

KUMARAGURU COLLEGE OF TECHNOLOGY

(Autonomous Institution Affiliated to Anna University, Chennai)

COIMBATORE – 641049

CURRICULUM AND SYLLABUS (REGULATIONS 2013)



3rd - 8th Semesters

B. Tech. TEXTILE TECHNOLOGY

KUMARAGURU COLLEGE OF TECHNOLOGY, COIMBATORE-641 049
DEPARTMENT OF TEXTILE TECHNOLOGY

Choice Based Credit System (Regulations 2013)

B. Tech. TEXTILE TECHNOLOGY

SEMESTER – III

Code No.	Course Title	L	T	P	C
THEORY					
U13MA7305	Probability and Applied Statistics	3	1	0	4
U13EET311	Basics of Electrical and Electronics Engineering	3	0	0	3
U13EIT306	Industrial Instruments and Process Control	3	0	0	3
U13CET311	Basics of Civil Engineering and Mechanics	3	0	0	3
U13TXT301	Manufactured Fibre Technology	3	0	0	3
U13TXT302	Yarn Manufacturing Technology I	4	0	0	4
PRACTICAL					
U13EEP311	Basics of Electrical and Electronics Engineering Lab	0	0	3	1
U13TXP301	Yarn Manufacturing Technology Laboratory I	0	0	3	1
U13EIP304	Industrial Instruments and Process Control	0	0	3	1
U13GHP301	Human Excellence Family Values	1	0	1	1

Total Periods: 31

Total Credits: 24

SEMESTER – IV

Code No.	Course Title	L	T	P	C
THEORY					
U13GST001	Environmental Science and Engineering	3	0	0	3
U13MA7401	Numerical Methods	3	1	0	4
U13MET406	Basics of Applied Mechanics and Thermal Engineering	3	1	0	4
U13TXT401	Automation in Textile Industry	3	0	0	3
U13TXT402	Yarn Manufacturing Technology II	4	0	0	4
U13TXT403	Woven Fabric Manufacturing Technology	4	0	0	4
PRACTICAL					
U13TXP401	Yarn Manufacturing Technology Laboratory II	0	0	3	1
U13TXP402	Woven Fabric Manufacturing Technology Laboratory	0	0	3	1
U13ENG401	Communication skill laboratory	0	0	3	1
U13GHP401	Human Excellence Professional Values	1	0	1	1

Total Periods: 33

Total Credits: 26

Semester V

Code No.	Course Title	L	T	P	C
THEORY					
U13TXT501	High Performance Fibres	3	0	0	3
U13TXT502	Textile Pretreatment and Colouration Technology	4	0	0	4
U13TXT503	Shuttleless Weaving Technology	3	0	0	3
U13TXT504	Mechanics of Textile Machinery	3	1	0	4
U13TXT505	Textile Quality Evaluation	4	0	0	4
U13TXT506	Physical properties of Textile fibres	4	0	0	4
PRACTICAL					
U13TXP501	Textile Pretreatment and Colouration Technology Laboratory	0	0	3	1
U13TXP502	Textile Quality Evaluation Laboratory	0	0	3	1
U13TXP503	In-Plant Training	1	0	1	1
U13GHP501	Human Excellence Social Values	1	0	1	1

Total Periods: 32

Total Credits: 26

Semester VI

Code No.	Course Title	L	T	P	C
THEORY					
U13TXT601	Woven Fabric Structure and Design	3	0	0	3
U13TXT602	Knitting Technology	4	0	0	4
U13TXT603	Textile Printing and Finishing Technology	4	0	0	4
U13TXT604	Garment Manufacturing Technology	3	0	0	3
U13TXT605	Nonwoven Technology	3	0	0	3
U13TXT606	Textile Project Management & Finance	3	0	0	3
PRACTICAL					
U13TXP601	Cloth Analysis Laboratory	0	0	3	1
U13TXP602	Knitting and Garment Laboratory	0	0	3	1
U13TXP603	Textile Printing and Finishing Technology Laboratory	0	0	3	1
U13GHP601	Human Excellence National Values	1	0	1	1

Total Periods: 31

Total Credits: 24

Semester VII

Code No.	Course Title	L	T	P	C
THEORY					
U13TXT701	Process Control in Textiles	3	1	0	4
U13TXT702	Technical Textiles	3	0	0	3
U13TXT703	Textile and Apparel Costing	3	0	0	3
U13GST008	Professional Ethics	3	0	0	3
U13TXTE01	Elective 1	3	0	0	3
U13TXTE02	Elective 2	3	0	0	3
PRACTICAL					
U13TXP701	Textile and Apparel CAD Laboratory	0	0	3	1
U13TXP702	Technical Textiles Laboratory	0	0	3	1
U13TXP703	Mini Project	0	0	2	1
U13GHP701	Human Excellence Global Values	1	0	1	1

Total Periods: 29

Total Credits: 23

Semester VIII

Code No.	Course Title	L	T	P	C
THEORY					
U13TXTE03	Elective 3	3	0	0	3
U13TXTE04	Elective 4	3	0	0	3
U13TXTE05	Elective 5	3	0	0	3
U13TXP801	Project	0	0	18	6

Total Periods: 27

Total Credits: 15

Total Credits: 185

ELECTIVES

ELECTIVE 1

Code No.	Course	L	T	P	C
U13TX7E101	Mechanical Processing of Man Made Fibres and their Blends	3	0	0	3
U13TX7E102	Pattern Making and Grading	3	0	0	3
U13TX7E103	Textile Composites	3	0	0	3
U13TX7E104	Theory of Drafting	3	0	0	3
U13TX7E105	Maintenance Management in Textile Mills	3	0	0	3
U13GS7004	Operations Research	3	0	0	3

ELECTIVE 2

U13TX7E201	Theory of Twisting	3	0	0	3
U13TX7E202	Organizational Behaviour	3	0	0	3
U13TX7E203	Texturizing Technology	3	0	0	3
U13TX7E204	Medical Textiles	3	0	0	3
U13TX7E205	Industrial Engineering in Textile Industry	3	0	0	3
U13GS7002	Total Quality Management	3	0	0	3

ELECTIVE 3

U13TX7E301	Energy Conservation in Textile Industry	3	0	0	3
U13TX7E302	Long Staple Spinning	3	0	0	3
U13TX7E303	Apparel Production Planning and Control	3	0	0	3
U13TX7E304	Structural Mechanics of Yarn	3	0	0	3
U13TX7E305	Smart Textiles	3	0	0	3
U13GS7005	Engineering Economics and Financial Management	3	0	0	3

ELECTIVE 4

U13TX7E401	Clothing Science	3	0	0	3
U13TX7E402	Garment Wet Processing	3	0	0	3
U13TX7E403	Apparel Quality Control	3	0	0	3
U13TX7E404	Structural Mechanics of Fabric	3	0	0	3
U13TX7E405	Marketing and Merchandising	3	0	0	3
U13GS7006	Product Design and Development	3	0	0	3

ELECTIVE 5

U13TX7E501	Advanced Knitting	3	0	0	3
U13TX7E502	Textile Product Engineering	3	0	0	3
U13TX7E503	Environmental Management in Textile Industry	3	0	0	3
U13TX7E504	Advances in Garment Processing Machinery	3	0	0	3
U13TX7E505	Computer Application in Textiles	3	0	0	3
U13TX7E506	Home Textiles	3	0	0	3

SEMESTER III

U13MAT305

**PROBABILITY AND APPLIED
STATISTICS**

L	T	P	C
3	1	0	4

Course Objectives

- Have a fundamental knowledge of statistical measures of central tendency and dispersion
- Have knowledge of basic probability concepts and random variables.
- Know about certain standard distributions.
- Test hypothesis regarding large samples and small samples
- Know about design of experiments and quality control

Course Outcomes

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

- Compute measures of central tendencies, dispersions and correlate the variables.
- Analyze random or unpredictable experiments and investigate important features of random experiments
- Construct probabilistic models for observed phenomena through distributions which play an important role in many engineering applications
- Analyze sample data and interpret the same for population.
- Sketch the control charts and outline the process capability

Course Content

STATISTICAL MEASURES

5 hrs

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

CORRELATION AND REGRESSION

4 hrs

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

PROBABILITY AND RANDOM VARIABLE

9 hrs

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 hrs

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 hrs

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 hrs

Analysis of Variance (ANOVA) – Completely Randomized Design (CRD) – Randomized

Block Design (RBD)– Latin Square Design (LSD).

STATISTICAL QUALITY CONTROL

5 hrs

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

L: 45 hr + T: 15 hr

Total Hours:60

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 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

U13EET211/ U13EET311	BASICS OF ELECTRICAL AND ELECTRONICS ENGINEERING	L	T	P	C
		3	0	0	3

Course Objectives

- To introduce the basic concept of Electrical and Electronics theory
- To introduce the basic working principles of machines
- To introduce the basic working of fundamental Electronics circuits

Course Outcomes

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

- The learners will acquire the knowledge of fundamental laws of electrical and electronics engineering.
- The students can state the definition of magnetic circuits.
- Students can choose suitable motor for desired application.
- The students have the ability to apply the fundamental laws of magnetic circuits to electrical machines.
- The learners can verify the truth table of digital logic gates.

Course Content

ELECTRIC CIRCUITS FUNDAMENTALS

9 hrs

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 hrs

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 stored in magnetic field – Magnetic Hysteresis.

AC-CIRCUITS

9 hrs

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 hrs

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.

9 hrs

ELECTRONIC CIRCUITS

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.

L: 45hrs

Total Hours:45

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 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

U13EI7306

**INDUSTRIAL INSTRUMENTS &
PROCESS CONTROL**

L	T	P	C
3	0	0	3

Course Objectives

- To understand the Basic Elements of Measuring Instruments.
- To Study the Characteristics of various types of Transducers.
- To Study the working Principle of different Electronic Instruments & Textile Instruments
- To Understand the Basic Components of Process Control System
- To Study in brief about PLC & DCS.

Course Outcomes

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

- Classify and describe Various transducers that are used for measuring various parameter like displacement, temperature, humidity, etc.,
- Identify and describe the basic Components of Process Control System.
- Compare the architecture of PLC & DCS.

Course Content

INSTRUMENT PRINCIPLES

9 hrs

Generalised Configuration and Functional Elements of Measuring Instrument - Null and Deflection Methods - Static Characteristics, Error, Accuracy Precision - Active and Passive Transducers.

MEASUREMENT OF NON ELECTRICAL PARAMETERS

9 hrs

Resistive potentiometer, strain gauge, Linear Variable Differential transformer - Inductive Transducer - Capacitance and Piezo electric transducers - Schemes for Measurement of Displacement, Force, and Pressure using the above Transducers - Measurement of Thickness and Humidity, Temperature measurement using Resistance Thermometer, Thermocouple and Thermistor.

ELECTRONIC & TEXTILE INSTRUMENTS

9 hrs

Digital Voltmeter - DMM- Digital Counters and Timers. Recorders: X-Y recorder, Magnetic Tape Recorders. A/D & D/A Converter. High Volume Fiber Tester - Evenness Tester - Single Yarn Strength Tester.

INTRODUCTION TO PROCESS CONTROL

9 hrs

Introduction to Control Systems: Process definition - Open and Closed Loop Control - Servo & Regulatory Control – Control System Components - Basic Principles of a Single Controller Loop – Two Position Control – PID Control – Pneumatic Actuation – Hydraulic Actuation – Electric Actuation.

PLC & DCS

9 hrs

Basics of PLC- Architecture of PLC-CPU, Memory and I/O modules- I/O devices of PLC- Programming Methods for PLC. Simple Sequential Logic Circuit Design- Distributed Control System- Architecture. Applications of PLC and DCS in Textile Machinery.

