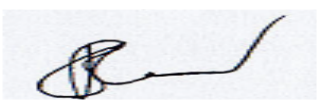

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U14MCP603 **Instrumentation and Automation Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

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

CO1: Demonstrate the performance characteristics of various transducers and infer their behavior.

CO2: Demonstrate the closed loop behavior of different process variables like level, temperature for set point changes and load changes.

Pre-requisites :

CO/PO Mapping

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

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

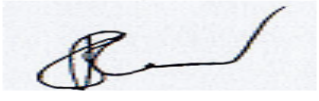
Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. Displacement measurement using potentiometer and LVDT
2. Study of Characteristics and calibration of strain gauge and Load Cell
3. Temperature measurement using Thermocouple, Thermistor and RTD
4. Capacitive Transducer & Piezoelectric Transducer for pressure measurement.
5. Comparison of capacitive and resistive type transducer for humidity



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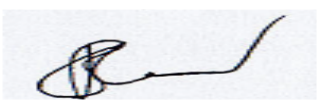
measurement.

6. Design and testing of Circuits for multiple cylinder sequencing in Pneumatic, Electro pneumatic Trainer kits.
7. Implementation of Simple Sequential Logics Using PLC
8. Implementation of Simple Synchronizing circuits Using PLC
9. Implementation of PLC system for Level & pressure control.
10. Development of SCADA system for simple process application.

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



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U14TX*P*601 Textile Quality Evaluation Laboratory

L	T	P	C
0	0	2	1

Course Outcomes

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

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

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

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

CO4: Examine the material with testing results.

CO5: Evaluate the results with various types of materials.

Pre-requisites :

CO/PO Mapping

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

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

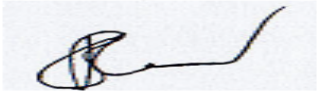
Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. Determination of the percentage of Trash, Lint, Micro dust, Invisible loss using Trash analyzer and Determination of fineness & its C.V% of the two different cotton fibre samples using Micronaire tester.
2. Determination of the Effective length, Mean length and Short fibre % of the given cotton fibre sample using Baer Sorter.
3. Determination of Hank and Hank C.V % (within & between) of the



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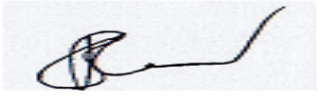
given blow room/comber lap.

4. Determination of the Hank and Hank C.V% of the given sliver / Determination of the within bobbin and between bobbin hank C.V % of the given roving.
5. Determination of the Single yarn strength of the given yarn sample using Instron.
6. Determination of Single yarn and Ply yarn twist of the given yarn.
7. Determination of the Yarn count, Lea Strength and CSP of the given yarn sample.
8. Determination of the Air permeability and Fabric Impact Strength of the given fabric.
9. Determination of the Fabric thickness, Stiffness and Crease recovery for the given fabric
10. Determination of the Fabric Drape and Bursting strength of the fabric.
11. Determination of the Fabric Abrasion Resistance and Fabric Pilling for the given fabric.
12. Determination of the Fabric Tensile strength of the given fabric sample using tensile tester.

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

CREATIVE EVALUATION (any two)

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



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U14TX*P*602 **Knitting and Garment Laboratory**

L	T	P	C
0	0	2	1

Course Outcomes

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

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

CO2: Construct different types of Seams

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

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

CO5: Calculate the Production of double track knitting machine

Pre-requisites :

U14TXT502-Knitting Technology

CO/PO Mapping

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

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

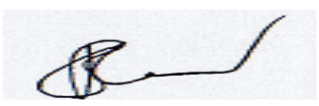
Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. Production calculation and study of single jersey circular weft knitting machine-yarn supply arrangements, loop forming mechanism, takedown motion.
2. Analysis of single jersey knitted fabrics
3. Demonstrate sewing operation in Single Needle Lock Stitch Machine, Machine adjustments-Threading-SPI and Tension setting and stitches and seams



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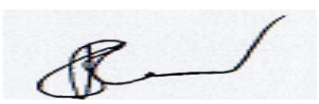
4. Demonstrate Sewing operations in Overlock and Flat lock machines and Machine adjustments-Threading-SPI and Tension setting
5. Developing pattern for Ladies wear
6. Developing pattern for Men's shirt
7. Developing pattern for T-Shirt
8. Developing pattern for Trousers.
9. Construct sleeve plackets (pointed and square)
10. Construct neckline and collars
11. Developing embroidery stitches and designs.
12. Construction of simple garment

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

CREATIVE EVALUATION (any two)

1. Identification of various types of seams and stitches in a Sewn Garment
2. Create a Trim Card with all the accessories and Trims used in the Garment
3. Design collection of various Knitted Fabrics
4. Design Collection of Various Embroidery, Printed, and Appliqué samples
5. Preparation of Technical File for a Garment.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U14TX*P*603 **Mini Project**

L	T	P	C
0	0	4	2

Course Outcomes

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

CO 1 : Formulate an experimental design to solve textile industrial problems

CO 2 : Conduct survey of literature

CO 3 : Scientific Presentation skills

Pre-requisites :

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S				S			S			S	
CO2	S		S								S	
CO3	S		S							S	S	

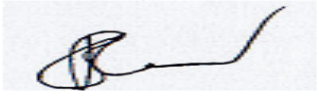
Course Assessment methods

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

i. Students should do carry out Project (Phase 1) under the guidance of a faculty member of the department

ii. Evaluation will be done by an internal panel

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



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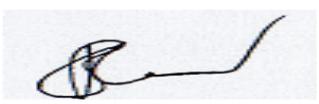
SEMESTER VII



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U14GS*T*007 **Professional Ethics**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO 1: Explain the ethical theories and concepts

CO 2: Discuss an engineer's work in the context of its impact on society

CO 3: Explain and analyze the concepts of safety and risk

CO 4: Review the professional responsibilities and rights of Engineers

CO 5: Explain the concepts of ethics in the global context.

Pre-requisites :

Nil

CO/PO Mapping

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

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

Course Assessment methods

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

ENGINEERING ETHICS AND THEORIES **9 Hours**

Definition, Moral issues, Types of inquiry, Morality and issues of morality, Kohlberg and Gilligan's theories, consensus and controversy, Professional and professionalism, moral reasoning and ethical theories, virtues, professional responsibility, integrity, self respect, duty ethics, ethical rights, self interest, egos, moral obligations.

SOCIAL ETHICS AND ENGINEERING AS SOCIAL EXPERIMENTATION **9 Hours**

Engineering as social experimentation, codes of ethics, Legal aspects of

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social ethics, the challenger case study, Engineers duty to society and environment.

SAFETY **9 Hours**

Safety and risk – assessment of safety and risk – risk benefit analysis and reducing risk – the Three Mile Island and Chernobyl case studies. Bhopal gas tragedy.

RESPONSIBILITIES AND RIGHTS OF ENGINEERS **9 Hours**

Collegiality and loyalty – respect for authority – collective bargaining – confidentiality – conflicts of interest – occupational crime – professional rights – employee rights – Intellectual Property Rights (IPR) – discrimination.

GLOBAL ISSUES AND ENGINEERS AS MANAGERS, CONSULTANTS AND LEADERS **9 Hours**

Multinational Corporations – Environmental ethics – computer ethics – weapons development – engineers as managers – consulting engineers – engineers as expert witnesses and advisors – moral leadership – Engineers as trend setters for global values.

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

REFERENCES

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2. John R. Boatright, “Ethics and the Conduct of Business”, (2003) Pearson Education, New Delhi.
3. Bhaskar S. “Professional Ethics and Human Values”, (2005) Anuradha Agencies, Chennai.
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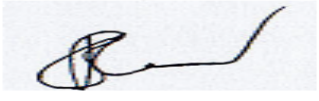

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U14TX*T*701 **Textile Project Management & Finance**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Define about project management

CO2: Outline on project planning

CO3: Estimate the cost of production & working capital requirement

CO4: Differentiate between income statement and balance statement

CO5: Review about financial ratio

Pre-requisites :

1. U14TXP503 In-Plant Training / Internship
2. U14TXT401 Yarn Manufacturing Technology II
3. U14TXT402 Shuttleless Weaving Technology

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

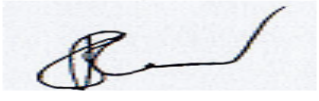
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	S		M								
CO2	S	S	S									
CO3	M	M		S	S							
CO4	S	S	M	M								
CO5	M	S		M	M							

Course Assessment methods

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

PROJECT MANAGEMENT **9 Hours**

Definition-Importance-Forms of project organization-Project Planning-Project control-Human aspects of project management; Prerequisites for



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successful project implementation; Various clearances from government agencies; Technical analysis; Market and demand analysis: Objectives-Secondary information-Market survey-Characterization- Demand forecasting-Market planning.

PROJECT PLANNING **9 Hours**

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

PROJECT COSTING **9 Hours**

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

FINANCIAL ANALYSIS **9 Hours**

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

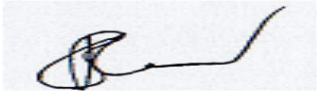
FINANCIAL RATIO ANALYSIS **9 Hours**

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

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

CASE STUDY (any two)

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



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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.
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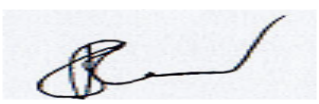

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U14TX*T*702 **Technical Textiles**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Describe the scope and classification of technical textiles

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

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

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

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

Pre-requisites :

1. U14TXT501 / Physical properties of Textile fibres
2. U14TXT503 / Nonwoven Technology

CO/PO Mapping

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

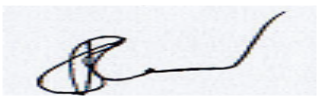
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1		M			S							
CO2	M	M	S		S							
CO3	M	M	M		S							
CO4	S	M	S		S					M	M	
CO5	M	M	S		S					M		
CO6	M	S	M		S					M		

Course Assessment methods

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

INTRODUCTION **9 Hours**

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



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

GEOTEXTILES AND MEDICAL TEXTILES **9 Hours**

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

PROTECTIVE TEXTILES **9 Hours**

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

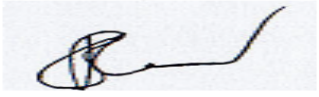
TRANSPORTATION AND SPORTS TEXTILES **9 Hours**

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

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

CASE STUDY (any two)

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



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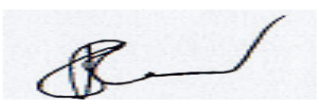

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U14TX*T*703 **Textile and Apparel Costing**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Outline the cost management concepts
CO2: Explain elements of cost of a product
CO3: Discuss various expenses incurred in garment industry
CO4: Calculate CMT cost for various garments
CO5: Prepare cost sheet for garment industry

Pre-requisites :

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

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

Course Assessment methods

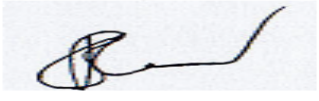
Direct	Indirect
1. Internal test I 2. Internal test II 3. Internal test III 4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	1. Course end survey

INTRODUCTION **9 Hours**

Costing: Aims of costing- Costing as an aid to management. Cost terms related to income measurement, profit planning and cost control for textile industry. Methods of inventory costing for 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. Selling cost and pricing, Full-cost pricing, Marginal cost pricing. Cost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sheet.

COSTING STRATEGY **9 Hours**

Analysis of over head expenses – Factory expenses – Administrative expenses – Selling and distribution expenses – Allocation of over head expenses – Depreciation – Reasons for depreciation – Methods of calculating depreciation –Break even analysis - Simple calculations.

COSTING OF TEXTILE PRODUCTS **9 Hours**

Yarn costing - Fabric Costing - Costing of fabric processing – Factors that Determination of the price of garments –Cost of components - Job-order costing for a garment industry. Batch costing. Process costing; waste cost and its control in a textile mill. CMT (Cutting, Making & Trimming) Cost, simple cost calculations.

COSTING OF ACCESSORIES **9 Hours**

Packing and labeling cost – different types and functions – Cost of bought out components. Shipment cost - Duty drawback. Cost calculation of Ladies and Men and Children's wear – Woven and Knitted - Simple calculations.

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

CASE STUDY (any two)

1. Cost reduction in spinning mills
2. Factors influencing costing of woven fabrics
3. Production cost optimization of a weaving preparation plant

REFERENCES

1. Lall Nigam B.M and Jain I.C., “Cost accounting: Principles & practice Prentice Hall India, 2000.
2. Jain S.P., Narang.K.L., “Elements of Cost Accounting”, Kalyani publishers, 2000.
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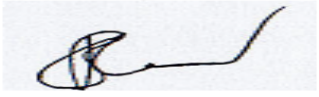

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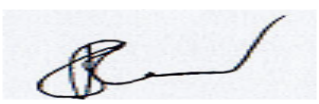

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U14TX*P*701 Textile and Apparel CAD Laboratory L T P C

0 0 2 1

Course Outcomes

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

CO1: Practice weave design using software tools

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

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

CO4: Develop garment patterns for T-Shirt, trouser, ladies top, skirt using CAD software

CO5: Calculate the Marker efficiency fot T-Shirt,Ladies top,skirt using CAD softeware

Pre-requisites :

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	M	M			S							
CO2	M	M			S							
CO3	M	M			S							
CO4	M	M			S							
CO5	M	M		M	S							

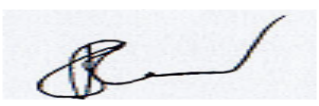
Course Assessment methods

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

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. Development of various motifs using software tools.
2. Sketch and design a garment including accessories.
3. Development of a dobby design for checked fabric & preparation of



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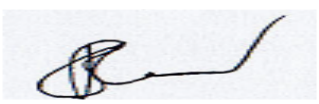
2D simulation.

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

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

CREATIVE EVALUATION (any two)

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



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U14TX*P*702	Technical Textiles Laboratory	L	T	P	C
		0	0	2	1

Course Outcomes

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

CO1: Construct composite material and determining its mechanical properties

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

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

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

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

Pre-requisites :

1. U14TX*P*601/ Textile Quality Evaluation Laboratory

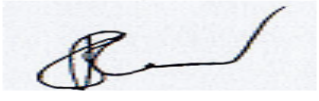
CO/PO Mapping

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

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

Course Assessment methods

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



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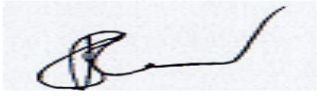
List of Experiment(s)
(Experiment beyond the syllabus should be taken)

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

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

CREATIVE EVALUATION (any two)

1. Evaluation of the quality parameters of automotive seat fabric
2. Evaluation of the quality parameters of Surgical gowns
3. Collection of various automobile textile products with specification
4. Collection of various medical textile products with specification
5. Collection of various food grade textile products and analyze, study and report.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U14TX*P*703 **Employability Skills**

L	T	P	C
0	0	2	1

Course Outcomes

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

CO1: Create effective PPT's, Resumes and Reports.

CO2: Demonstrate presentation skills, Group discussion and brain storming sessions.

CO3: Practice soft skill techniques.

CO4: Prepare job applications, covering letters and emails.

CO5: Demonstrate leadership and Teamwork skills.

Pre-requisites :

1. U14TX*P403* /Technical Seminar
2. U14ENG501/ Communication skill laboratory

CO/PO Mapping

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

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

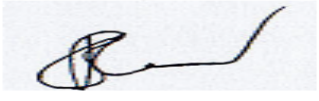
Course Assessment methods

Direct	Indirect
1. Presentation 2. Group Discussion 3. Report writing 4. Resume writing 5. Mock interview 6. End Semester Practical Examination	1. Course end survey

List of Experiment(s)

(Experiment beyond the syllabus should be taken)

1. To enhance the employability skills of students with a special focus on Presentation skills, Group discussion skills and Interview skills
2. To help them improve their soft skills, including report writing, necessary for the workplace Situations



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3. Making presentations – introducing oneself – introducing a topic – answering questions individual presentation practice
4. Creating effective PPTs – presenting the visuals effectively
5. Using body language with awareness – gestures, facial expressions, etc.
6. Preparing job applications - writing covering letter and résumé
7. Applying for jobs online - email etiquette
8. Participating in group discussions – understanding group dynamics - brainstorming the topic
9. Training in soft skills - persuasive skills – sociability skills - questioning and clarifying skills – mock GD
10. Writing reports – collecting, analyzing and interpreting data – drafting the report
11. Attending job interviews – answering questions confidently
12. Interview etiquette – dress code – body language – mock interview

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

REFERENCE

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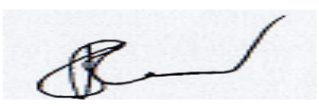

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U14TX *P*704 **Project Work-Phase I**

L	T	P	C
0	0	4	2

Course Outcomes

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

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

CO 2: Construct a design to overcome its problems

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

CO 4: Develop and analyse the product

CO 5: Select the optimum design

Pre-requisites :

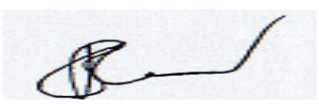
1. Knowledge in Design and Fabrication of component

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

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

Course Assessment methods

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



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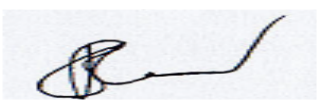
SEMESTER VIII



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U14TX *P801* **Project Work-Phase II**

L	T	P	C
0	0	12	6

Course Outcomes

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

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

CO 2: Analyze data and interpret the results obtained.

CO 3: Identify the process the fabrication / manufacturing.

CO 4: Experiment of the model developed.

CO 5: Summarize the results and submit a report.

Pre-requisites :

1. Knowledge in Design and Fabrication of component

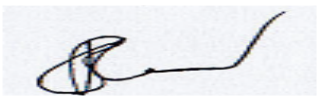
CO/PO Mapping

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

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

Course Assessment methods

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



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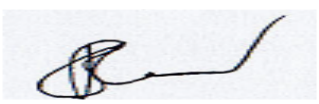
ELECTIVE I



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U14TXTE51 **High Performance Fibres**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Discuss the aramid and sulphur based fibres.

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

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

CO4: Demonstrate about the various aspects of metallic fibres.

CO5: Describe about the newly developed fibres.

Pre-requisites :

1 U14TXT301 / Manufacturing fiber Technology

CO/PO Mapping

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

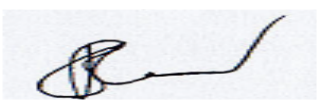
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S											
CO2		M										
CO3		M										
CO4		S	S	M								
CO5		S			S							

Course Assessment methods

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

ARAMID AND SULPHER BASED FIBRES **9 hrs**

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



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

CARBON AND GLASS FIBRES **9 hrs**

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

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

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

METALLIC FIBRES **9 hrs**

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

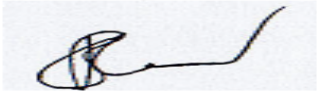
NEW FIBRES **9 hrs**

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

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

CASE STUDY (any two)

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



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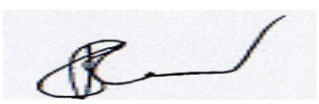

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U14TX*T*E52 Maintenance Management in Textile Mills

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Inventory control techniques in spinning mill.

CO2: One week maintenance schedule in preparatory and spinning departments

CO3: Erection procedure in carding machine

CO4: Cost work sheet

CO5: Production planning in spinning

Pre-requisites :

U14TXT401 Yarn Manufacturing Technology II

2. U14TXT402 Shuttleless Weaving Technology

3. U14EET311 Basics of Electrical and Electronics Engineering

4. U14TXT505 Textile Printing and Finishing Technology

CO/PO Mapping

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

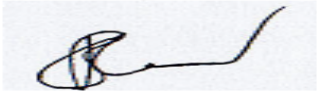
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	S	M	S	M	S						
CO2	S	S	S	M	M	S						
CO3	M	M	S	M		S						
CO4	S	M	M	M								
CO5	S	S	M	M								

Course Assessment methods

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

INTRODUCTION TO MAINTENANCE **9 hrs**

Object of maintenance – types of maintenance- Organizational structure for 25,000 and 50,000 spindles spinning mill, composite mills and vertically integrated units- systems and procedure of maintenance-



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planning- scheduling- controlling- back logs rescheduling- roll of computer in maintenance management- Mill stores planning inventory control techniques- tools required for maintenance – general tools and specialty tools and gauges.