L: 45hrs

Total Hours:45

REFERENCES

1. Sawhney.A.K, “A course in Electrical and Electronics Measurements and Instrumentation, DhanpatRai and Sons, New Delhi, 1981.
2. Doebelin E O, “Measurement System : Application and Design”, Mc.Graw Hill Pub., New York, 1995.
3. John E Webb, Ronald Areis, “Programmable Logic Controllers: Principles and Applications”, Prentice Hall of India,4th Edition,1999.
4. Krishna Kant, “Computer – Based Industrial Control”, PHI Learning Pvt Ltd, 2nd edition, New Delhi, 2011.
5. Berkstresser G.A, Buchanan D.R and Grady P, “Automation in Textile Industry from Fibres to Apparel”, The Textile Institute, UK, 1996.
6. Venkatachalam A and Ashok Kumar L, “Instrumentation and Textile Control Engineering”, PSG Tech Book Depot, 2007.

U13CE7311	BASICS OF CIVIL ENGINEERING AND	L	T	P	C
	MECHANICS	3	0	0	3

Course Objectives

- To make the students aware of properties of building materials, surveying methods and effects of different types of forces on structures.

Course Outcomes

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

- understand the principle of Surveying methods
- have knowledge on properties of building materials and identify good quality materials for construction.
- acquire knowledge on stress, strain and elastic constants.
- analyse determinate structures and find the bending moment and shear force under the system of loads.
- solve bending and torsion problems

Course Content

SURVEYING AND CIVIL ENGINEERING MATERIALS 9 hrs

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 hrs

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 hrs

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 hrs

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 hrs

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.

L: 45hrs

Total Hours:45

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

U13TX7301	MANUFACTURED FIBRE TECHNOLOGY	L	T	P	C
		3	0	0	3

Course Objectives

- Basic concepts about Regenerated and Bicomponent Fibre manufacturing
- Basic concepts about Synthetic Fibre manufacturing

Course Outcomes

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

- To understand the manufacturing process various of synthetic fibres
- To get exposure about concepts of polymer production
- To get competence in the manmade fibre characterization techniques
- To obtain exposure above various post spinning operations preferred in man made fibre.

Course Content

INTRODUCTION

9 hrs

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 hrs

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

POLYESTER, NYLON AND POLYOLEFIN FIBRES

9 hrs

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 hrs

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 hrs

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.

L: 45hrs

Total Hours:45

REFERENCES

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

CASE STUDY:

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.

Course Objectives

- To know the design, constructional features and working principles of spinning preparation machines – ginning machinery, blowroom, card, comber, drawframe and speed frame
- To educate on the processing of different types of fibres and their blends according to the specifications and needs of the customers

Course Outcomes

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

- Outline the process flow of the yarn manufacture
- Estimate the yarn realization of a spinning factory
- Analyze the material unevenness to find out the reason
- Infer the influence of process parameter with yarn quality
- Calculate the production as well as draft of all the spinning machine

Course Content

GINNING AND BLOW ROOM

9 hrs

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

CARDING

9 hrs

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

DRAWFRAME

9 hrs

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

9 hrs

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

SPEED FRAME**9 hrs**

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.

L: 45hrs**Total Hours:45****REFERENCES**

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

CASE STUDY:

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

U13EEP211/	BASICS OF ELECTRICAL AND	L	T	P	C
U13EEP311	ELECTRONICS ENGINEERING LAB	0	0	3	1

Course Objectives

- To experimentally verify the principle of operation, performance characteristics of DC Motors and AC Motors.
- To obtain the characteristics of electronic devices and its applications

Course Outcomes

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

- Understand and verify the breadboard connections.(knowledge level-1)
- Check the working condition of a cathode ray oscilloscope. (knowledge level-1)
- Understand the basic laws of electric circuits. (knowledge level-1)
- Understand the working of various electronic devices. (knowledge level-1)
- Understand the performance of an amplifier to carryout different operations.
(Knowledge level-1)

List of Experiments

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

Total Hours:45

U13TXP301

**YARN MANUFACTURING
TECHNOLOGY LABORATORY I**

L	T	P	C
0	0	3	1

Course Objectives

- To know the constructional features and working principles of spinning preparatory machines
- To experimentally verify the processing of different types of fibres and their blends according to the specifications and calculate the speed of the machines

Course Outcomes

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

- To identify the key components of the machine
- To assemble the main parts of the machine
- To calculate the production and speed of all the machine
- To outline the main gearing diagram of the machine

List of Experiments

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 comb.
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.

Total Hours:45

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.

U13EIP304

**INDUSTRIAL INSTRUMENTS &
PROCESS CONTROL LABORATORY**

L T P C

0 0 3 1

Course Objectives

- To experimentally verify the principle & characteristics of various transducers.
- To experimentally analyze the closed loop response of different process variables.
- To experimentally implement simple logics using PLC.

Course Outcomes

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

- Demonstrate the performance characteristics of various transducers and infer their behavior.
- Demonstrate the closed loop behavior of different process variables like level, temperature for set point changes and load changes.

LIST OF EXPERIMENTS

1. Loading Effect of Potentiometer
2. Strain gauge & Load Cell Characteristics
3. Characteristics of LVDT
4. Characteristics of Thermocouple
5. Characteristics of Thermistor
6. Characteristics of RTD
7. Capacitive Transducer & Piezoelectric Transducer
8. Humidity Measurement
9. Implementation of Simple Sequential Logics Using PLC
10. Implementation of Controller for Level & Temperature Process.

Total Hours:45

Course Objectives

- To inculcate the basic need for family life and peace in it.
- To lead spiritual development through good family life.
- To respect womanhood and live disease free life.
- To live with sound health.
- To reach Intuition.

Course Outcomes

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

- Develop skills in maintaining harmony among the family members.
- Acquire skills in traditional yogasanas leading to sound health.
- Behaves as a family member and leading to a blissful family life.
- Learnt Food is Medicine.

Course Content**RESTRAINT IN FAMILY****4 hrs**

Definition - Greatness of life force & mind. Introduction - Kayakalpa yoga -aim - maintaining youthfulness – sex & spirituality – ten stage of mind – mental frequency-method of concentration – kayakalpa philosophy - physical body – sexual vital fluid – life force – bio-magnetism - mind –food transformation into seven minerals – postponing the ageing process – death – importance of kayakalpa training.

SPIRITUAL DEVELOPMENT THROUGH GOOD FAMILY LIFE **4 hrs**

Kayakalpa exercise – methods –aswinimudhra – ojus breathing – explanations – benefits – practices – Responsibility of men and women – introduction a good education – need of morality – spiritual development. Revision of previous physical exercises. Introduction – hints & caution – body massaging – accu-pressure –relaxation.

PEACE IN FAMILY**4 hrs**

Family value – meaning – Introduction – values – benefits of blessings – effect of vibrations – make blessings a daily habit – greatness of friendship – individual & family peace – reason for misunderstanding in the family – no comment – no command – no demand – no ego – peace of mind.

GREATNESS OF WOMANHOOD & FOOD IS MEDICINE**4 hrs**

Good–cultured behavioral patterns – love and compassion - Greatness of womanhood – Food is medicine (healthy food habits)

SIMPLIFIED PHYSICAL EXERCISES**7 hrs**

Simplified physical exercises – Kaya Kalpa Yoga (Benefits related to the Patient, Tolerance, Sacrifice)

MEDITATION &YOGASANAS

7 hrs

Thuriya meditation – introduction – practice – benefits. Asanas– ashtanga yoga – pathanjali maharishi –hints & cautions – posture - movement – involvement – standing asanas: thadasana – ekapathasana – chakrasana(side) – uthkatasana – trikonasana. Sittingasanas: thandasana – padmasana – vajrasana – suhasana – siddhasana – parvathasana – yogamudhra. Downward lying asanas: makkarasana – bhujangasana – salabhasana –navukasana– dhanurasana. Upward lying asanas: savasana - arthapavanamukthasana– pavanamukthasana – utthanapathasana – navasana& Surya namaskara.

Total Hours:30

REFERENCES

- | | |
|--|---------------------------|
| 1. Yoga for Modern Age | ---- Vethathiri Maharishi |
| 2. The Man making Messages | ---- Swami Vivekananda |
| 3. Manavalakalai Part- 1&2&3 | ---- Vethathiri Maharishi |
| 4. Value Education for Health & Happiness and Harmony. | ---- Vethathiriyam |

SEMESTER III

U13GST001	ENVIRONMENTAL SCIENCE AND ENGINEERING	L	T	P	C
		3	0	0	3

(Common to all branches of Engineering and Technology)

Course Objectives

- At the end of this course the student is expected to understand what constitutes the environment, what are precious resources in the environment, how to conserve these resources, what is the role of a human being in maintaining a clean environment and useful environment for the future generations and how to maintain ecological balance and preserve bio-diversity.

Course Outcomes

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

- Play a important role in transferring a healthy environment for future generations
- Analyse the impact of engineering solutions in a global and societal context
- Discuss contemporary issues that results in environmental degradation and would attempt to provide solutions to overcome those problems
- Ability to consider issues of environment and sustainable development in his personal and professional undertakings
- Highlight the importance of ecosystem and biodiversity
- Paraphrase the importance of conservation of resources

Course Content

INTRODUCTION TO ENVIRONMENTAL STUDIES AND 10 hrs NATURAL RESOURCES

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 hrs

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 hrs

Definition – Causes, effects and control measures of: (a) Air pollution (b) Water pollution (c) Soil pollution (d) Marine pollution (e) Noise pollution (f) Thermal pollution (g) Nuclear hazards – 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 hrs

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 hrs

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.,

L: 45hrs

Total Hours:45

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 Edition.
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 Publications.

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

Course Objectives

- To understand concepts of pseudocode and various errors.
- To solve algebraic, transcendental and system of linear equations by using various techniques.
- To understand the concepts of curve fitting, interpolation with equal and unequal intervals.
- To understand the concepts of numerical differentiation and numerical integral by various methods.
- To solve the ordinary differential equations with initial condition by numerical techniques.
- To solve the partial differential equations using numerical techniques.

Course Outcomes

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

- Solve a set of algebraic equations representing steady state models formed in engineering problems
- Fit smooth curves for the discrete data connected to each other or to use interpolation methods over these data tables
- Find the trend information from discrete data set through numerical differentiation and summary information through numerical integration
- Predict the system dynamic behaviour through solution of ODEs modeling the system
- Solve PDE models representing spatial and temporal variations in physical systems through numerical methods.
- Have the necessary proficiency of using MATLAB for obtaining the above solutions.

Course Content**INTRODUCTION****2 hrs**

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 hrs**

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 hrs**

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 hrs**

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 hrs**

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)**13 hrs**

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

Use of MATLAB Programs to workout solutions for all the problems of interest in the above topics.5

L+T : 45+15**Total Hours:60****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.
5. Kandasamy P., Thilagavathy K. and Gunavathy K., “Numerical Methods”, S.ChandCo. Ltd., New Delhi, 2007.

U13MET406	BASICS OF APPLIED MECHANICS AND	L	T	P	C
	THERMAL ENGINEERING	3	1	0	4

Course Objectives

- To understand the working of various mechanisms and heat engines.
- To construct the layout of plate cam profiles.
- To calculate speed in gear trains
- To know the working of refrigeration systems.

Course Outcomes

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

- Define various components of mechanisms and construct CAM profile for the specific follower motion.
- Calculate the speed and number of teeth in gear trains and explain the working principle of IC engines.
- Describe the working principle of refrigeration and air conditioning systems.

Course Content

BASICS OF MECHANISMS

9 hrs

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 hrs

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

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

GEAR TRAINS

9 hrs

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 hrs

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 hrs

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

L: 45 T: 15

Total Hours:60

REFERENCES

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

U13TX7401	AUTOMATION IN TEXTILE INDUSTRY	L	T	P	C
		3	0	0	3

Course Objectives

- To gain knowledge about industrial automation
- To get exposure on textile control systems

Course Outcomes

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

- Learn various control system
- Summarize the various control systems used in textile industry
- Examine the textile machine and suitable control systems

Course Content

INDUSTRIAL AUTOMATION

6 hrs

Introduction, Integration, material handling Systems - Simple systems for motions by electrical and mechanical devices - Mechanical design for automatic feeding assembly and transfer lines.