MAINTENANCE SCHEDULE **9 hrs**

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

POWER HOUSE MAINTENANCE **9 hrs**

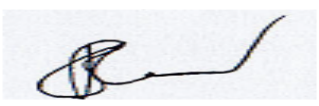
Maintenance of power house- transformers- Generators- Humidification plants - Maintenance for special motors-Servo motors- Gear motors – Fluid coupling motors - Stepped speed drive motor- Variable speed motors- Starters and switches- Compressors- Regulators- Driers- Pressure monitors- Over head cleaners-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

SPECIAL MAINTENANCE ACTIVITIES **9 hrs**

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

MODERNIZATION PROGRAMME **9 hrs**

House keeping techniques- lay out planning- basic erection procedure for ring frame and looms- Maintenance audit- maintenance cost control-



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depreciation concepts- - replacement theory and concepts- calculation of replacement duration – Renovation Vs Modernization – investment decision tools, disposal procedure for scrap items.

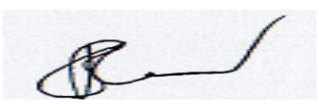
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

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

REFERENCES

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



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U14TX*T*E53 **Pattern Making and Grading**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Explain the basic concepts about pattern making
CO2: Describe the drafting procedure for basic patterns
CO3: Explain the draping procedure
CO4: Describe the dart manipulating procedure
CO5: Explain the pattern alteration techniques

Pre-requisites :

1. U14TXT603 / Garment Technology

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

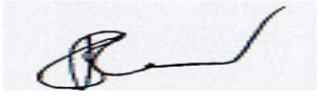
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S				S							
CO2		S										
CO3			S									
CO4			S	S	S							
CO5					S							

Course Assessment methods

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

BASIC PATTERN MAKING **9 hrs**

Patterns – definition and types – individual and commercial patterns. Pattern making – definition and types of pattern making- drafting, draping, flat pattern techniques, their advantages and disadvantages. Tools for pattern making. Body measurements – importance, principles, precautions. Size charts – ASTM Standards) definition and standardization.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DRAFTING **9 hrs**

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

DRAPING **9 hrs**

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

FLAT PATTERN TECHNIQUES **9 hrs**

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

PATTERN ALTERATION AND GRADING **9 hrs**

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

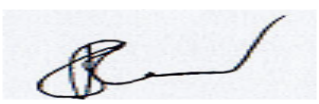
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

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

REFERENCES

1. Helen Joseph Armstrong, “Pattern Making for Fashion Design” Pearson Education (Singapore) Pvt. Ltd., 2005.
2. Winifred Aldrich, “Metric Pattern Cutting” Blackwell Science Ltd.,1994.
3. Gillian Holman, “Pattern Cutting Made Easy”, Blackwell Scientific



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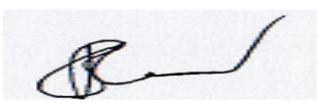
Publications, 1997.
4. Natalie Bray “More Dress Pattern Designing” Blackwell Scientific Publications, 1986.
5. Gillian Holman, “Pattern Cutting Made Easy”, Blackwell Scientific Publications 1997.
6. Gerry Cooklin, “Master Patterns and Grading for Women’s Outsizes”, Blackwell Scientific Publications, 1995.



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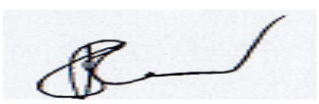
ELECTIVE II



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U14TX*T*E61 **Instrumental Analysis of Textile and Chemicals**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Analyze the textiles and chemicals using UV and IR Spectrometry

CO2: Analyze the textiles and chemicals using NMR and MAS Spectrometry

CO3 : Analyze the textiles and chemicals using TGA and pH analysis instrument

CO4: Analyze the textiles and chemicals using Chromatographic instrument

CO5: Summarize the instrument calibration procedure

Pre-requisites :

1. U14TXT505 / Textile Printing and Finishing Technology

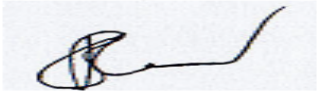
CO/PO Mapping

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

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

Course Assessment methods

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



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UV AND IR SPECTROMETRY ANALYSIS **9**

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

NMR AND MASS SPECTROMETRY ANALYSIS **9**

NMR spectroscopy – Theory, Relaxation Process – Instrumentation (block diagram only) –Chemical shift – Internal standard – TMS – Shielding and De- Shielding Effects – Factors influencing Chemical shift - Applications. Mass spectroscopy: Theory, Instrumentation (block diagram only) – Ionization Techniques – Electron impact ionization, Chemical ionization and Desorption techniques. Nirogen rule, McLafferty rearrangement.

THERMAL AND p H ANALYSIS **9**

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

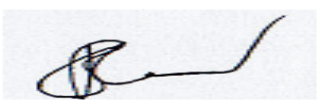
CHROMATAGRAPHIC ANALYSIS **9**

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

INSTRUMENT CALIBRATION **9**

Errors, Precision and Accuracy : Difinitions, Significant figures – Types of Errors – Methods of expressing accuracy and precision , Confidence limits.

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



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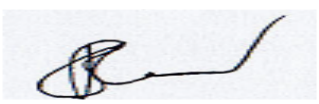
CASE STUDY (any two)

REFERENCES

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



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U14TX*T*E62 **Textile Composites**

L	T	P	C
3	0	0	3

Course Outcomes

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

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

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

CO3: Analyze and interpret the necessary steps involved in textile composite formation

CO4: Demonstrate the different composite manufacturing techniques with its limitations

CO5: Outline the various testing performed in composite materials

Pre-requisites :

1. U14TXT504 Woven Fabric Structure and Design
2. U14TXT501 Physical properties of Textile fibres
3. U14TXTE51 High Performance Fibres

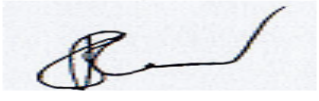
CO/PO Mapping

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

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

Course Assessment methods

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



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INTRODUCTION TO COMPOSITES **9 hrs**

Composites- Introduction, Definition and classification –Structure of the matrix such as MMC, CMC and PMC. Reinforcement forms – Limitations of the conventional engineering materials such as metal, plastics and ceramics-Advantages of Composites over Conventional Engineering materials. Introduction to green composites and nano-composites.

MATRIX AND REINFORCEMENT **9 hrs**

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

MECHANICS OF COMPOSITES **9 hrs**

Mechanical Properties of composites-Elasticity of Composites-Failure modes of Composites-Ply and orientation- Rule of Mixture and Property prediction-Fibre Volume fraction(FVF) and Fibre Mass Fraction(FMF)-Interface and interfacial reactions-Other properties of Composites such as Delamination and Fracture toughness-Compression behavior of Composites- Calculations in FVF, FMF and ply thickness.

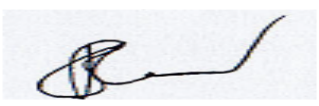
COMPOSITES MANUFACTURING METHOD **9 hrs**

Goals of Composite manufacturing process, Manufacturing Technologies, Characteristics, Application and Limitations: Lay-up, Spray lay-up, Automatic Lay-up, Vacuum bagging, Compression moulding, Injection moulding, Filament winding, Pultrusion, Resin transfer moulding.

TESTING OF COMPOSITES **9 hrs**

Types of loading: Tension, Compression, shear, flexure. Destructive Testing: Tensile Testing: Inplane tension test, out of plane tensile test - Compression test, interlaminar shear testing, $\pm 45^{o}$ tensile test, rail shear test, short beam shear test, interlaminar fracture testing, Fibre volume fraction: Matrix digestion, Ignition Loss. Moisture diffusivity, void content, accelerated weathering test. Non destructive test: visual, optical, ultrasonic, acoustic, radiographic, thermal.

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



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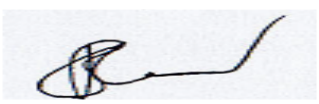
CASE STUDY (any two)

1. With lower Fibre Volume Fraction, Interface strength of jute/epoxy composite found lower.
2. Web form of matrix inclusion in composite preparation has good Interface strength.
3. Prepregs are economical in composite manufacturing process.

REFERENCES

1. Guneri Akovali “Handbook of Composite Fabrication”, Rapra Technology Ltd, 2003.
2. Autar K.Kaw , “Mechanics of Composite Materials”, Second Edition, CRC press, 2006.
3. George H.Stab , “Laminar Composites”, B-H publication,1999.
4. Sanjay K.Mazumdar, “Composite manufacturing-Material, Product and Process engineering”, CRC press, 2002.
5. Daniel Gay, Suong V. Hoa, Stephen W. Tsai, “Composite Materials – Design and Applications”, CRC press, 2002.



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U14TX*T*E63 **Garment Wet Processing**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Outline the process flow for garment processing

CO2: Explain the various dyeing, printing and finishing methods involved in garment processing

CO3: Prepare the garment with different style using advanced finishing

CO4: Explain the working principle of garment processing machines

CO5: Label the garment care

Pre-requisites :

1. U14TXT505 / Textile Printing and Finishing Technology

CO/PO Mapping

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

COs	Programme Outcomes(POs)											
	P1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	M										
CO2	S	M	M									
CO3	S				W							
CO4	S						W					
CO5	M										W	

Course Assessment methods

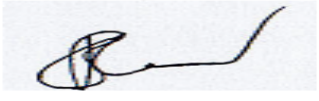
Direct	Indirect
1. Internal test I 2. Internal test II 3. Internal test III 4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	1. Course end survey

GARMENT PROCESSING **9 hrs**

Developments in garment processing and its future – Problems in garment dyeing – Remedies– Considerations and precautions to be taken for garment Dyeing – Pros and Cons of garment dyeing – Chemical preparation of garments for dyeing and printing. Use of enzymes in the preparation.

DYES FOR DIFFERENT MATERIALS **9 hrs**

Dyeing of cotton and P/C Blended garments using reactive dyes & vat



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dyes. Dyeing of socks and hose – Dyeing of fasteners – Machines for garment dyeing – Paddle, rotary –Solvent dyeing process – Dyeing of wool garments – Dyeing of polyester garments –Printing of garments – Cut process /pattern stage.

EFFECTS ON GARMENTS 9 hrs

Wash down effects, stone wash, Enzyme wash, Bio – polishing, Acid wash, sand blasting, leather finish, rubbery touch, feather touch, peach skin finish, ION wash, mud wash, chalk wash, easy care finishes, wrinkle free and wrinkle resistant finish, water repellent finish, UV protective garments, Anti – microbial (or) anti – bacterial inhibition finish, silicone softeners, fire retardant finishes for garments.

GARMENT FINISHING 9 hrs

Finishing techniques, Dip process, Tumbling process, pad – dry – cure method. Stone washing machines, tumble dryer, used look finishing machines, garment finishers, hand finishers, multiform finishers, shirt finishers, pant finishers, cabinet finishers, tunnel finishers, continuous finishers.

LAUNDERING AND GARMENT CARE 9 hrs

Selection of garments, need for garment care. Identification of stain – classification of soil and stains cleaning processes – Air & Wet cleaning, Stain removal, Laundering using detergents &dry cleaning. Laundry procedures for natural and synthetics. Drying, pressing, storage – protection against light temperature, microbes, hand washable and machine washable garments– Garment care and care labeling.

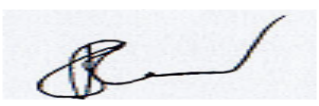
Theory: 45 Hours Total: 45 Hours

CASE STUDY (any two)

1. Quality aspects of garment wet processed material
2. Energy conservation in garment wet processing industry
3. Techno economic study for garment wet processing industry

REFERENCES

1. Trotman.E.R.”Dyeing and Chemical technology of textile fibres”,B.I.Pub.,New Delhi.1994.
2. Noemia D’ Souza ,Fabric Care, , New AGE International Pub.1998
3. NCUTE – Programme series, Finishing of Garments and Knits, held



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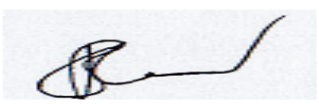
7. Nicholas P Cheremisinoff, “Handbook of Chemical Processing Equipment, Butterworth-Heinemann 2000



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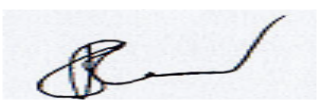
ELECTIVE III



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U14TX*T*E71 **Medical Textiles**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Outline on medical textile industry

CO2: Explain properties, types, applications of implantable, non-implantable and drug delivery textiles

CO3: Discuss on property requirements, applications and testing of biopolymers and Tissue engineering

CO4: Summarize different types and its properties of wound care and reusable medical textiles

CO5: Compare the characteristics of different smart medical textiles and its applications

Pre-requisites :

1. U14TXT503 / Nonwoven Technology
2. U14TXT702 / Technical Textiles

CO/PO Mapping

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

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

Course Assessment methods

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

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INTRODUCTION **9 hrs**

Medical textiles — classification, current market scenario in international and national level – government initiatives; antimicrobial fibres and finishes; nano fibrous materials and films; super absorbent polymers; operating room garments; personal health care and hygiene products and their testing methods; applications of non-wovens in medicine; textiles in infection prevention control.

BIOPOLYMERS, TESTING AND TISSUE ENGINEERING **9 hrs**

Biopolymers: classification and their properties, requirements, and applications, testing methods; In vitro tests – direct contact, agar diffusion & elution methods – in vivo assessment of tissue compatibility. Tissue engineering: properties and materials of scaffolds- relationship between textile architecture and cell behavior – applications of textile scaffolds in tissue engineering.

IMPLANTABLES, NON-IMPLANTABLES AND DRUG DELIVERY **9 hrs**

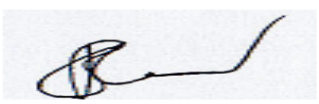
Bandages-types, properties and applications; compression garments-types, properties and applications; sutures: types and properties; implantable textiles: hernia mesh – vascular prostheses – stents; Extra corporeal materials: Cartilage nerves – liver ligaments, kidney, tendons, cornea; Drug delivery textiles: classification – mechanism various fabrication methods – characterization – applications.

WOUND CARE AND REUSABLE MEDICAL TEXTILES **9 hrs**

Wound: types and healing mechanism- textile materials for wound dressing – bio active dressing – anti microbial textiles dressing – composite dressing –- testing of wound care materials; Wound compression textiles; Reusable medical textiles: types, advantages, physical properties and performance — reusable processing methods.

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

Smart textiles – types, characteristics – smart textiles in wound care; applications of phase change and shape memory materials – monitoring



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pregnancy, children and cardio patients – mobile health monitoring ; electronics in medical textiles; Smart textiles in rehabilitation and applications; textile sensors for healthcare ;legal and ethical values involved in the medical textile materials.

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

CASE STUDY (any two)

1. Study about the various wound care materials.
2. Analysis on market & its potential of medical textiles in national and international level.
3. Study of various bandages available in market.

REFERENCES

1. Rajendran.S, "Advanced Textiles for Wound Care", Wood Head publishing in Textiles: Number 85, 2009.
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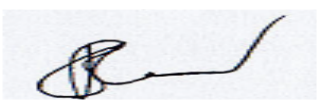

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U14TX*T*E72 **Clothing Science**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Outline dimensional stability of clothing with different mechanisms.

CO2: Explain tailorability and serviceability of woven and knitted fabrics.

CO3: Summarize handle and aesthetic properties of fabrics.

CO4: Relate human-clothing-environment system in terms of comfort.

CO5: Explain thermal properties of clothing related to clothing comfort.

Pre-requisites :

1. U14TX*T*301 / Manufactured fibre technology
2. U14TX*T*504 / Woven fabric structure and design

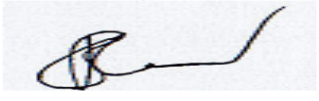
CO/PO Mapping

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

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

Course Assessment methods

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



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DIMENSIONAL STABILITY **9 hrs**

Dimensional Stability of Fabrics: Hygral expansion, Relaxation shrinkage, Swelling shrinkage, Felting shrinkage. Mechanism of fabric shrinkage- Relationship between Hygral Expansion, Relaxation shrinkage and extensibility - Knitting Process Parameters and fabric stability.

TAILORABILITY & SERVICEABILITY **9 hrs**

Tailorability of fabrics: Woven and knitted - formability, sewability. Serviceability of Fabrics: Wear- Abrasion resistance, Tearing strength. Pilling - mechanism of pilling formation, anti-pilling techniques, snagging, seam strength and seam slippage-Color fastness.

HANDLE AND ASTHETIC PROPERTIES **9 hrs**

Fabric Handle: Handle characteristics, subjective hand judgment, objective evaluation of fabric hand and its applications. Aesthetic properties: Drape, Crease and Wrinkle recovery - Lustre. Scroopiness - Stain resistance.

CLOTHING COMFORT **9 hrs**

Definition of comfort - Human clothing system - Physical, Physiological and psychological aspects of comfort – Tactile and pressure sensation aspects. Applications of clothing comfort research.

THERMAL COMFORT **9 hrs**

Introduction. Thermal transfer processes – Dry heat transfer and Rapid heat transfer. Flammability – burning behaviour. Thermal degradation. Function of Textiles in enhancing thermal comfort. Comparison of thermal comfort properties for different textile structures

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

CASE STUDY (any two)

1. Comfort properties of PV blended suiting fabrics
2. Comfort properties of linen knits
3. Designing comfort garment for children

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1. Kothari, V K, “Testing and Quality Management “, CBS Book Publishers, New Delhi, 2000.
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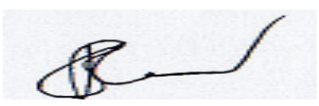

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4. Billie J Collier and Helen H Epps,” Textile Testing and Analysis,”Prentice- Hall Inc., New Jersey , ISBN 0134882148, 1999.
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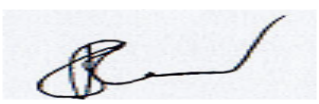

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U14TX*T*E73 Marketing and Merchandising

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Describe the 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

Pre-requisites :

1. U14TXT603 / Garment Manufacturing Technology

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

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

Course Assessment methods

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

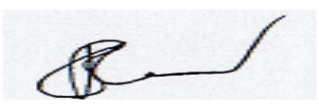
MARKETING AND CONSUMER BEHAVIOR 9 hrs

MARKETING

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

CONSUMER BEHAVIOUR 9 hrs

Understanding Consumers -Determinants of Consumer behaviour – models of Consumer Behaviour – Indian Consumer Environment.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PRODUCTION PLANNING AND MANAGEMENT **9 hrs**

Introduction to Product Planning – Product Divisions and Strategies – Product Life Cycle and New Product Development –Branding and Packaging Decisions with special reference to textile products.- RETAILING AND WHOLE SALING**:** Importance of retailing and wholesaling – types of retailing and wholesaling – recent trends in retailing and wholesaling with reference to textiles – retail and wholesale centres with reference to textiles in India.

MERCHANDISING AND SOURCING **9 hrs**

Definition of merchandising – functions of merchandising division – role and responsibilities of a merchandiser – different types of buyers – communications with the buyers – awareness of current market trends – product development, line planning – line presentation.

SOURCING: Need for sourcing- sourcing materials- manufacturing resources planning – principles of MRP – Overseas sourcing – sourcing strategies. Supply chain and demand chain analysis – Materials management for quick response – Just In Time technology.

EXPORT DOCUMENTATION **9 hrs**

Order confirmation, various types of export documents, pre-shipment and post-shipment documentation, terms of sale, payment and shipment. Duty drawback, DEPB, I/E license-exchange control regulation-foreign exchange regulation acts-export management risk-export finance. Functions and objectives of WTO-Concepts of GATT and MFA.