BUILDING BLOCKS OF AUTOMATION SYSTEM

12 hrs

Control Module - Supervisory Control and Data Acquisition Systems - Channel Scanning - Conversion to Engineering - Data Processing - Distributed SCADA System - Remote Terminal Unit - Input/output and Communication Module - Display parameters - Displays in process control environment – principle - computer graphic generation - interfacing graphics - Reliable System Development Strategy.

CONTROL SYSTEM AND AUTOMATION IN SPINNING

9 hrs

MACHINERY

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.

CONTROL SYSTEM AND AUTOMATION IN WEAVING

12 hrs

MACHINERY

Yarn cleaner controls – knotter/splicer carriage controls – pre set/full cone motors - 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

6 hrs

CAD/CAM/CIM in spinning, Weaving, Dyeing, Printing, Apparel production - Electronic data interchange and E- Com - Robotics in textile industries.

L: 45HRS

Total Hours:45

REFERENCES

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” – Nov 05
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”, Butterworths, 1993.

U13TX7402

**YARN MANUFACTURING
TECHNOLOGY II**

L	T	P	C
4	0	0	4

Course Objectives

- To know the design, constructional details and working principles of spinning machines (ring frames, alternative spinning systems and post spinning machinery)
- To educate the inter-relationship of the process of conversion of fibres to yarns and the related machinery features

Course Outcomes

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

- Explain the basic principles of different spinning system
- Compare the basis principle of different spinning system
- Plan the outline spinning system based on end use applications
- Calculate the production as well as draft of all the spinning systems

Course Content

RING FRAME

12 hrs

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

COMPACT SPINNING

12 hrs

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

12 hrs

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

12 hrs

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.

12 hrs

DOUBLING AND FANCY YARN PRODUCTION

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.

L: 45 T: 15

Total Hours:60

REFERENCES

1. Gowda R.V.M., "New Spinning Systems", NCUTE, IIT Delhi, 2003.
2. Ishtiaque, S.M., Salhotra K.R. and Gowda R.V.M., "Friction Spinning", Textile Progress, Vol. 33, No.2, Textile Institute, U.K., 2001
3. Chattopadhyay R. (Ed)., "Advances in Technology of Yarn Production", NCUTE, IIT Delhi, 2002.
4. Lawrence C.A. and Chen K.Z., "Rotor Spinning", Textile Progress, Vol. 13, No.4, Textile Institute, U.K., 1981.
5. Basu A., "Progress in Air-jet Spinning", Textile Progress, Vol. 29, No.3, Textile Institute, U.K., 1997.
6. Oxtoby E., "Spun Yarn Technology" Butterworths, London 1983.
7. W.Klein, "New spinning systems", The Textile Institute Manchester, U.K. 1993.

CASE STUDY

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.

U13TX7403

**WOVEN FABRIC MANUFACTURING
TECHNOLOGY**

L	T	P	C
4	0	0	4

Course Objectives

- To gain knowledge about various preparatory processes to weaving.
- To understand the loom timing diagram and various mechanisms in the loom.

Course Outcomes

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

- Outline the process flow for woven fabric manufacturing
- Explain the various mechanisms involved in woven fabric manufacturing
- Prepared the patter card for various fabric designs (Both warp and weft pattern)
- Examine the fabric flaws and troubleshooting the problems
- Create the new designs in woven fabric manufacturing

Course Content

WINDING

12 hrs

Objectives of winding, Geometry of cone winding. Classification of winders. Working principles of automatic winders-Tensioner & Slub catcher-knotters and splicers. Winding drums - anti-ribboning device - Package defects, causes and remedies. Types and working principles of pirn winding machines. Pirn types and dimensions. Pirnbunching. Pirn winding defects causes and remedies. Production calculations of cone and pirn winders.

WARPING& SIZING

12 hrs

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 calculations.

WEAVING - INTRODUCTION

12 hrs

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

12 hrs

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

12 hrs

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.

L: 45 T: 15

Total Hours:60

REFERENCES

1. Lord P.R. and Mohammed M.H., “Weaving – Conversion of Yarn to Fabric”, Merrow Publication, 2001.
2. Adanur S., “Handbook of Weaving”, Woodhead Publishing Limited, 2001.
3. Sriramulu P.K., Ajgaonkar D.B. & Talukdar M.K., “Weaving Machines: Mechanisms, Management”, Mahajan Publishers, Ahmedabad, 1998.
4. Modi J.R.D., “Sizing Ingredients”, Mahajan Publications, Ahmedabad
5. Booth J.E., “Textile Mathematics”, Vol. II & III, Textile Institute, Manchester, U.K., 1975.
6. Sengupta E., “Yarn Preparation”, Vol. I & II, Popular Prakasam, Bombay, 1970.
7. “Woven fabric production – I”, Quality CBT & course material from NCUTE, 2002.
8. “Woven fabric production – II”, Quality CBT & course material from NCUTE, 2002.

CASE STUDY:

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. Analyse the classmate fault report in winding machine
5. Occurrences of shuttle fly out and remedial measures

U13TXP401	YARN MANUFACTURING TECHNOLOGY	L	T	P	C
	LABORATORY II	0	0	3	1

Course Objectives

- To experimentally know the design, constructional details and working principles of spinning machines
- To educate the inter-relationship of the process of conversion of fibres to yarns and the related machinery features

Course Outcomes

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

- To calculate the production and speed of all the machine
- To outline the main gearing diagram of all the machine
- To identify the key components of the machine

LIST OF EXPERIMENTS

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

Total Hours:45

CREATIVE EVALUATION (Any Two)

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

U13TXP402

**WOVEN FABRIC MANUFACTURING
TECHNOLOGY LABORATORY**

L	T	P	C
0	0	3	1

Course Objectives

- To experimentally gain knowledge about various preparatory processes to weaving.
- To experimentally understand the loom timing diagram and various mechanisms in the loom.

Course Outcomes

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

- Outline the process flow for woven fabric manufacturing
- Summarize the working principle of various mechanisms involved in woven fabric manufacturing
- Change the settings of various mechanisms involved in weaving preparatory and weaving machines
- Assemble the dismantled parts of the mechanisms in weaving machine
- Describe the importance of each part in weaving preparatory and weaving machines

LIST OF EXPERIMENTS

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

Total Hours:45

CREATIVE EVALUATION (Any Two)

- Design and development of shedding tappet for plain weave using wooden block
- Design and development of shedding tappet for twill weave using wooden block
- Preparation of pegging pattern for a given design for dobby loom
- Preparation of pattern card for a given design for jacquard loom

Course Objectives

- To equip students of engineering and technology with effective speaking and listening skills in English
- To help them develop their soft skills and people skills, which will make the transition from college to workplace smoother and help them to excel in their jobs and to enhance students' performance at Placement Interviews, Group discussions and other recruitment exercises

Course Outcomes

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

- Imparting the role of communicative ability as one of the softskills needed for Placement
- Developing communicative ability and softskills needed for placement
- Making students Industry-Ready through inculcating team-playing capacity

Course Content**ENGLISH LANGUAGE LAB**

Listening Comprehension: Listening – Listening and sequencing of sentences – Filling in the Blanks – Listening and answering the question

Reading Comprehension and Vocabulary: Filling in the blanks – Cloze Exercises – Vocabulary building – Reading and Answering questions

Speaking: Intonation – Ear Training – Correct Pronunciation – Sound Recognition exercises – Common Errors in English

Conversations: Face to face Conversation – Telephone conversation - Role play Activities (Students take on roles and engage in conversation)

CAREER LAB

Resume / Report Preparation / Letter Writing: Structuring the resume / report – Letter writing / E-mail communication – Samples

Presentation Skills: Elements of an effective presentation – Structure of a presentation – Presentation Tools – Voice Modulation – Audience analysis – Body Language

SOFT SKILLS

Time Management – Articulateness – Assertiveness – Innovation and Creativity – Stress Management & Poise

GROUP DISCUSSION

Why is GD part of the selection process? – Structure of a GD- Moderator-led and Other GDs – Strategies in GD – Team work – Body Language –Mock GD

INTERVIEW SKILLS

Kinds of Interviews –Required Key Skills – Corporate culture- Mock Interviews

REFERENCES

1. Meenakshi Raman and Sangeetha Sharma, Technical Communication- Principles and Practice, Oxford University Press. New Delhi (2004)
2. Barker. A – Improve your communication skills – Kogan page India Pvt Ltd. New Delhi (2006)
3. Adrian Doff and Christopher Jones- Language in Use (Upper- Intermediate). Cambridge University Press. First South Asian Edition (2004)
4. John Seely, the Oxford Guide to writing and speaking, Oxford University Press, New Delhi (2004)

CDs:

1. Train2sucess series 1.Telephone Skills.2. Interviewing Skills 3. Negotiation Skills by Zenith Global Consultants Ltd. Mumbai
2. BEC Series
3. Look Ahead by Cambridge University Press

U13GHP 401**PROFESSIONAL VALUES****L T P C**

(Common to all branches of Engineering and Technology)

1 0 1 1**Course Objectives**

- To know the 5 Cs (Clarity, courage, confidence, commitment, compassion)
- To Know the 5 Es(Energy, Enthusiasm, Efficiency, Enterprise, Excellence)
- To Practice the IQ Questions and given to the result
- To Learn about Professional Ethics
- To know the examples for Self Control

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

- Acquire knowledge on the Clarity, courage, confidence, commitment, compassion for a good Professionalize
- Demonstrate Skills of IQ test
- Contribute to the better Management of Time
- Behave a good Professionalism from Quality Enhancement

Course Content**PERSONALITY CONCEPTS - 5C'S & 5E'S****5 hrs**

Personality-concepts, definition,-types of personality-personality development activities- how to develop a good personality factors affecting personality development tools of improve personality-steps to a dynamic personality-5 C's and 5 E's.

TIME MANAGEMENT**5 hrs**

Self-development – importance of self development – how to develop oneself – continuous learning – laser focus +persistence – working a plan – sound mind follows sound body – complete responsibility – practice – those who make it, made it – never give-up – meditation – ten commandments of self development – self control technique for teenagers.

LEADERSHIP TRAITS**5 hrs**

Leadership traits – style – factors of leadership – principles of leadership - time management – importance of time management – benefits – top five time sucks of the average Human –time management for college students. Passion for excellence – what is passion? – Why passion? – Value of life – index of life – fuel for fulfillment – secret of physical & spiritual fitness – improves learning ability.

EMPOWERMENT OF MIND**5 hrs**

IQ, - Factors affecting the intelligence quotient – IQ and the brain – sex – race – age – relationship between IQ & intelligence – how to develop good intelligence quotient power – exercise can improve IQ – food plan to increase IQ – meditation – reading – playing – try right with opposite hands – learn new things - the IQ tests. EQ – emotional Intelligence – list positive & negative emotions. SQ – spiritual quotients – definition – basic science of spiritual quotient – how to build SQ? – Relationship between IQ, EQ, SQ.

MEDITATION**3 hrs**

Panchendhriya meditation – Introduction – practice – benefits.

SIMPLIFIED PHYSICAL EXERCISE & YOGASANAS**7 hrs**

Asanas – revision of previous asanas–standing asanas: natarasana –virabhadrasana – pathangusthasana– ardhachandrasana–utthithatrikonasana–parsvakonasana.

Total Hours:30**REFERENCES**

1. Personality & Self Development –ICFAI University
2. Leadership-Dr.A Chandra Mohan
3. Intelligence-Swami Vivekananda
4. Ways to make every second valuable-Robert W. Bly
5. Manavalkalai Part-II-Vethathiri Maharishi
6. Professional Ethics& Human Values-D.R Kiran&S.Bhaskar
7. Extraordinary performance from ordinary people- Keith Ward& Cliff Bowman,
8. Mind-Vethathiri Maharishi.
9. Manavalkalai Part-I-Vethathiri Maharishi,
10. Self Cotrol-Russell Kelfer

SEMESTER V

U13TX7501

HIGH PERFORMANCE FIBRES

L	T	P	C
3	0	0	3

Course Objectives

- To gain knowledge on high performance fibres.
- To understand the production process of high performance fibres.
- To get exposure on recent developments of fibres.

Course Outcomes

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

- List the high performance fibres
- State the application of high performance fibre
- Summarize the manufacture methods of high performance fibre
- Explain the working of fibre forming techniques
- Choose the appropriate polymers and auxiliary chemicals in fibre formation

Course Content

ARAMID AND SULPHUR BASED FIBRES

9 hrs

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

CARBON AND GLASS FIBRES

9 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.

L: 45hrs

Total Hours:45

REFERENCES

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

CASE STUDY

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

U13TX7502

**TEXTILE PRETREATMENT AND
COLOURATION TECHNOLOGY**

L	T	P	C
4	0	0	4

Course Objectives

- To gain knowledge about various pretreatment process given to textile material.
- To understand the different dyeing principles.
- To understand the different machineries available for treating the textile materials

Course Outcomes

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

- Outline the process flow for cotton fabric processing
- Explain the various methods involved in grey fabric processing
- Prepare the dye recipe for colouring the various fibre/ fabric
- Examine the colour fastness of the dyed fibre/ fabric
- Explain the working principles of various dyeing machines

Course Content

SINGEING, DESIZING AND SCOURING

12 hrs

Introduction: 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. 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 hrs

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 hrs

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 hrs

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 hrs

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.

L: 45 T: 15

Total Hours:60

REFERENCES

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

CASE STUDY:

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 Finishing industry.

U13TX7503

**SHUTTLELESS WEAVING
TECHNOLOGY**

L	T	P	C
3	0	0	3

Course Objectives

- To gain knowledge about various modern weaving principles and machineries.
- To understand the different weft insertion principles.
- To know about high speed weaving

Course Outcomes

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

- Outline the process flow of the fabric formation
- Classify the Weaving machines based on developments
- Summarize the working of each elements in unconventional weaving machines
- Generalized the weft insertion cycle of unconventional weaving machines
- Calculate the WIR and production rate of the weaving machine

Course Content

INTRODUCTION

9 hrs

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

PROJECTILE LOOMS

9 hrs

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 hrs

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 hrs

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 hrs

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. Modifications required in the machine for filament yarns. Fabric defects and remedies in multiphase looms. Special jacquards.

L: 45hrs

Total Hours:45

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.

CASE STUDY:

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

U13TX7504	MECHANICS OF TEXTILE MACHINERY	L	T	P	C
		3	1	0	4

Course Objectives

- To gain knowledge about various design concepts on shedding tappets, speed frame cone drums and ring frame shaper cams.
- To know about power transmissions
- To acquire knowledge about application of principle of moments on various textile machineries

Course Outcomes

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

- Define the importance of gear and belt drives
- Express the relationship between tensions in belt drives and also the condition for maximum power transmission
- Design the profiles of cone drums used in speed frames as well as scutcher, plain and twill tappets and ring frame builder motion cams
- Calculate the picking force, shuttle velocity and acceleration in weaving machines
- Justify the use of kinetic energy, potential energy and principle of moments in textile industry
- Use the equations of motions in textile applications
- Explain the importance of friction in textile applications
- 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

Course Content

DRIVES

12 hrs

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

12 hrs

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

12 hrs

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

12 hrs

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

VFRICTION, BRAKES AND CLUTCHES

12 hrs

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.

L: 45 T: 15

Total Hours:60

REFERENCES

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

CASE STUDY:

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.

Course Objectives

- To impart knowledge on various testing methods of textiles
- To get knowledge about the quality parameters
- To attain knowledge on various factors influencing quality parameters
- To gain knowledge about application of statistical tools in testing.

Course Outcomes

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

- Describe the concepts of quality and statistical application in textiles
- Explain the sampling methods carried out in testing
- Calculation of maturity, fineness, crimp, yarn numbering system, evenness, hairiness
- Summarize the working Principle of all testing instruments of fibre, yarn & fabric
- Generalize the advanced testing instruments

Course Content**INTRODUCTION TO QUALITY****12 hrs**

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

FIBRE TESTING**12 hrs**

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 hrs**

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 hrs

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 significance. 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

12hrs

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

L: 45 T: 15

Total Hours:60

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.

CASE STUDY:

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.

U13TX7506	PHYSICAL PROPERTIES OF TEXTILE	L	T	P	C
	FIBRES	4	0	0	4

Course Objectives

- To gain knowledge about the physical, moisture and electrical properties of various fibres.
- To impart knowledge about thermal & friction properties of various fibres.

Course Outcomes

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

- Outline the fundamentals of fibre structures and various properties of fibres
- Interpret the relationship between various parameters and the properties of fibres
- Explain about the concepts of fibre structures and various properties of fibres
- Estimate the important parameters of fibre properties
- Discuss about the measurement of fibre properties

Course Content

STRUCTURE OF FIBRES

9 hrs

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

9 hrs

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

MECHANICAL PROPERTIES OF FIBRES

9 hrs

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

OPTICAL AND FRICTIONAL PROPERTIES

9 hrs

Refractive index of fibres Birefringence – measurement techniques, effect of factors like fibre orientation, density and regain. Optical orientation factor, its relation with refractive index and

birefringence. Reflection of light – specular and diffused reflection, lustre, lustre index, factors influencing lustre. Absorption of light – dichroism, dichroic ratio. Theories of fibre friction- Amonton's law; Measurement: Bowden's model, Capsten's methods; Lindberg's inter fibre friction Yarn to yarn abrasion and friction; friction of wool.

ELECTRICAL AND THERMAL PROPERTIES

9 hrs

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 dielectricity. Thermal properties – specific heat, thermal conductivity, thermal expansion and contraction, structural changes in fibres on heating, heat setting of various synthetic fibres.

L: 45hrs

Total Hours:45

REFERENCES

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

CASE STUDY:

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

U13TXP501	TEXTILE PRETREATMENT AND COLOURATION TECHNOLOGY LABORATORY -I	L	T	P	C
		0	0	3	1

Course Objectives

- To gain knowledge about various pretreatment process given to textile material.
- To understand the different dyeing principles.
- To understand the different machineries available for treating the textile materials

Course Outcomes

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

- Outline the process flow for cotton fabric processing
- Explain the various methods involved in grey fabric processing
- Prepare the dye recipe for colouring the various fibre/ fabric
- Examine the colour fastness of the dyed fibre/ fabric
- Explain the working principle of dyeing machines

List of Experiments

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

Total Hours:45

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 auxillary chemicals.
3. Dyeing of cellulosic material with tie & dye method.
4. Dyeing of Cotton/ Silk/ Wool with natural dye.

Course Objectives

- To acquire knowledge on basic quality parameters
- To understand the working principle of testing instruments
- To able to operate testing instruments
- To interpret and analyze the results of the experiments

Course Outcomes

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

- Calculation of maturity, fineness, crimp, yarn numbering system, evenness, hairiness.
- Summarize the working Principle of all testing instruments of fibre, yarn & fabric.
- Analyze and interpret the results of testing of fibre, yarn & fabric properties with statistical analysis.
- Examine the material with testing results.
- Evaluate the results with various type of materials.

List of Experiments

1. Determination of the percentage of Trash, Lint, Micro dust, Invisible loss using Trash analyzer and Determination of fineness & its C.V% of the two different cotton fibre samples using Micronaire tester.
2. Determination of the Effective length, Mean length and Short fibre % of the given cotton fibre sample using Baer Sorter.
3. Determination of Hank and Hank C.V % (within & between) of the given blow room/comber lap.
4. Determination of the Hank and Hank C.V% of the given sliver / Determination of the within bobbin and between bobbin hank C.V % of the given roving.
5. Determination of the Single yarn strength of the given yarn sample 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.

Total Hours:45

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.

Course Objectives

- To get Practical exposure on Textile Industry
- To get hands on training experience in Industry

Course Outcomes

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

- Demonstrate the working of the factory
- Categorize the machines, products and work force.
- Compare the performance of machines, quality and description of products and efficiency of work force.
- Compile the data on machine, material men and relevant parameters
- Discuss the working of machines, product quality, general mill particulars and layout of factory

Course Content

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

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

The Evaluation Pattern as Follows:

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

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

L: 45hrs

Total Hours:45

U13GHP501	HUMAN EXCELLENCE SOCIAL VALUES	L	T	P	C
		1	0	1	1

Course Objectives

- To produce responsible citizens to family and society
- To uplift society by pure politics and need education
- To realize the value of unity, service
- To immunize the body
- To get divine peace through inward travel

Course Outcomes

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

- Learn knowledge on the Duties and Responsibilities. (20%)
- Demonstrate skills required for the Disparity among human being (20%)
- Behave as a responsible Politics and Society & Education and Society (30%)
- Analyze Impact of Science in Society (30%)

Course Content

1. Evolution of man – Man in society.
2. Duties and Responsibilities, Duty to self, family, society and the world.
3. Disparity among human beings.
4. Social welfare – Need for social welfare – Pure mind for pure society.
5. Politics and society – Education and society-Case study and live examples.
6. Impact of science in society - social development & society upliftments by science.
7. Economics & society – role of economics in creating a modern society.
8. Central message of Religions.
9. Yogasanas-I
10. Meditation-II [Thuriatheetham]

Total Hours:30

SEMESTER VI

U13TX7601	WOVEN FABRIC STRUCTURE AND DESIGN	L	T	P	C
		3	0	0	3

Course Objectives

- To develop design and draft for simple weaves,
- To impart knowledge on woven fabric structure.
- To gain knowledge about colour and weave effects.
- To impart knowledge about pile structures.

Course Outcomes

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

- Design various weave structures
- Analyze colour and weave effects
- Learn to create new structures
- Draw pile and corded structures
- Illustrate special weaves

Course Content

BASIC WEAVES

9 hrs

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 hrs

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

COLOUR AND WEAVE EFFECTS

9 hrs

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 hrs

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 hrs

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.

L: 45hrs

Total Hours:45

REFERENCES

1. Grosicki Z.J., “Watson’s Textile Design and Colour” – Butterworths London, 1988.
2. Grosicki Z J, “Advanced Textile Design and Color” – Butterworths London, 2004.
3. Goerner D, “Woven Structure and Design”, Part – I – WIRA, 1986
4. Jacquire Wilson, “ Hand Book of Textile Design, Woodhead Publishing Ltd, 2001.
5. Robert Beameront, “Colour in Woven Design” Whittaker & Co, 1972.
6. B.K.Behra and P.K.Hari, “Woven Textile Structure (Theory and Application), Woodhead Publishing Limited, 2010.
7. J Herbert Cooke, “Velvet and Corduroy”, Sir issac pitman & Sons Ltd, London

CASE STUDY:

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

Course Objectives

- To gain knowledge about concept of knitting
- To understand the working of various knitting machines and parts
- To understand different knitted structures
- To impart knowledge on development of designs

Course Outcomes

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

- Classify knitting machines
- Summarize the working Principle of plain, rib and interlock knitting machine
- Calculate the Production of knitting machines
- Explain the Knitting cycle for warp knitting
- List out the Application of weft and warp knit fabric in Technical Textiles
- Describe Seamless knitting

Course Content**INTRODUCTION****9 hrs**

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**9 hrs**

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

WEFT KNITTED STRUCTURES**9 hrs**

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

WARP KNITTING**9 hrs**

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

knitting. Rack, run-in, quality, production calculations of warp knitting.

WARP KNITTED STRUCTURES

9 hrs

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.

L: 45 T: 15

Total Hours:60

REFERENCES

1. D. B Ajgaonkar., “Knitting technology” Universal publication corporation, Mumbai, 1998.
2. Dr.N.Anbumani., “Knitting Fundamentals, Machines, Structures and Developments”, New Age International, 2006.
3. Chandrasekhar Iyer, Bernd Mammel and Wolfgang Schach, “Circular knitting”, Meisenbach Gmbh, Bamberg, 1995.
4. D.J. Spencer., “Knitting technology”, Textile Institute Manchester, 2005.
5. Samuel Raz., “Warp knitting production”, Melliand Textilberichte Gmbh, 1987.
6. Samuel Raz., “Flat Knitting Technology”, C. F. Rees GmbH, 1993
7. Chandrasekhar Iyer, Bernd Mammal and Wolfgang Schach., Circular Kintting, Meisenbach GmbH, Bamberg, 1995.