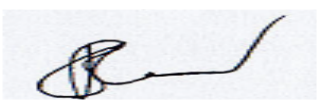
Theory: 45 Hours **Total: 45 Hours**

CASE STUDY (any two)

1. Study on the consumer behavior in textile marketing
2. Study on the export documentation and processing
3. Study on the impact of globalization and effect on export marketing
4. Study on the export documentation and processing.

REFERENCES

1. Evans. J. R. “Marketing: Marketing In The 21st Century”, 8th edition, 2003.



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4. Ruth E.Glock and Grace L.Kunz, “Apparel manufacturing and sewn product analysis”, Prentice Hall, New Jersey, 2000.
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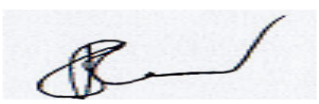

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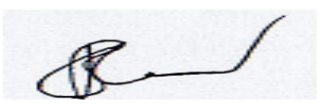

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U14TX*T*E74 **Apparel Production Planning and Control**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Discuss various apparel production systems

CO2: Illustrate production planning techniques in marker planning and spreading

CO3: Illustrate production planning techniques sewing line

CO4: Explain the concept of work study

CO5: Apply production control techniques in garment industry

Pre-requisites :

1. U14TXT603 / Garment Manufacturing Technology

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

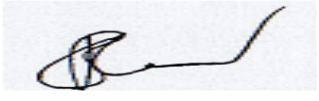
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	M	S	S							M		
CO2	M	S	S		M					M		
CO3	M	S	S									
CO4		S		S								
CO5	M	M	M									

Course Assessment methods

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

INTROCUCTION **9 hrs**

Introduction-Objectives-Production management-Product design-Design of production system-Types of production system-Manufacturing process-Types of manufacturing process-Factors affecting the choice of manufacturing process-Production planning and control-Benefits to small entrepreneur-Steps of production planning and control- Planning & lead Time -Importance of pre- production activities.



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MARKER AND LAY PLANNING **9 hrs**

Marker planning –Direction of Design-Marker utilization –spreading technique for plain – stripes, plaid and checks –splicing – marker making; lay lot planning; cutting and sewing schedule- preparation of cutting schedule-numerical exercises on lay lot planning-Types of Lay

OPERATION SEQUENCE DEVELOPMENT **9 hrs**

Garment breakdown with machine and attachment details, development of production grid for T- Shirts - development of production flowchart – men's full sleeve shirt – trousers – five-pocket jeans – ladies night dress – shorts – T-shirt

WORK STUDY **9 hrs**

Method Study and Work Measurement -Techniques - Principles of Motion Economy – Classification to Movements - Process Flow Chart – Two-handed Process Chart, Micro-motion Study - Time Study – Definition - Steps in making a Time Study - Breaking the Job into Elements - Stop Watch Procedure. Time Study Rating, Calculation of Standard Time

PRODUCTION PLANNING AND CONTROL **9 hrs**

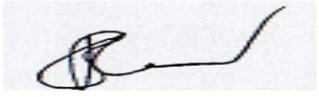
Production scheduling-Gantt chart preparation-Capacity calculation for cutting, sewing and finishing; determination of machine requirements for a new factory; line balancing: determination and allocation of manpower and machine for balanced production in existing plant for a given target

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

CASE STUDY (any two)

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.



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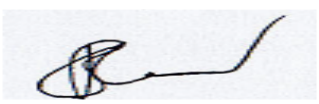

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U14TX*T*E75 **Entrepreneurship Development**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: The graduates will demonstrate their ability to solve technical problems via technical approaches, self study, team work and life-long learning approaches.

CO2: The graduates develop skills to be effective members of a team.

CO3: Graduates will become equipped with the knowledge and skills necessary for entry-level
placement in both TT as well as IT companies.

CO4: The graduates will develop capacity to understand professional and ethical responsibility and will display skills required for continuous and life-long learning and up gradation.

CO5: The graduates are expected to have knowledge of contemporary issues and modern practices.

Pre-requisites :

1. U14TXT603 Garment Manufacturing Technology
2. U14TXTE501 Industrial Engineering in Textile Industry

CO/PO Mapping

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

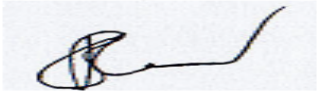
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	M	S	S							M		
CO2	M	S	S		M					M		
CO3	M	S	S									
CO4		S		S								
CO5	M	M	M									

Course Assessment methods

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

Entrepreneurship **9 hrs**

Entrepreneurship development skills – concept of small scale industry – advantages of SSI units. Classification of Garment Units: Woven – knitted



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– lingerie – Leather garment – sports wear – outer wear –under garments – hospital wear. Costing: Garment cost elements – cost calculations (numerical problems).*Industrial garments*

Setting up a Garment **9 hrs**

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

Production Management **9 hrs**

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. *Welfare measures*

Marketing **9 hrs**

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

Export Scenario **9 hrs**

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. *Fashion shows*

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

CASE STUDY (any two)

REFERENCES

1. R. K. Sharma, *Development Banks and Entrepreneurship Promotion in India*, Mittal Publications,
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2. O. P. Khanna, *Industrial Engineering and Management*, Dhanpat Rai Publications (p) Ltd., New
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3. Ruth E Glock, Grace I Kunz, *Apparel Manufacturing – Sewn Product Analysis – 3rd Edition*,
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4. Jacob Solinger, *Apparel Manufacturing Handbook – Analysis Principles and Practice*, Bobbin
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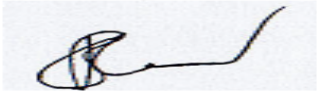

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U14TX*T*E76 **Statistical Application in Textile Industry**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Apply the distribution functions in Textile related problems

CO2: Analyze the significance of sampling and its techniques

CO3: Analyze the different models of variance

CO4: Design and interpret the process control charts

CO5: Analyze the experiments by correlation and regression

Pre-requisites :

1. U14MAT305 Probability and Applied Statistics
2. U14TXT601 Textile Quality Evaluation

CO/PO Mapping

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

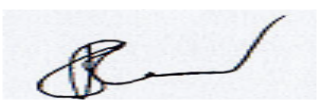
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S	S	S	S								
CO2	S	S	S	S								
CO3	S	S	S	S								
CO4	S	S	S	S								
CO5	S	S	S	S								

Course Assessment methods

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

DATA COLLECTION AND INTERPRETATION **9 hrs**

Population – Samples – Variation – variables Random variation – uncertainty- frequency distribution- Relative frequency – Probability – Relative frequency – Probability curves – Probability- Probability density curves – measures of variability – Standard deviation – Coefficient of



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variation – Point Estimates _ Confidence limits – Choosing the sample size

DISTRIBUTION FUNCTIONS AND TEST OF SIGNIFICANCE **9 hrs**

Binomial –poission– Normal – Probability distribution _ F distribution – 'T' distribution – chi-square distribution

TEST HYPOTHESIS **9 hrs**

One way ANOVA - Two ways ANOVA – randomized block design – Test method for ANOVA

QUALITY CONTROL AND ACCEPTANCE SAMPLING **9 hrs**

Sampling inspection – Acceptance sampling – producer and Consumer Risk – quality control chart – Action and warning Limits – control Chart for defects – defectives, Averages and Ranges – Average run length

CORRELATION AND REGRESSION **9 hrs**

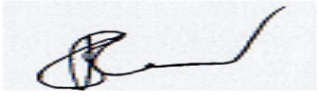
Analysis of Discrete and Ranking data- Relation between variable – Fitting Straight Line – Confidence limits – correlation coefficient – interpretation of 'r' regression through origin.

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

CASE STUDY (any two)

REFERENCES

1. Statistical Technique in Textile mills SITRA- Year 2006
2. Practical Statistics for the Textile Industry Part-I, II GAV- leaf – 1984/ Textile Institute England
3. Textile Processes – quality Control and design of Experiments;- Georgi Damyanov and Diana Germanova – Krasteva / Momentum Press Newyork - 2013



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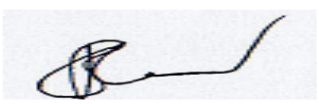
ELECTIVE V



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U14TX*T*E81 **Industrial Engineering in Textile Industry**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Discuss industrial engineering techniques
CO2: Analyze the garment breakdown sequence
CO3: Prepare operation bulletin for different garments
CO4: Calculate SAM for various garments
CO5: Conduct time study experiment

Pre-requisites :

1. U14TXT603 / Garment Manufacturing Technology

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

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

Course Assessment methods

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

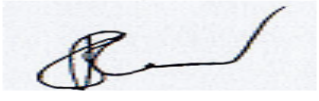
PRODUCTIVITY AND WORK STUDY **9 hrs**

PRODUCTIVITY

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.

WORKSTUDY **9 hrs**

Work Study: definition, work-study and productivity - basic procedure of work-study – work study and the worker, supervisor and the management -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working condition and the working environment.

METHOD STUDY **9 hrs**

Method study: definition and objects of method study – basic procedure, selection of work, Recording, examining, development of method – Textile / Apparel factory lay out and movement of workers and material - string diagram – man type flow process chart – multiple activity chart – travel chart – principle of motion economy – classification to movements – two-handed process chart – micro motion study – SIMO chart – Define, installs and maintain improved method.

WORK MEASUREMENT **9 hrs**

Work measurement: definition, purpose, procedure and uses – techniques of work measurement – work sampling: need and use time study – definition – basic time study equipment – time study forms – selecting the job, steps in making a time study – breaking the job into elements – sample size, timing card element – stop watch procedure - time study rating – calculation of standard time – setting time standards for work with apparel production machineries.

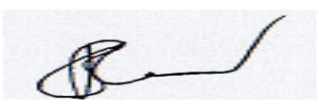
INDUSTRIAL ENGINNEERING **9 hrs**

Industrial engineering term in textile and apparel industry-role of industrial engineering in textile industry- methodology- benefits- tools and techniques-pre production activities- capacity study- operator performance fall offs-work in progress- operation bulletin- line balancing- steps in line balancing –efficiency-cycle checks-balancing tools- scientific method of training – Ergonomics and its concept in textile industry

APPLICATION OF WORKSTUDY **9 hrs**

Application of work study technique in optimizing work load in stitching activity in garment industry –Line Balancing techniques – comparative study of different manufacturing systems used in the garment production - group system, batch system – industrial system – productivity calculation in Stitching activity.

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



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CASE STUDY (any two)

1. Productivity Improvement in Garment Industry
2. Principle of Motion Economy
3. Method study and Time study for given operation

REFERENCES

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2. JaccoSolinger "Apparel Manufacturing Hand Book", Reinhold Co., 1998.
3. Juan CrloHiba "Improving working conditions and productivity in the garment industry" International Labour Organization, Geneva, 1998.
4. V.RameshBabu " Industrial Engineering in Apparel Production" Wood Head publishing India Ltd., ISBN 13:978-93-80308-17-3, 2012.
5. M.I.KHAN"Industrial Engineering"New age international, 2007
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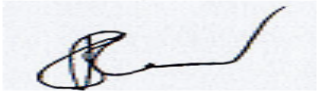

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U14TX*T*E82 **Project Preparation, Appraisal & Implementation**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Identify the suitable project and market demand analysis
CO2: Prepare the technical and financial analysis reports
CO3: Estimate the cost of production & working capital requirement
CO4: Evaluate the project and risk analysis
CO5: Implement the proposed project

Pre-requisites :

U14*TXT*701 Textile Project Management & Finance

CO/PO Mapping

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

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

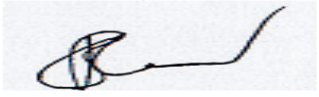
Course Assessment methods

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

PROJECT IDENTIFICATION, MARKET & DEMAND ANALYSIS **9 Hrs**

Overview – Capital expenditure, Phase of capital budgeting, Project development cycle, Objectives of investment, decision-making, Risk & return. Identification of investment opportunities – Governmental regulatory framework – Generation & screening of project ideas – Project identifications for an existing company.

Market & demand analysis – Information required for market & demand analysis – demand forecasting methods – market planning.



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TECHNICAL AND FINANCIAL ANALYSIS **9 Hrs**

Technical Analysis – Material inputs & utilities – Manufacturing process / technology – Plant capacity – location & site – structures & civil works – Machineries & equipments – Project charts & layouts – Work schedule – Need for tendering alternatives.

Financial Analysis – Cost of Project – Means of finance – Estimation of Sales & Production – Cost of production – Working capital requirement & financing – Profitability projections – Break even point – Project cost flow statements – Projected balance sheet – Multi – year projection.

PROJECT COST **9 Hrs**

Time value of money – Future value of single amount, Future value of an annuity –Present value of single amount – Present value of an annuity. Cost of Capital – Basic concepts – Cost of debt – cost of preference capital – cost of Equity Capital – Weighted average cost of capital – Marginal cost of capital-Cost of capital for a new company.

PROJECT APPRAISAL AND ANALYSIS OF RISK **9 Hrs**

Appraisal criteria – Urgency, Pay back period – Accounting, Debt service coverage ratio, Rate of Return, Net present value – Internal rate of return – Annual capital charge – Investment appraisal in practice.

Analysis of Risk – Types & measurement of project risk – Analytical derivation or simple estimation – Sensitivity Analysis – Scenario analysis – Selection of a project-Risk analysis in practice.

PROJECT IMPLEMENTATION & EVALUATION **9 Hrs**

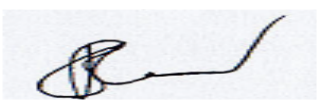
Project implementation – Forms of project organization – Project planning – project control – Human aspects of project management – Prerequisites for successful project implementation.

Review – Initial review, performance evaluation.

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

CASE STUDY (any two)

1. Productivity Improvement in Garment Industry
2. Principle of Motion Economy
3. Method study and Time study for given operation



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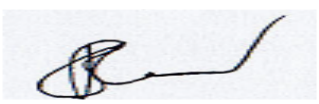
REFERENCES

1) Textile Project Management by A. Ormerod, The Textile Institute Publication.
2) Goal Directed Project Management by E.S. Andersen, K.V. Grude & Tor Hang, Coopers & Cybranl Publication.
3) Project, Planning Analysis, Selection Implementation & Review by Prasanna Chandra, Tata McGraw Hill Publishing Co. Ltd.,
4) Industrial Organisation & Engg. Economics T.R. Banga & S.C. Sharma,Khanna Publishers, Delhi.



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U14TX*T*E83 Environmental Management in Textile Industry

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Outline the sources of pollution

CO2: Examine the pollution problems in textile industry

CO3: Summarize the pollution control measures in textile industry

CO4: Describe environment management systems (EMS)

CO5: Choose eco-friendly dyes and chemicals in wet processing of fabric

Pre-requisites :

U14GST001 Environmental Science and Engineering

CO/PO Mapping

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

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

Course Assessment methods

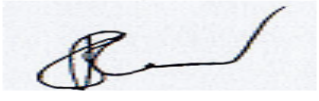
Direct	Indirect
1. Internal test I 2. Internal test II 3. Internal test III 4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	1. Course end survey

INTRODUCTION TO POLLUTION AND ITS SOURCES 9 hrs

Pollution and its impact on ecology, environment and society - Sources of pollution -Air, water, noise pollution in textile industry-Overview of pollutants and waste streams-hazardous waste-Waste categorization for the textile industry-Problems associated with waste-Importance of pollution control in textile industry.

POLLUTION IN SPINNING AND WEAVING 9 hrs

Air pollution in yarn and fabric manufacturing process-standards –causes-effects- health hazards associated with air pollution-pollution prevention



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measures-Noise pollution in various textile departments- standards - causes and effects- preventive measures-health hazards associated with noise pollution-Method of noise control in textile mills. Water pollution in slashing and sizing- water pollutants –causes and effects – remedial measures.

POLLUTION IN TEXTILE CHEMICAL PROCESSING 9 hrs

Pollutant associated with dyeing- Toxicity of dyes, intermediates, auxiliaries, finishing chemicals –causes and effects – health hazards associated with hazardous dyes and chemicals -Pollution prevention measures in dyeing–Emerging pollution prevention technologies-pollution in printing, finishing, garment manufacturing process – Pollution control and preventive measures.

EFFLUENT TREATMENT 9 hrs

Textile effluent and their characterization, measurement of effluent strength- BOD-COD-AOX-TDS- methods of effluent treatment: primary, secondary and tertiary treatments- disposal and recycling of effluents- Environment legislation in India and other countries with respect to dyes and other chemicals- Banned dyes and chemicals.

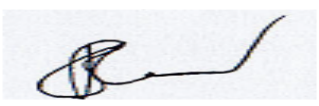
ENVIRONMENTAL MANAGEMENT 9 hrs

Organisation involved in pollution control-national & international-Waste Audit-Pollution prevention programme-Pollution control board, pollution norms -ISO 14000-Ecolabels-Organic Clothing-Eco-friendly garment processing-Environmental management, Study of polluted rivers and audit system-Pollution prevention case studies.

Theory: 45 Hours Tutorial: Hours Total: 45 Hours

CASE STUDY (any two)

1. Lack of awareness on air pollution caused by cotton dust among textile industry personnel. Do a case study.
2. Noise in the textile mill and its consequences. Do a case study.
3. Application of Eco-standards in chemical processing industry. Do a case study.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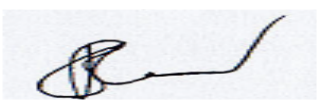
REFERENCES

1. Harold R, Park Ridge. N.J, "Pollution Control in the Textile Industry", Jones Noyes Data Corp., 1973.
2. Best Management Practices for Pollution Prevention in the Textile Industry –Manual by US Environmental Prevention Agency, 1996.
3. K.Slater, "Environmental Impact of Textiles" , Wood head publication,2003.
4. Pollution Prevention in Textile Industry manual by U.S EPA/SEMARNAP Pollution prevention work group, 1996.
5. S.C.Bhatia "Handbook of Industrial Pollution and Control (Vol. 1 & 2), CBS edition, 2002.
6. Peter I Norman and Roy Seddon , Low Moor, " Pollution Control in the Textile industry the chemical auxiliary manufacturer's role", Allied Colloids plc, Bradford , UK, Journal of Society of Dyers and Colourists, Volume 107 May/June 1991.
7. R.Senthil Kumar, "Cotton Dust-Impact on human health and environment in the textile industry", Textile Magazine, January 2008.
8. R.Senthil Kumar, "Noise pollution-A nuisance to Textile industry" , Asian Textile Journal, May 2008.



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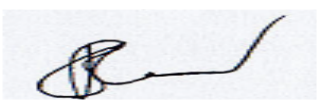
ELECTIVE VI



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U14GS*T*002 **Total Quality Management**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO 1: Understand quality concepts and philosophies of TQM

CO 2: Apply TQM principles and concepts of continuous improvement

CO 3: Apply and analyze the quality tools, management tools and statistical fundamentals to improve quality

CO 4: Understand the TQM tools as a means to improve quality

CO 5: Remember and understand the quality systems and procedures adopted

Pre-requisites :

1. Knowledge in quality and management

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

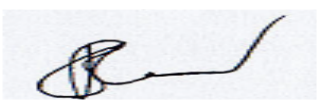
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1						M						
CO2												M
CO3					S							
CO4					S							
CO5		M										

Course Assessment methods

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

INTRODUCTION: **9 Hours**

Definition of Quality, Dimensions of Quality, Quality costs, Top Management Commitment, Quality Council, Quality Statements, Barriers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to TQM Implementation, Contributions of Deming, Juran and Crosby, Team Balancing

TQM PRINCIPLES: 9 Hours

Customer satisfaction – Customer Perception of Quality, Customer Complaints, Service Quality, Customer Retention, Continuous Process Improvement,5S, Kaizen, Just-In-Time and TPS

STATISTICAL PROCESS CONTROL: 9 Hours

The seven tools of quality, New seven Management tools, Statistical Fundamentals – Measures of central Tendency and Dispersion, Population and Sample, Normal Curve, Control Charts for variables and attributes, Concept of six sigma.