CASE STUDY

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.

U13TX7603	TEXTILE PRINTING AND FINISHING	L	T	P	C
	TECHNOLOGY	4	0	0	4

Course Objectives

- To give a detailed knowledge about the chemical concepts of printing methods
- To give a detailed knowledge about the principle of printing machines
- To give a detailed knowledge of principles of finishing of textiles

Course Outcomes

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

- Outline the process flow for printing processing
- Explain the various printing and finishing methods involved in fabric processing
- Prepare the printing screen for printing purpose
- Explain the working principle of finishing machines
- Summarize the pollution control measures in textile processing industry

Course Content

CHEMICAL CONCEPTS OF PRINTING

9 hrs

Sequence of printing process. Styles of printing: Direct, Discharge, Resist. Printing Methods- block, roller, screen printing. Essential ingredients of print paste and their functions. Mechanism of color transfer in printing of cotton, wool, silk and polyester material with direct, reactive, vat, metal complex, acid dye and pigments for different styles.

PRINTING MACHINES

9 hrs

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

FINISHING

9 hrs

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

FUNCTIONAL FINISHES

9 hrs

Water proof and repellent finishes: Mechanisms of repellency, Paraffin repellents, Stearic acid-melamine repellents, Silicone water repellents, Fluorocarbon-based repellents. Flame resistance finishes: Theory and Mechanisms of flame retardancy, Flame retardants for cellulose, polyester and its blends, application methods. Soil release finish: Mechanisms of soil release.

Antimicrobial finishes: Mechanisms of antimicrobial finishes. Bio-polishing for cellulose material. Anti-static finishes: Mechanism, durable and nondurable antistatic finish. UV Protection finish. Assessment techniques for UV Finishes.

WASTE MINIMIZATION AND TEXTILE EFFLUENTS

9 hrs

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.

L: 45 T: 15

Total Hours:60

REFERENCES

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

CASE STUDY:

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

U13TX7604

**GARMENT MANUFACTURING
TECHNOLOGY**

L	T	P	C
3	0	0	3

Course Objectives

- To gain knowledge about pattern making and grading.
- To get exposure in the garment manufacturing process.
- To attain knowledge in sewing techniques and sewing machineries.

Course Outcomes

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

- Outline the process flow of garment industry
- Develop the patterns for Kids, Baby's, Men's and Women's wear
- Discuss the Requirements and Methods of Marker planning
- List out the objectives of Cutting
- Define Stitch and Seam
- Compare different production systems used in garment industry
- Explain different packing methods

Course Content

PATTERN MAKING

9 hrs

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

CUTTING

9 hrs

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 hrs

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 hrs

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

9 hrs

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.

L: 45hrs

Total Hours:45

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 Peggall, “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

CASE STUDY

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

U13TX7605

NONWOVEN TECHNOLOGY

L	T	P	C
3	0	0	3

Course Objectives

- To gain knowledge on various nonwoven technologies.
- To impart knowledge on the nonwoven process and applications.
- To gain knowledge about finishing & testing of nonwovens.
- To attain exposure on various applications of nonwovens.

Course Outcomes

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

- Describe the various nonwoven web laying and web bonding systems
- Discuss the production rate of various fabric manufacturing systems
- Explain the principle of working of various web laying and web bonding systems.
- Review the various finishing process on nonwoven fabrics
- List the applications of nonwovens in technical textiles
- Summarize the various nonwoven fabric characterization techniques.

Course Content

INTRODUCTION TO NONWOVEN

9 hrs

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

WEB FORMATION SYSTEMS

9 hrs

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 hrs

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 hrs

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.

CHARACTERISATION AND TESTING OF NONWOVEN FABRICS 9 hrs

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

L: 45hrs

Total Hours:45

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.

CASE STUDY

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

U13TX7606	TEXTILE PROJECT MANAGEMENT & FINANCE	L	T	P	C
		3	0	0	3

Course Objectives

- To gain knowledge on the concepts of project management.
- To understand the concept of investment decision making.
- To understand various project planning techniques
- To understand the basics of capital budgeting

Course Outcomes

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

- Define about project management
- Outline on project planning
- Estimate the cost of production & working capital requirement
- Differentiate between income statement and balance statement
- Review about financial ratio

Course Content

PROJECT MANAGEMENT

9 hrs

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

PROJECT PLANNING

9 hrs

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 hrs

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 hrs

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.

9 hrs

FINANCIAL RATIO ANALYSIS

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.

L: 45hrs

Total Hours:45

REFERENCES

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

CASE STUDY:

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.

U13TXP601

CLOTH ANALYSIS LABORATORY

L	T	P	C
0	0	3	1

Course Objectives

- To analyze the fabric for design, draft & peg plan
- To analyze about the construction particulars of woven fabrics

Course Outcomes

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

- Analyze of Plain / Twill / Satin / Sateen fabric.
- Analyze of Honey comb fabric.
- Analyze of Huck-a-Back fabric.
- Analyze of Extra Warp / Extra Weft fabric.
- Analyze of Pile Fabrics (Warp & Weft)

LIST OF EXPERIMENTS

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

L: 45hrs

Total Hours:45

CREATIVITY EVALUATION (Any Two)

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

U13TXP602

**KNITTING AND GARMENT
LABORATORY**

L	T	P	C
0	0	3	1

Course Objectives

- To experimentally gain knowledge operation and setting of various sewing machines.
- To experimentally develop patterns for various garments
- To experimentally calculate the production of knitting machine.

Course Outcomes

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

- Construct Stitches using SNLS, Overlock and Flat lock machines
- Construct different types of Seams
- Demonstrate threading, SPI and Tension setting of SNLS, Overlock and Flat lock machines
- Develop patterns for Ladies wear, Men's shirt, T-Shirt and Trousers using pattern sheet
- Calculate the Production of double track knitting machine

LIST OF EXPERIMENTS

- 1) Construction of Various Stitches-Chain stitch-Hand stitch-Lock stitch-Multithread Chain stitch-Overlock stitch-Flat lock stitch
- 2) Construction of Various Seams-Super imposed seam-Lap seam-Bound seam-Decorative seam-Flat seam-Edge Finishing seam
- 3) Construction of Gathers-Pleats-Tucks
- 4) Demonstrate sewing operation in Single Needle Lock Stitch Machine and Machine adjustments-Threading-SPI and Tension setting
- 5) Demonstrate Sewing operations in Overlock and Flat lock machines and Machine adjustments-Threading-SPI and Tension setting
- 6) Developing pattern for Ladies wear
- 7) Developing pattern for Men's shirt
- 8) Developing pattern for T-Shirt
- 9) Developing pattern for Trousers.
- 10) Production calculation and study of single jersey circular weft knitting machine-yarn supply arrangements, loop forming mechanism, takedown motion.
- 11) Production calculation and study of double track knitting machine-yarn supply arrangements, loop forming mechanism, takedown motion.
- 12) Developing embroidery stitches and designs.

L: 45hrs

Total Hours:45

CREATIVITY 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.

U13TXP603	TEXTILE PRINTING AND FINISHING	L	T	P	C
	TECHNOLOGY LABORATORY	0	0	3	1

Course Objectives

- To give a detailed knowledge about the principle of printing machines
- To give a detailed knowledge of principles of finishing of textiles

Course Outcomes

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

- Outline the process flow for cotton fabric processing
- Explain the various printing and finishing methods involved in wet processing
- Prepare the print paste and screen for printing the various fabric
- Examine the colour fastness of the printed fabric
- Explain the working principle of finishing machines

LIST OF EXPERIMENTS

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

L: 45hrs

Total Hours:45

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.

U13GHP601

**HUMAN EXCELLENCE NATIONAL
VALUES**

L	T	P	C
1	0	1	1

Course Objectives

- To produce responsible citizens
- To uphold our culture and spiritual life
- To realize the value of unity, service
- To immunize the body
- To get divine peace through inward travel

Course Outcomes

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

- Learn knowledge on the Duties and Responsibilities. (20%)
- Demonstrate skills required for the Disparity among human being (20%)
- Behave as a responsible Politics and Society & Education and Society (30%)
- Analyze Impact of Science in Society (30%)

Course Content

1. Citizenship- its significance-Enlightened citizenship.
2. Emerging India-it's glory today- Global perspective-other view about India.
3. Indian culture and it's greatness.
4. India and Peace.
5. India and Spirituality- Great spiritual leaders.
6. India's message to the world – it's role in global peace.
7. Service and sacrifice-Unity in diversity – case studies-live examples.
8. National values identification and practice.
9. Yogasanas -II
10. Meditation III [Nithyanandam& Nine Centre Meditation]

Total Hours:30

REFERENCES

- | | |
|--|---------------------------|
| 1. World peace plane | ---- Vethathiri Maharishi |
| 2. Prosperous India | ---- Swami Vivekananda |
| 3. Samudhaya chikkalukkana nala Aaivugal | ---- Vethathiri Maharishi |
| 4. World Community Life | ---- Vethathiriyam |

SEMESTER VII

Course Objectives

- To gain knowledge in process control procedures in spinning and weaving.
- To get exposure in quality parameters and norms.
- To know the importance of process control in spinning and weaving process.

Course Outcomes

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

- Outline the various fibre quality characteristics and fibre quality indices
- Analyze and interpret the defects occur in the spinning process
- Evaluate yarn realization, waste%, Invisible loss and cleaning efficiency
- Solve the productivity calculations
- Explain and interpret the problems relevant to process control in the spinning and weaving process.

Course Content**CONTROL OF FIBRE QUALITY****9 hrs**

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

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

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 hrs**

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 hrs**

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 hrs

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.

L: 45

Total Hours:45

REFERENCES

1. Abhijit Majumdar, Apurba Das , R. Alagirusamy, V. K. Kothari, “Process Control in Textile Manufacturing”, Woodhead Publishing Series in Textiles, November 2012.
2. R. Senthil Kumar, “Process Management in Spinning” CRC Press, USA, September 2014
3. Garde. A. R. & Subramaniam T. A., “Process Control in Spinning”, ATIRA, Ahmadabad 1987.
4. M.C.Paliwal & P.D. Kimothi., “Process Control in Weaving”, ATIRA, Ahmedabad, 1974.
5. Van der Sluijs M and Hunter L., “Neps in Cotton Lint”, Textile Progress Volume: 2 Number:4, The Textile Institute, Manchester, U.K., 1999.
6. Ratnam T.V. & Chellamani. K. P., “Quality Control in Spinning”, SITRA Coimbatore 1999.
7. “Loom shed”, BTRA Publication, Mumbai, 1986.
8. “Warping and Sizing”, BTRA Publication, Mumbai, 1983.
9. “Winding”, BTRA Publication, Mumbai, 1986.

CASE STUDY:

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

U13TX7702

TECHNICAL TEXTILES

L	T	P	C
3	0	0	3

Course Objectives

- To impart information about applications of various structures of yarn, fabric in technical textiles.
- To gain knowledge on various sectors of technical textiles.
- To impart knowledge of manufacturing of technical textiles.

Course Outcomes

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

- Describe the classification of technical textiles
- Outline the fibres, yarns and fabric structures used in technical textiles
- Express the property requirements, fabric type used, applications of agro textiles and filtration textiles
- Demonstrate skills in the product development of technical textiles
- Outline the functions and various requirements of protective textiles, sports textiles and transportation textiles.
- Formulate solutions during technical textiles product development

Course Content

INTRODUCTION

9 hrs

Technical Textiles: Definition and scope of technical textiles, Global and Indian Scenario, Classification of technical textiles. Fibres used in Technical textiles, Technical yarns: staple yarns, monofilament, multifilament yarns. Technical fabrics: knitted, woven, nonwoven and braided structures.

AGRO TEXTILES AND FILTRATION TEXTILES

9 hrs

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 hrs

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 hrs

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 hrs

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.