TQM TOOLS: 9 Hours

Quality Policy Deployment (QPD), Quality Function Deployment (QFD), Benchmarking, Taguchi Quality Loss Function, Total Productive Maintenance (TPM), FMEA

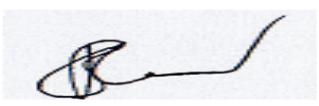
QUALITY SYSTEMS: 9 Hours

Need for ISO 9000 and Other Quality Systems, ISO 9001:2008 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 14001:2004

Theory : 45 Hours Total: 45 Hours

REFERENCES

1. Dale H.Besterfiled, “Total Quality Management”, Pearson Education, 2011.
2. James R.Evans & William M.Lidsay, “The Management and Control of Quality”, South-Western (Thomson Learning), 2008.
3. Feigenbaum.A.V. “Total Quality Management”, McGraw Hill,1991.



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4. Oakland.J.S. “Total Quality Management”, Butterworth – Hcinemann Ltd., Oxford,1989.
5. Narayana V. and Sreenivasan, N.S. “Quality Management – Concepts and Tasks”, New Age International, 2007.
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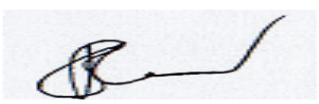

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U14GS*T*004 **Operations Research**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO 1: Apply linear programming model and assignment model to domain specific situations

CO 2: Analyze the various methods under transportation model and apply the model for testing the closeness of their results to optimal results

CO 3: Apply the concepts of PERT and CPM for decision making and optimally managing projects

CO 4: Analyze the various replacement and sequencing models and apply them for arriving at optimal decisions

CO 5: Analyze the inventory and queuing theories and apply them in domain specific situations.

Pre-requisites :

1. Knowledge in Mathematics

CO/PO Mapping

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

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

Course Assessment methods

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

LINEAR MODEL **9 Hrs**

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

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phase method), duality in simplex

TRANSPORTATION AND ASSIGNMENT MODELS 9 Hrs

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

PROJECT MANAGEMENT BY PERT & CPM 9 Hrs

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

REPLACEMENT AND SEQUENCING MODELS 9 Hrs

Replacement policies - Replacement of items that deteriorate with time (value of money not changing with time) – Replacement of items that deteriorate with time (Value of money changing with time) – Replacement of items that fail suddenly (individual and group replacement policies), Sequencing models- n job on 2 machines – n jobs on 3 machines – n jobs on m machines, Traveling salesman problem.

INVENTORY AND QUEUING THEORY 9 Hrs

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

Theory: 45 Hours Total: 45 Hours

REFERENCES

1. Taha H.A., "Operation Research", Pearson Education, Sixth Edition, 2003
2. Hira and Gupta "Introduction to Operations Research", S.Chand and Co.2002
3. Hira and Gupta "Problems in Operations Research", S.Chand and Co.2008
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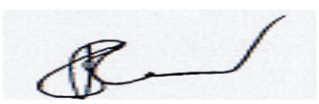

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U14GS*T*005 Engineering Economics and Financial Management

L	T	P	C
3	0	0	3

Course Outcomes

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

CO 1: Evaluate the economic theories, cost concepts and pricing policies

CO 2: Understand the market structures and integration concepts

CO 3: Understand the measures of national income, the functions of banks and concepts of globalization

CO 4: Apply the concepts of financial management for project appraisal

CO 5: Understand accounting systems and analyze financial statements using ratio analysis

Pre-requisites : NIL

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

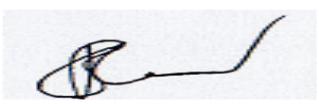
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1							M				S	
CO2											M	
CO3						M						
CO4											S	
CO5											S	

Course Assessment methods

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

ECONOMICS, COST AND PRICING CONCEPTS 9 Hrs

Economic theories – Demand analysis – Determinants of demand – Demand forecasting – Supply – Actual cost and opportunity cost – Incremental cost and sunk cost – Fixed and variable cost – Marginal costing – Total cost – Elements of cost – Cost curves – Breakeven point and breakeven chart – Limitations of break even chart – Interpretation of break even chart – Contribution – P/V-ratio, profit-volume ratio or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relationship – Price fixation – Pricing policies – Pricing methods

CONCEPTS ON FIRMS AND MANUFACTURING PRACTICES **9 Hrs**

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

NATIONAL INCOME, MONEY AND BANKING, ECONOMIC ENVIRONMENT **9 Hrs**

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

CONCEPTS OF FINANCIAL MANAGEMENT **9 Hrs**

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

ACCOUNTING SYSTEM, STATEMENT AND FINANCIAL ANALYSIS **9 Hrs**

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

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

REFERENCES

1. Prasanna Chandra, " Financial Management (Theory & Practice) TMH
2. Weston & Brigham, " Essentials of Managerial Finance"
3. Pandey, I. M., "Financial Management"
4. Fundamentals of Financial Management- James C. Van Horne.
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6. Management Accounting & Financial Management- M. Y. Khan & P. K. Jain
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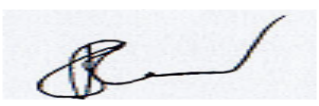

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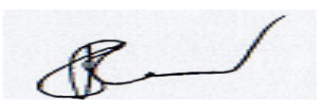
ELECTIVE VII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U14MC*E* 502 **Textile Mechatronics**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Explain the evolution of textile technology and manufacturing with textile fibers

CO2: Describe various process and machines involved in spinning

CO3: Explain various process and machines involved in weaving

CO4: Explain various stages of automation scopes in spinning and weaving

CO5: Explain role of computers in automated textile manufacturing

Pre-requisites : NIL

CO/PO Mapping

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

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

Course Assessment methods

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

INTRODUCTION TO TEXTILE TECHNOLOGY **4 Hours**

History of textile technology and its advancements, introduction to textile

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fibers, overview of textile manufacturing, Introduction to automation in textile industries.

BASICS OF SPINNING **8 Hours**

Spinning process flow chart – Objectives and process variables of textile spinning machineries: Mixing, Blow room, Carding, Draw frame, Combing, Speed frame, Ring frame, rotor spinning.

BASICS OF WEAVING **8 Hours**

Weaving process flowchart – Objectives and process variables in weaving preparatory: Winding, Warping, Sizing and beaming. Objectives and process variables in weaving: drawing in, knotting, denting and weaving.

BASICS OF PROCESSING **5 Hours**

Objectives and process variables in processing machines: Singeing, Desizing, Scouring, Bleaching, Mercerizing, Dyeing, Printing, Finishing.

AUTOMATION IN SPINNING MACHINERY **8 Hours**

Machinery material flow and its variation controls – Feeders & Stop motions – Auto levelers – Safety switches – Production and quality monitors – Full doff and pre-set length monitors. Data acquisition system for spinning preparatory, ring spinning – rotor spinning.

AUTOMATION IN WEAVING MACHINERY **8 Hours**

Yarn cleaner controls – Knotter / splicer carriage controls – Warping machine monitors and controls – sizing machine monitors and controls – Auto reaching / drawing in and knotting machine monitors and controls – Data acquisition system in weaving preparatory and weaving – humidification systems .

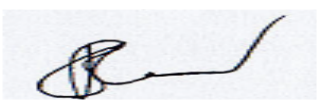
APPLICATIONS **4 Hours**

CAD / CAM / CIM in spinning, Weaving, Dyeing, Printing, Apparel production – Electronics data interchange - Robotics in textile industries

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

REFERENCES

1. Chattopadhyay R. (Ed), “Advances in Technology of Yarn Production”, NCUTE, IIT Delhi, 2002.
2. Oxtoby E “Spun Yarn Technology” butter worth’s, London, New Edition 2002.



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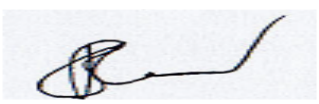
3. Lord P.R. and Mohammed M.H., “Weaving – Conversion of Yarn to Fabric”, Merrow Publication, 2001.
1. Krishna Kant, “Computer – Based Industrial Control”, PHI Learning Pvt Ltd, 2nd edition, New Delhi, 2011.
2. Venkatachalam. A and Ashok Kumar L, “Monograph on — Instrumentation & Textile Control Engineering” – 2005.
3. Berkstresser G A, Buchanan D R and Grady P, “Automation in the Textile Industry from Fibers to Apparel”, The Textile Institute, UK, 1995.
4. “Textiles Go On-line”, the textile Institute, UK, 1996.
5. Nalura B C. “Theory and Applications of Automation Controls” New Age International (P) Ltd Pub, 1998.
6. Ormerod A, “Modern Development in spinning and Weaving Machinery”, Butterworth’s, 1993.



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U14MC*E* 603 **Energy Management and Auditing**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Classify the importance of energy management and costing requirement. (K2)

CO2: Describe and apply the basic measurement, instruments for measuring various parameters in energy systems in energy auditing. (K2, K3)

CO3: Relate the significance of waste heat recovery systems and its consideration for improvement. (K2)

Pre-requisites : NIL

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

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

Course Assessment methods

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

ENERGY MANAGEMENT 9 Hours

Importance of Energy Management, Need of Energy Management, Scope of Energy Management, Energy Economics - Discount Rate, Payback Period, Internal Rate of Return, Life Cycle Costing

Direct use of Primary Energy Sources, Conversion of Primary into Secondary Energy Sources such as Electricity, Hydrogen, Nuclear energy.

Energy Conversion through Fission and Fusion, Nuclear Power Generation.

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ENERGY AUDITING **9 Hours**

Methodology with respect to Process Industries -Power Plants, Boilers. Characteristic Method Employed in Certain Energy Intensive Industries, Analysis of Past Trends (Plant Data), Closing the Energy Balance, Laws of Thermodynamics, Measurements, Portable and On Line Instruments.

THERMAL ENERGY **9 Hours**

Boiler – Efficiency Testing, Excess Air Control, Steam Distribution, Losses in Boiler, Methodology of Upgrading Boiler Performance ,Use - Steam Traps, Condensate Recovery, Flash Steam Utilization and Thermal Insulation.

ELECTRICAL ENERGY **9 Hours**

Energy Management Opportunities in Electrical Heating, Lighting System and Cable Selection. Demand Control, Power Factor Correction, Load Scheduling/Shifting, Motor –variable speed Drives-adjustable AC drives-Efficiency Testing- Speed Control. Energy Conservation in Pumps, Fans, Compressed Air Systems, Refrigeration & Air Conditioning Systems.

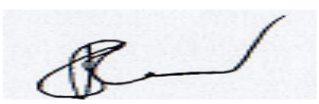
WASTE HEAT RECOVERY **9 Hours**

Recuperators, Regenerators, Heat Pipes, Heat Pumps, Cogeneration - Concept, Options (Steam/Gas Turbines/Diesel Engine based), Selection Criteria, Control Strategy. Heat Exchanger Networking - Concept of Pinch, Target Setting, Problem Table Approach, Composite Curves, Demand Side Management.

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

REFERENCES

1. CB Smith, “Energy Management Principles”, Pergamon Press, New York, 1981.
2. Hamies, “Energy Auditing and Conservation; Methods, Measurements, Management & Case Study”, Hemisphere, Washington, 1980.
3. Trivedi, PR, Jolka KR, “Energy Management”, Commonwealth Publication, New Delhi, 1997.



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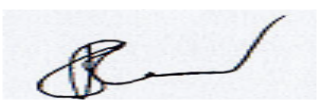
4. Institute of Fuel, London, “Waste Heat Recovery”, Chapman & Hall Publishers, London, 1963.
5. Sengupta Subrata, Lee SS EDS, “Waste Heat Utilization and Management”, Hemisphere, Washington, 1983.
6. “Handbook on Energy Efficiency”, TERI, New Delhi, 2001.
7. “Industrial Energy Conservation Manuals”, MIT Press, Mass, 2007.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U14AUTE28 **Technical Textiles for Automobiles**

L	T	P	C
3	0	0	3

Course Outcomes

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

CO1: Identify suitable textile materials for automobiles
CO2: Review of smart textile in automobiles
CO3: Discuss the various products in automobile by using textile
CO4: Design of textile reinforced composites for automobile
CO5: Apply the textile material in safety purpose in automobile

Pre-requisites :

1. Textile Fibres
2. Technical Textile

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

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

Course Assessment methods

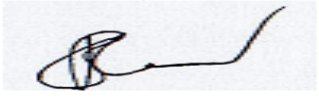
Direct	Indirect
1. Internal test I 2. Internal test II 3. Internal test III 4. Assignment/ Seminar/ Tutorial 5. End Semester Examination	1. Course end survey

AUTOMOTIVE TEXTILES **9 hrs**

Requirements for automotive textiles, design demands, woven & knitted ,non-woven fabrics used in automotive interiors, Recycling of automotive textiles –Future trends

SMART TEXTILES IN AUTOMOTIVE INTERIORS **9 hrs**

Car seats- Types of materials used as cushions. Technology for replacing polyurethane foams in car seats. Smart textiles: definition, textile sensors, textile actuators- heating fabrics for car interior, Shape memory alloys for car seats.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TRANSPORTATION TEXTILES **9 hrs**

Materials used in automobiles – tire cord, filter, air bag- future applications , belt, seat cover, acoustic textiles for noise insulation; Design and development of textile reinforced composites in automobile industry

AUTOMOTIVE TEXTILE STRUCTURES & COMPOSITES **9 hrs**

2D and 3D textile structures for load bearing applications in automobiles, future trends in applications of textile structures in automobiles, composite structural components

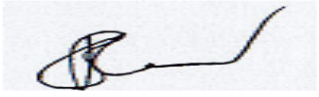
SAFETY APPLICATIONS & FUTURE TRENDS **9 hrs**

Recent developments in fibre/textile reinforcements used in tyres,fibre-rubber adhesion in tyres resent advances in tyre design

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

REFERENCES

1. R.Shishoo, Textile advances in the automotive industry, Woodhead Publishing Limited, Cambridge, England- 2008
2. A.R. Horrocks & S.C. Anand (Edrs.), "Handbook of Technical Textiles", The Textile Institute, Manchester, U.K., Woodhead Publishing Ltd., Cambridge, England, 2000.
3. S. Adanur "Wellington Sears Handbook of Industrial Textiles", Technomic Publishing Co. Inc., Lancaster, Pennsylvania, 1995.
4. S.K. Mukhopadhyay and J.F. Partridge, "Automotive Textiles", Text. Prog, Vol. 29, No.1/2, 1998.



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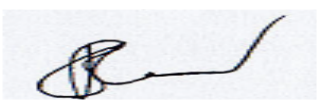
ONE CREDIT COURSE
(Industry Based)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U14TX*IN*01 **Work Study in Sewing Line**

L	T	P	C
1	0	0	1

Course Outcomes

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-requisites : -

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	S				S							
CO2	M			S								
CO3		S										

Course Assessment methods

Direct	Indirect
1. End Semester 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.

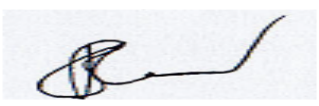
MICRO MOTION ANALYSIS: Applications for a basic garment style - case studies from different garment styles.

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.

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",



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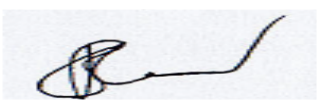
Blackwell Publishing, Oxford, UK, 2007.
3. Jacob Solinger, “Apparel Manufacturing Handbook, Analysis, Principles and Practice” Boblin Media Corp, Columbia, 2000.
4. Ruth E Glock, Grace I Kunz, “Apparel manufacturing – Sewn production Analysis”, Prentice hall Inc, New Delhi, 2000.
5. Kiell B.Zandin, “Maynard’s “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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U14TX*IN*02 **Retail Management**

L	T	P	C
1	0	0	1

Course Outcomes

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-requisites : -

CO/PO Mapping

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

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

Course Assessment methods

Direct	Indirect
1. End Semester Examination	1. Course end survey

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

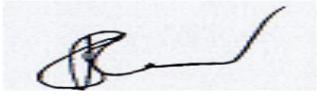
RETAIL OPERATIONS: Retail location strategy, product and Merchandise management, EDP/MIS, Logistics & SCM, Security measures, Footfalls / computerized methods & non computerized methods, Merchandising & Management - Fashion designing.

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

Total: 15 Hours

REFERENCES

1. Chetan Bajaj, Rajnish tuli , “Retail Management”, Oxford University Press, 2005.



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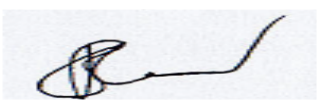
2. Ellen Diamond, “Fashion Retailing: Multi Channel Approach”, Prentice Hall, 2006.
3. James B Ayers, Mary, Ann Odegaard , “Retail Supply Chain Management”, Auer Bach Publishers,USA, 2008.



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U14TX*IN*03 **Fancy Yarns**

L	T	P	C
1	0	0	1

Course Outcomes

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-requisites : -

CO/PO Mapping

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

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

Course Assessment methods

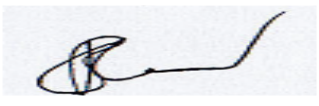
Direct	Indirect
1. End Semester Examination	1. Course end survey

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.

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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U14TX*IN*04 Erection and Commissioning of Textile Machines

L	T	P	C
1	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-requisites : -

CO/PO Mapping

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

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

Course Assessment methods

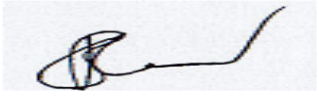
Direct	Indirect
1. End Semester Examination	1. Course end survey

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.

Total: 15 Hours

REFERENCES

1. LMW erection manuals and handouts



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U14TX*IN*05 Workload and Work Assignments

L	T	P	C
1	0	0	1

Course Outcomes

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

CO1: Define work load and work assignments

C02: Assign the workload in spinning, weaving, chemical processing, knitting and garment industries.

C03: Calculate the productivity in spinning, weaving and chemical processing

Pre-requisites : -

CO/PO Mapping

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

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

Course Assessment methods

Direct	Indirect
1. End Semester Examination	1. Course end survey

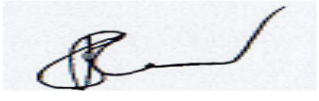
Definitions of Workload and Work assignment – multi-machine work assignment – interference.

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.

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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14TX*IN*06 **ERP in Textiles**

L	T	P	C
1	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-requisites : -

CO/PO Mapping (S/M/W indicates strength of correlation) S-Strong, M-Medium, W-Weak												
COs	Programme Outcomes(POs)											
	PO 1	PO 2	PO 3	PO 4	PO 5	PO 6	PO 7	PO 8	PO 9	PO 10	PO 11	PO 12
CO1	M	M										
CO2		M										
CO3		M		M								

Course Assessment methods

Direct	Indirect
1. End Semester Examination	1. Course end survey

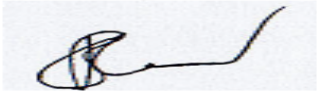
Fundamentals – Definitions and overview of ERP – advantages and limitations of ERP;

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.

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



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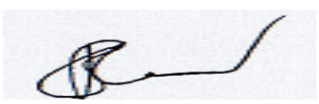
3. Information Age. New York: McGraw-Hill, 2002.
4. E. Monk and B. Wagner,Concepts in Enterprise Resource Planning (2nd ed.), Thomson Course Technology, Boston, 2006.
5. D. L. Olson, Managerial Issues of Enterprise Resource Planning Systems, New York: McGraw- Hill, 2004.
6. K. Sandoe, G. Corbitt and R. Boykin, Enterprise integration,Hoboken, NJ: John Wiley & Sons Inc., 2001



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U14TX*IN*07 **Export Documentation**

L	T	P	C
1	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-requisites : -

CO/PO Mapping

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

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

Course Assessment methods

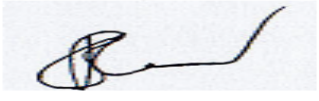
Direct	Indirect
1. End Semester Examination	1. Course end survey

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.

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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