L: 45hrs

Total Hours:45

REFERENCES

1. A.R. Horrocks & S.C. Anand (Eds.), “Handbook of Technical Textiles”, The Textile Institute, Manchester, U.K., Woodhead Publishing Ltd., Cambridge, England, 2000.
2. S. Adanur “Wellington Sears Handbook of Industrial Textiles”, Technomic Publishing Co. Inc., Lancaster, Pennsylvania, 1995.
3. N.W.M. John, “Geotextiles”, Blackie, London, 1987.
4. S.K. Mukhopadhyay and J.F. Partridge, “Automotive Textiles”, Text. Prog, Vol. 29, No.1/2, 1998.
5. S. Anand, “Medical Textiles”, Textile Institute, 1996.
6. R.Shishoo, Textiles in Sports, CRC press, 2005.
7. R.Senthil Kumar, Textiles for Industrial Applications, CRC press, USA, August 2013.

CASE STUDY:

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

U13TX7703

TEXTILE AND APPAREL COSTING

L	T	P	C
3	0	0	3

Course Objectives

- To gain knowledge about various types of costing and its elements.
- To get exposure in costing of textile products.
- To understand the concept of costing.

Course Outcomes

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

- Distinguish between costing and estimation
- Explain elements of cost of a product
- Discuss various expenses incurred in garment industry
- Calculate CMT cost for various garments
- Prepare cost sheet for garment industry

Course Content

INTRODUCTION

9 hrs

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 hrs

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 sheet.

COSTING STRATEGY

9 hrs

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 hrs

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 hrs

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.

L: 45hrs

Total Hours:45

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.
3. Johnson Maurice, E. Moore, “Apparel Product Development”, Om Book Service, 2001.
4. Katherine McKelvy, “Fashion Source Book”, Om Book Service, 2001.
5. Jain S.P., Narang, K.L., “Cost Accounting –Principles and Practice”, Kalyani Publishers, 2009.
6. Deakin& Maher “Cost accounting”, 3rd edition, Irwin publications,1991.
7. Larry M,Walther & Christopher J Kousen, “ Managerial and Cost Accounting”, Ventus Publishing,ISBN:978 87 7681 491 5 (2009)
8. M.Krishnakumar “Apparel Costing: A functional Approach” Abhishek Publications, 2011, ISBN, 8182473926.

CASE STUDY

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

U13GS7008

PROFESSIONAL ETHICS

L	T	P	C
3	0	0	3

Course Objectives

- To create an awareness on Engineering Ethics and its use in ones profession
- To instill moral values, social values and loyalty
- To provide an insight into ones professional rights and a view of professional ethics in the global context

Course Outcomes

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

Understand the ethical theories and concepts

Understanding an engineer's work in the context of its impact on society

Understand and analyze the concepts of safety and risk

Understand the professional responsibilities and rights of Engineers

Understand the concepts of ethics in the global context

Course Content

ENGINEERING ETHICS AND THEORIES

9 hrs

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

9 hrs

EXPERIMENTATION

Engineering as social experimentation, codes of ethics, Legal aspects of social ethics, the challenger case study, Engineers duty to society and environment.

SAFETY

9 hrs

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 hrs

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, 9 hrs

CONSULTANTS AND LEADERS

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.

L: 45

Total Hours:45

REFERENCES

1. Mike Martin and Roland Schinzinger, “Ethics in Engineering”. (2005) McGraw-Hill, New York.
2. John R. Boatright, “Ethics and the Conduct of Business”, (2003) Pearson Education, New Delhi.
3. Bhaskar S. “Professional Ethics and Human Values”, (2005) Anuradha Agencies, Chennai.
4. Charles D. Fleddermann, “Engineering Ethics”, 2004 (Indian Reprint) Pearson Education / Prentice Hall, New Jersey.
5. Charles E. Harris, Michael S. Protchard and Michael J Rabins, “Engineering Ethics – Concepts and cases”, 2000 (Indian Reprint now available) Wadsworth Thompson Learning, United States.

U13TXP701

**TEXTILE AND APPAREL CAD
LABORATORY**

L	T	P	C
0	0	3	1

Course Objectives

- To give a detailed knowledge about software tools used for textile designing
- To teaching the applications of computers in the field of printing, woven, design, garment, design, pattern, making and grading
- To import hand on experience in the relevant software

Course Outcomes

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

- Practice weave design using software tools
- Develop 2D fabric simulation with different weaves for dobby and jacquard design.
- Create various types of motifs for printing with repeat designs
- Develop garment patterns for T-Shirt, trouser, ladies top, skirt using CAD software.
- Calculate the Marker efficiency for T-Shirt, Ladies top, skirt using CAD software.

LIST OF EXPERIMENTS

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

L: 45

Total Hours:45

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.

U13TXP702	TECHNICAL TEXTILES LABORATORY	L	T	P	C
		0	0	3	1

Course Objectives

- To determine the properties of Technical Textiles
- To know the quality requirements of medical textiles
- To evaluate physical properties of technical textile fabrics

Course Outcomes

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

- Analyze the mechanical properties of composite materials
- Demonstrate necessary skills in the operation of testing machines for the above listed experiments
- Analyze the various quality parameters obtained for medical textiles
- Describe the principle of operation of testing machines for above listed experiments
- Calculate the quality parameters using the data obtained from testing machines
- Interpret the results obtained from the above listed experiments

LIST OF EXPERIMENTS

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.

L: 45

Total Hours:45

CREATIVE EVALUATION (Any Two)

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

U13GHP701

**HUMAN EXCELLENCE GLOBAL
VALUES**

L	T	P	C
1	0	1	1

Course Objectives

- To realize global brotherhood and protect global
- To know the youths participation in politics
- To know importance of retain of our culture and maintain
- To know impact of global terrorism
- To know the current economic status among the youths

Course Outcomes

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

- Learn knowledge on the Duties and Responsibilities. (20%)
- Demonstrate skills required for the Disparity among human being (20%)
- Behave as a responsible Politics and Society & Education and Society (30%)
- Analyze Impact of Science in Society (30%)

Course Content

1. Global values – understanding and identification – its importance.
2. Racial discrimination and solution – Ecological imbalance and solution.
3. Political upheavals and solution – Social inequality and solution – live case discussions and debate.
4. Cultural degradation and solution – live case discussions and debate.
5. Emergence of monoculture – solution.
6. Global terrorism – it's cause and effect – solution.
7. Economic marginalization and solution – it's impact in the globe.
8. Man is the cause and man is the solution.
9. All Meditations.
10. All Yogasanas.

Total Hours:30

REFERENCES

- | | |
|--|---------------------------|
| 1. World peace plane | ---- Vethathiri Maharishi |
| 2. Prosperous India | ---- Swami Vivekananda |
| 3. Samudhaya chikkalukkana nala Aaivugal | ---- Vethathiri Maharishi |
| 4. World Community Life | ---- Vethathiriyam |

ELECTIVE

U13TXTE101	MECHANICAL PROCESSING OF MAN	L	T	P	C
	MADE FIBRES AND THEIR BLENDS	3	0	0	3

Course Objectives

- To understand the processing of manmade fibre and its blends.
- To attain knowledge in processing of manmade fibre in short staple spinning.
- To get exposure about process parameters in manmade fibre weaving.

Course Outcomes

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

- Summarize the quality requirements of blending
- Identify different blending system used spinning mills
- Discuss processing parameters of man-made fibres in spinning mills
- Choose the yarn for weaving preparation in manmade yarn
- Apply technical knowledge to weave synthetic yarn

Course Content

INTRODUCTION

9 hrs

Requirements and need for Blending - Factors influencing perfect blend. Assessment of Blend irregularity using IBI equation of Coplan and Klein. Conventional methods of blending and its limitations. Fibre characteristics and spinnability, Prediction of blended yarn strength.

SPINNING OF MANMADE FIBRE AND ITS BLENDS

9 hrs

Mechanics of blending and modification of cotton spinning machineries for processing of manmade fibres. Bale opening, tinting, blending, opening, carding, preparation of roving and ring spinning for viscose staple & its blends, polyester staple & its blends and Acrylic.

SPINNING OF POLYESTER/WOOL BLENDS

9 hrs

Process of polyester/wool blends: Blending-opening, picking-roller and clearer cards-Gill box Drawing, spinning, Throwing of continuous filament yarns; Definition-objects-preparation-winding or spooling, spinning and twist setting

WEAVING PREPARATION

9 hrs

Preparation of Synthetic blends for weaving: Warp and weft winding machines for synthetic yarns and blends- Precautions: Speed - Package size – Shape - Tension control. warping and sizing machines for synthetic and blend yarns- Creels - Yarn tension – Stretch - Size box – recipe for synthetic materials and their blends.

WEAVING OF SYNTHETICS

9 hrs

Requirements for weaving synthetic yarns and its blends in shuttleless looms- defects in synthetic fabrics production – Causes – remedies - Pilling propensity and measures to control- synthetic fabrics – construction – application in apparels and technical textiles.

L: 45 hr

Total Hours:45

REFERENCES

1. Salhotra K.R., “Spinning of Manmade fibres and their blends on cotton system”, Textile Association (India) Publications, 2004.
2. Pattabhiram TK, “Synthetic weaving”, Mahajan Publishers, Ahmedabad, 1976.
3. Wray F. R, “Modern yarn production”, columbine press London, 1982
4. Kulkarni GG, “Processing of polyester/cotton blends”, ATIRA, 1967.
5. Andrea Wynne, “Motivate series in Textiles”, Macmillan Education Ltd., London, 1997.
6. Usenko, V., “Processing of Man-Made fibres”, MIR publishers, Moscow, 1985.
7. R.W.Moncrief, “Man Made fibres”, 6th edition, London Newnes-Butterworths,1975

CASE STUDY:

1. Process and quality in spinning of synthetic fibre
2. Evaluation of modern spinning systems
3. Process and quality in weaving of synthetic yarn

U13TXTE102 PATTERN MAKING AND GRADING

L	T	P	C
3	0	0	3

Course Objectives

- To impart knowledge on the basic techniques used for preparing garment patterns
- To gain knowledge about dart manipulation
- To impart knowledge on grading and pattern alteration method

Course Outcomes

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

- Draft pattern for men's wear
- Learn about body measurements
- Analyze the fitting of the garments
- Design pattern for new styles
- Manipulate dart and gatherings

Course Content

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.

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, Balance 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.

L: 45 hr

Total Hours:45

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 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.

CASE STUDY:

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

U13TX7E103 TEXTILE COMPOSITES

L	T	P	C
3	0	0	3

Course Objectives

- To gain knowledge on various engineering materials.
- To attain knowledge in composites structure & components.
- To understand the characteristics of reinforcement and matrix.
- To attain knowledge in mechanics of composites
- To get exposure about the composite manufacturing technologies & testing methods.

Course Outcomes

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

- Describe the various reinforcements and resins used in composite materials.
- Distinguish the properties of composite materials with conventional engineering materials.
- Analyze and interpret the structure of the composite materials
- Demonstrate the necessary skills in the composite material development
- Outline the various testing performed in composite materials

Course Content

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, $\pm 45^\circ$ 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.

L: 45 hr

Total Hours:45

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.

CASE STUDY

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.

U13TX7E104

THEORY OF DRAFTING

L	T	P	C
3	0	0	3

Course Objectives

- To teach the underlying theoretical principles of various processes that take place during spinning
- To impart fundamental knowledge on drafting system & yarn evenness
- To educate to think deeply on the fundamentals of spinning processes

Course Outcomes

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

- Outline the drafting theory
- Define drafting wave & related problem
- Indicate drafting irregularity on yarn
- Compare different drafting system used in different spinning
- Calculate different draft in different spinning machine

Course Content

IDEAL DRAFTING

9 hrs

Definition of ideal drafting; conditions required to achieve ideal drafting in a roller drafting system; deviations from ideal drafting situation duration actual drafting conditions

DRAFTING WAVE

9 hrs

Definition of drafting wave; condition for drafting wave formation during roller drafting ; estimation of the magnitude of the irregularity caused by the occurrence of the drafting wave; forces acting on a fibre during drafting at different positions in a drafting zone; methods to avoid drafting wave formation ; role of apron in controlling drafting wave formation.

ROLLER SLIP

9 hrs

Definition of roller slip; conditions for the formation of forward and backward slips in the roller drafting. systems; measures to avoid roller slip occurrence

OTHER DRAFTING IRREGULARITIES

9 hrs

The causes for roller nip movement and roller speed variation during drafting and their effect on products. Irregularity: control of the irregularity formed from these sources.

COMPARISON OF DIFFERENT DRAFTING SYSTEM

9 hrs

Comparison of roller drafting system with wire point drafting system application of wire point drafting in card and rotor spinning machine; comparison of roller drafting in drawframe, comber preparatory, comber, speedframe, ringframe, condensed yarn spinning and in air-jet spinning machine; influence of draft on spinning triangle size and the subsequent effect on machine performance and product quality

L: 45 hr

Total Hours:45

REFERENCES

1. Foster G.A.R, The Principles of Roller Drafting and the Irregularity of Drafted Materials, The Textile Institute, Manchester, 1958.
2. Klein W. A Practical Guide to Combing, Drawing and the Roving Frame, The Textile Institute, Manchester, 1999.
3. Lord P.R., Roller Drafting, Textile Progress, The Textile Institute, Manchester, 1993.
4. Groberg P and Iype C. Yarn Production: Theoretical Aspects, The Textile Institute, Manchester, 1999.

CASE STUDY:

1. Effect on spacer on yarn quality
2. Comparison of different type of top arm & yarn properties
3. Effect on front roller off set on yarn quality

U13TX7E105	MAINTENANCE MANAGEMENT IN	L	T	P	C
	TEXTILE MILLS	3	0	0	3

Course Objectives

- To understand various maintenance activities in textile mill.
- To acquire knowledge in inventory planning and management.
- To get exposure about the material handling equipments.

Course Outcomes

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

- Inventory control techniques in spinning mill.
- One week maintenance schedule in preparatory and spinning departments
- Erection procedure in carding machine
- Cost work sheet
- Production planning in spinning

Course Content

INTRODUCTION TO MAINTENANCE

9 hrs

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

MAINTENANCE SCHEDULE

9 hrs

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

POWER HOUSE MAINTENANCE

9 hrs

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

SPECIAL MAINTENANCE ACTIVITIES

9 hrs

Piano feed maintenance- Card grinding- Mounting- End milling – Flat burnishing- Cot buffing- Roller lapping prevention techniques-Berkolisation- Cot selection and mounting procedure- Spindle oiling – topping, replenishing- spindle and lappet gauging- top roller pressure setting- roller eccentricity measurement and removal methods- loom timing and setting procedure-

causes and remedies for various defects in processing – Lubricants- Types- Properties- Selection of lubricant for different operations- various lubricating equipments and its applications- Textile bearings and selection – abrasives used in textile maintenance and their specifications – Maintenance of safety equipments- fire alarms- micro dust filters- fire extinguishers.

MODERNIZATION PROGRAMME

9 hrs

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

L: 45 hr

Total Hours:45

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. Balasubramanian.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.

CASE STUDY:

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

Course Objectives

- Apply knowledge of OR techniques to domain specific industrial situations to optimize the quality of decisions
- Conduct investigations by the use of OR techniques

Course Outcomes

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

- Apply linear programming model and assignment model to domain specific situations
- Analyze the various methods under transportation model and apply the model for testing the closeness of their results to optimal results
- Apply the concepts of PERT and CPM for decision making and optimally managing projects
- Analyze the various replacement and sequencing models and apply them for arriving at optimal decisions
- Analyze the inventory and queuing theories and apply them in domain specific situations.

Course Content**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 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

L: 45 hr

Total Hours:45

REFERENCES

1. Taha H.A., "Operation Research", Pearson Education
2. Hira and Gupta "Introduction to Operations Research", S.Chand and Co.2002
3. Hira and Gupta "Problems in Operations Research", S.Chand and Co.2008
4. Wagner, "Operations Research", Prentice Hall of India, 2000
5. S.Bhaskar, "Operations Research", Anuradha Agencies, Second Edition, 2004

U13TXTE201

THEORY OF TWISTING

L	T	P	C
3	0	0	3

Course Objectives

- To teach the underlying theoretical principles of various processes that take place during spinning
- To impart fundamental knowledge on yarn twisting
- To educate to think deeply on the fundamentals of spinning processes

Course Outcomes

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

- Compare various twisting methods used in different spinning system
- Compare the principles of false twisting and real twisting
- Identify different ring, traveler count used in spinning industry
- Analyze twisting on yarn quality
- Calculate twisting on different spinning system

Course Content

FUNDAMENTALS OF TWISTING

9 hrs

Mechanics of imparting strength to a stable-fibre strand by twisting meaning of twist multiplier and the basis of selection of required twist; principles of false twisting; fundamental requirements to create real twist in the strand

TWISTING IN RING SPINNING

9 hrs

Principle of twist insertion in ring spinning; limitation of ring twisting; mechanics of balloon formed during twisting; influence of twisting on spinning triangle size and the subsequent effect on yarn quality and spinning performance. design features of rings and travellers used for twisting different types of yarns.

TWISTING IN OPEN-END SPINNING

9 hrs

Principle of twist insertion in open-end spinning; application of this principle in rotor spinning and friction spinning machines; advantages of this method of twisting over ring twisting method; comparison of yarn tension developed during twisting in these two machine.

TWISTING IN AIR-JET SPINNING

9 hrs

Principle of twist formation in air-jet spinning; advantage of using two air nozzles; the merits and demerits of this method of twisting; application of this method of twisting in PLYfil yarn production.

OTHER TWISTING METHODS

9 hrs

Principle of two-for-one twisting; the advantages of this method of twisting working of two for one twister. Twisting of yarns in double-rove fed spinning machines; operating principle involved in the twisting of wrap spun yarns; technological and economic interrelationships in these methods of twisting; role of twisting in fancy yarn production

L: 45 hr

Total Hours:45

REFERENCES

1. De Barr A.E and Catling H., "The Principle and Theory of Ring Spinning , The Textile Institute, Manchester, 1965.
2. Usenko V., Processing of Man-made Fibres, Mir Publishers, Moscow, 1979.
3. Klein W., New Spinning Systems, The Textile Institute, Manchester, 1993.
4. Grosberg P and Iype C. Yarn Production; Theoretical Aspects, The Textile Institute, Manchester, 1999.
5. Lord P.R., Yarn Production: Science, Technology and Economics, The Textile Institute, Manchester, 1999.

CASE STUDY

1. Study on traveler count & hairiness
2. Compare ring spinning twist & open end spinning twist
3. Method of twisting & timing in fancy yarn

Course Objectives

- To understand the organizational structure of the industry.
- To know about the foundations of individual and group behaviours.

Course Outcomes

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

- Explain the motivational technique
- Discuss the individual and group behavior
- Summarize the behavioral and leadership theory
- Discuss about organizational culture
- Summarize the personality traits

Course Content**INTRODUCTION TO ORGANISATIONAL BEHAVIOUR****9 hrs**

Meaning of Organisational Behaviour- Contributing disciplines- Challenges and opportunities for Organisational Behaviour- Managing work force diversity-Improving quality and productivity-Improving customer service-Working in net work organization Organisational Behaviour Model.

BEHAVIOURAL ATTITUDES**9 hrs**

Foundations of individual behaviour- Attitudes- components – Job attitudes and job satisfaction. Personality – Meaning – Determinants –Personality traits – Personality attributes- Values – Types – Values across cultures. Learning – Definition – Theories : Classical conditioning Theory-Operant Conditioning Theory-Social learning– Shaping-Methods of shaping Behaviour-Schedules of reinforcement-Behaviour Modification– Perception– Meaning – Factors.

MOTIVATION TECHNIQUES**9 hrs**

Motivation – Meaning – Content and Process Theories : Hierarchy of needs theory- Theory of X and Y- Two factor Theory-Mc Cellands's Theory- Goal setting theory-Equity theory- Expectancy theory– Application of motivation theories: Employee involvement-Rewarding systems – leadership: Leadership theories—Behavioural theory– Managerial Grid–Trait theories- Situational theories.

GROUP BEHAVIOUR**9 hrs**

Foundations of group behaviour – Classification- Stages of group development – Group properties-Group decision making- Teams – Types of teams – Creating effective teams. Conflict – Meaning – Views – Conflict process. Negotiation – Process – Bargaining strategies.

POWER TACTICS**9 hrs**

Definition of Power – Bases of power – Power tactics –Power in groups-.Politics:.Definition – Factors contributing to political behaviour – Impression management-Organizational culture – Common organizational designs- functions – Creating and sustaining culture- Creating customer responsive culture-Creating ethical organizational culture.

L: 45 hr

Total Hours:45

REFERENCES

1. Robbins Stephen P., "Organisational Behaviour" 12th Edition Prentice Hall (India) Pvt., Ltd 2006.
2. McshaneL.Steven Von Glinow Ann Mary Sharma R. Radha., "Organisational Behaviour" Tata McGraw Hill 2006.
3. Robin Fincham Peter Rhodes., "Principles of Organizational Behaviour" Oxford University Press 2005.
4. Bratton., "Work and Organizational Behaviour" Palgrave Macmillan 2005.
5. V.S.P Rao, "Organisational Behaviour", Excel Books, 2009.
6. IvancevichM.John et.al "Organisational Behaviour and Management" 7th Edition Tata McGraw Hill 2005.
7. Angelo Kinicki Robert Kreitner., "Organisational Behaviour Concepts, Skills and Practices" Tata McGraw Hill 2006.
8. Mirza S Saiyadain., "Organisational Behaviour" Tata McGraw Hill 2003.

CASE STUDY:

1. Study on the organizational structure of textile mill
2. Study on the HR policies and implementation process in Textile Mill
3. Study on the labour training methods in textile mill

Course Objectives

- To impart knowledge about texturization process.
- To get knowledge about various texturization techniques.
- To get exposure about application of textured yarns

Course Outcomes

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

- Define science and technology of texturing
- Explain testing and application of textured yarns and fabrics made from them
- Describe setting and adjustments in various texturing process
- Select process parameters to process various synthetic fibre
- Discuss the developments in Texturization

Course Content**BASICS OF TEXTURIZATION****9 hrs**

Purpose - Need for bulking of synthetic fibres -Types of texturised yarns - Classification of process - Comparison of texturised and untexturised yarns and fabrics –Application of texturised yarns - Role of spin finish on texturised yarns.– High speed spinning of synthetics fibre forming polymers, advantage and disadvantages of HSS, high speed spinning speeds, structure development during high speed spinning.

DIMENSIONAL STABILITY**9 hrs**

Heat setting – need-factors involved – types -mechanism – effects on fibre morphology and mechanical properties – fundamentals of thermo-mechanical texturing – Helanca process.

TEXTURIZATION TECHNIQUES**9 hrs**

Draw Texturising-Advantages - Simultaneous and sequence draw texturising - Working principles and machines, False Twist Texturising-Principle - Single heater and double heater - False twist texturising machines. Twisting elements – Factors influencing Twist - Properties of Textured yarn - Effect of feed material and process variables.

AIR JET TEXTURIZATION**9 hrs**

Basics of air jet texturing – types of yarns produced – process variables -over feed, air pressure temperature and water content. Nozzles, evaluation of textured yarn – Measurement of shrinkage force - Crimp contraction and dye uniformity - Texturamat - M.Dynafil tester.

DEVELOPMENTS IN TEXTURIZATION METHODS**9 hrs**

Stuffer box and edge crimping methods – principles, limitations, and applications – knit-de-knit and gear crimping methods. Bi-component filament texturing – texturing of polypropylene and jute fibres – Chemo-mechanical and thermo-mechanical texturing.

L: 45 hr**Total Hours:45**

REFERENCES

1. J.W.S. Hearle, L. Hollick and D.K. Wilson, Yarn Texturing Technology, Woodhead Publishing, UK, 1998.
2. L. Hes and P. Ursing, Yarn Texturing Technology, Eurotex, Universidade do Minho, 1994.
3. Hassan Mohamed Behery Ali Demir, *Synthetic Filament Yarn: Texturing Technology*, Prentice Hall, 1997.
4. R. S. Gandhi, *Textured yarns*, MANTRA, 1998.
5. D. K. Wilson and T. Kollu, *The Production of Textured Yarns by the False Twist Technique*, Textile Progress, Vol. 21, No.3, Textile Institute, Manchester, U.K., 1991.
6. D. K. Wilson and T. Kollu, *The Production of Textured Yarns by the False Twist Technique*, Textile Progress, Vol. 16, No.3, Textile Institute, Manchester, U.K., 1981.
7. Behery H.M. and Demir A., “Synthetic Filament Yarn Texturing Technology”, Prentice Hall, 1996.

CASE STUDY:

1. Study on texturizing fault
2. Study on static electricity during post spinning operation
3. Study on the heat setting for various fibres

Course Objectives

At the end of the course the students would be exposed to

- Market scenario of medical textile industry.
- Bio polymers and tissue engineering.
- Wound dressing concepts.
- Knowledge on tissue engineering, smart textiles and legal issues.

Course Outcomes

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

- Outline on medical textile industry
- Explain about implantable, non-implantable and drug delivery systems, wound care and reusable medical textiles and smart textiles.
- Discuss on the various concepts of biopolymers and Tissue engineering, implantable, non-implantable and drug delivery systems, wound care and reusable medical textiles and smart textiles.
- Summarize about important concepts in medical textiles
- Compare the differences and similarities between various medical textile products.

Course Content

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 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.

L: 45 hr

Total Hours:45

REFERENCES

1. Rajendran.S, “Advanced Textiles for Wound Care”, Wood Head publishing in Textiles: Number 85, 2009.
2. Bartel.V.T, “Handbook of medical textiles”, Wood Head publishing, 2011.
3. Van Langenhove, “Smart textiles for medicine and health care – materials, systems and applications”, Wood Head publishing, 2007.
4. Ray smith, “Biodegradable polymers for industrial application”, CRC press, 2005.
5. Buddy D.Ratner and Allan S. Hoffman, “Biomaterials science – An introduction to materials in medicine”, Academic press, 1996.
6. Pourdegtimi..B, “Vascular grafts: Textile structures and their performance”, Textile progress, vol. 15, No. 3, the Textile Institute, 1986.
7. Cusick. GE and Teresa Hopkins, “Absorbent incontinence products”, the Textile Institute, 1990.
8. Kothari.V.K., “Progress in textiles: Technology developments and applications”, volume 3, IAFL Publications, 2008.

CASE STUDY:

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.

U13TXTE205

**INDUSTRIAL ENGINEERING IN
TEXTILE INDUSTRY**

L	T	P	C
3	0	0	3

Course Objectives

- To understand the work study and method study techniques.
- To get exposure about productivity terms and terminologies.
- To know about the application of work study in textile industry.

Course Outcomes

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

- Discuss industrial engineering techniques
- Analyze the garment breakdown sequence
- Prepare operation bulleting for different garments
- Calculate SAM for various garments
- Conduct time study experiment

Course Content

PRODUCTIVITY AND WORK STUDY PRODUCTIVITY

9 hrs

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

WORKSTUDY

9 hrs

Work Study: definition, work-study and productivity - basic procedure of work-study – work study and the worker, supervisor and the management - working condition and the working environment.

METHOD STUDY

9 hrs

Method study: definition and objects of method study – basic procedure, selection of work, Recording, examining, development of method – Textile / Apparel factory lay out and movement of workers and material - string diagram – man type flow process chart – multiple activity chart – travel chart – principle of motion economy – classification to movements – two-handed process chart – micro motion study – SIMO chart – Define, installs and maintain improved method.

WORK MEASUREMENT

9 hrs

Work measurement: definition, purpose, procedure and uses – techniques of work measurement – work sampling: need and use time study – definition – basic time study equipment – time study forms – selecting the job, steps in making a time study – breaking the job into elements – sample size, timing card element – stop watch procedure - time study rating – calculation of standard time – setting time standards for work with apparel production machineries.

INDUSTRIAL ENGINEERING

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.

L: 45 hr

Total Hours:45

REFERENCES

1. Johnson Maurice “Introduction to Work Study”, International Labour Organization, Geneva, 2006.
2. JaccoSolinger “Apparel Manufacturing Hand Book”, Reinhold Co., 1998.
3. Juan CrloHiba “Improving working conditions and productivity in the garment industry” International Labour Organization, Geneva, 1998.
4. V.RameshBabu “ Industrial Engineering in Apparel Production” Wood Head publishing India Ltd., ISBN 13:978-93-80308-17-3, 2012.
5. M.I.KHAN”Industrial Engineering”New age international, 2007
6. Kjell zondin, “Maynard’s Industrial Engineering Handbook”, 5th edition, Mcgraw Hill, 2001.
7. Sheth vijay, “Industrial engineering methods and practices”, penram international, publishing, India, 2005.

CASE STUDY

1. Productivity Improvement in Garment Industry
2. Principle of Motion Economy
3. Method study and Time study for given operation

U13GS7002

TOTAL QUALITY MANAGEMENT

L	T	P	C
3	0	0	3

Course Objectives

- Acquire knowledge on TQM concepts
- Acquire knowledge on quality systems
- Develop skills to use TQM tools for domain specific applications

Course Outcomes

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

- Understand quality concepts and philosophies of TQM
- Apply TQM principles and concepts of continuous improvement
- Apply and analyze the quality tools, management tools and statistical
- Fundamentals to improve quality
- Understand the TQM tools as a means to improve quality
- Remember and understand the quality systems and procedures adopted

Course Content

INTRODUCTION

9 hrs

Definition of Quality, Dimensions of Quality, Quality costs, Top Management Commitment, Quality Council, Quality Statements, Barriers to TQM Implementation, Contributions of Deming, Juran and Crosby, Team Balancing

TQM PRINCIPLES

9 hrs

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 hrs

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 hrs

Quality Policy Deployment (QPD), Quality Function Deployment (QFD), Benchmarking, Taguchi Quality Loss Function, Total Productive Maintenance (TPM), FMEA

QUALITY SYSTEMS

9 hrs

Need for ISO 9000 and Other Quality Systems, ISO 9001:2008 Quality System – Elements, Implementation of Quality System, Documentation, Quality Auditing, ISO 14001:2004

L: 45 hr

Total Hours:45

REFERENCES

1. Dale H.Besterfiled, "Total Quality Management", Pearson Education
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
4. Oakland.J.S. "Total Quality Management", Butterworth – Hcinemann Ltd., Oxford
5. Narayana V. and Sreenivasan, N.S. "Quality Management – Concepts and Tasks", New Age International 2007.
6. Zeiri. "Total Quality Management for Engineers", Wood Head Publishers.

U13TX7E301	ENERGY CONSERVATION IN TEXTILE	L	T	P	C
	INDUSTRY	3	0	0	3

Course Objectives

- To gain knowledge on various sources of energy.
- To understand the energy consumption patterns in different textile sectors.
- To get exposure on energy audit and conservation measures.

Course Outcomes

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

- Outline the sources of energy
- Describe energy used in production processes
- Analyze energy audit in textile industry
- Estimate energy consumption in Textile Industry
- Apply energy management technology in textile industry

Course Content

ENERGY SOURCES

9 hrs

Sources of Energy: hydro, thermal, wind, solar, biofuels and nuclear. Limitations of Natural resources. Types of energy sources used in textile industry. Unexploited energy sources and problems in their exploitation. Energy consumption, unit of measurement, maximum demand.

ENERGY CONSUMPTION PATTERNS

9 hrs

Present energy consumption trends, Growth and Demand pattern. Energy use in production processes – Fibre production, Spinning, Textured yarn production, Weaving, Knitting, Stenter, Sizing Dyeing and Finishing, Clothing Manufacture. Energy use in Auxiliary Machinery – Boiler, Humidification plants, compressors. Energy & material balance diagram.

ENERGY AUDIT

9 hrs

Objectives. Types of Audit. Instrumentation and Methodology of conducting Audit. Analysis of Energy Audit Data. Energy audit in textile industry: spinning, weaving, garmenting and processing. Energy conservation measures.

PERFORMANCE INDICATORS

9 hrs

Specific Energy Consumption (UKG), Specific Water Consumption, Specific Fuel Consumption, Specific Steam Consumption. Cross – Country Comparisons of energy usage – Developed & Developing Nations. Benchmarking. Impact on environment. Policy options for promotion of Energy Efficient and Environmentally Sound Technologies.

ENERGY MANAGEMENT TECHNOLOGIES

9 hrs

Organizational rationalization, Improving the efficiency of usage of Electricity Fuel and Steam. Utilization of heat exchanger. Case Study: Benefits of energy efficient technologies / equipments- Economics with payback period.

L: 45 hr

Total Hours:45

REFERENCES

1. “Energy Data Directory and Yearbook”, Tata Energy Research Institute Publication, New Delhi, 1997/98.
2. SITRA Focus: Energy Conservation Measures in Spinning Mills, Vol.16/No.6, SITRA, 1999.
3. Norms for Spinning Mills, SITRA, 2010.
4. Norms for the Textile Industry, NITRA, 1991.
5. SIMA Annual Report, SIMA, 1996 – 97.

CASE STUDY

1. Conducting energy audit in spinning mill
2. Energy conservation measures in Textile mill
3. Energy audit in weaving unit

U13TXTE302

LONG STAPLE SPINNING

L	T	P	C
3	0	0	3

Course Objectives

- To attain knowledge about the processing of unconventional natural fibres.
- To gain knowledge about wool and silk processing.
- To gain knowledge about bast fibre processing.

Course Outcomes

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

- Outline the process flow of long staple spinning
- Explain the basic principles of different long staple spinning
- Compare the basis principle of different long staple spinning system
- Infer the influence of process parameter with yarn quality
- Plan the outline long staple spinning system based on end use applications

Course Content

UNCONVENTIONAL FIBRES

9 hrs

Long Staple Fibre: Protein fibres -wool, camel hair, angora hair; cellulosic fibres -Jute and Flax. Long staple fibre characteristics-sorting - grading. Unconventional Natural Fibres: Pineapple-coir-jute sisal-leaf fibres. Numbering systems for long staple fibres and their conversions.

WOOL SPINNING

9 hrs

Manufacturing Processes of Wool: Preparation - scouring –Carbonizing- Drying - oiling - Dyeing. Blending. Roller and clearer cards. Gilling and combing - Roving – Spinning. Process parameters of wool spinning process. Process parameters for wool spinning.

WORSTED SPINNING

9 hrs

Scouring, composition of scouring, pre-opening, blending, opening and beating, weight check, carding: Roller and clearer cards-Combing-Gill box Drawing, spinning. Process parameters for worsted spinning.

SPUN SILK PROCESSING

9 hrs

Spun silk- introduction, sources to fabricate spun silk; Manufacturing Process -separator, sett frame, draw box, rover; methods-Italian, Japanese.

9 hrs

SPINNING OF BAST FIBRES

Opening and Cleaning: methods of raw flax and jute processing-blending of fibres.Carding: Functions of a carding machine- flax and jute carding machines; jute and flax drawing, combing, roving and spinning.

L: 45 hr

Total Hours:45

REFERENCES

1. Woollen and Worsted Spinning, Abishek Publications, Chandigarh, 2002.
2. W.S.Simpson and G H Crawshaw Wool: Science and Technology, Woodhead Publishing Ltd, 2002.
3. Corbman.B.P "Textiles: Fibre to fabric", McGraw Hill, Edn.1983.
4. Eric Oxtoby, "Spun Yarn Technology", Butterworths, London, 1988.
5. Mukherjee RR & Radhakrishnan "Long Vegetable Fibres", Text. Prog. Vol.4 No.4, Text.Inst. Manchester 1972.
6. Sonwalkar T.N., "Hand Book of Silk Technology", Wiley Eastern Ltd. , Bombay, 1992.
7. Stout H.P., "Fibre and Yarn Quality in Jute Spinning", The Text. Inst., Manchester, 1988.

CASE STUDY

1. Scouring & carbonizing of wool
2. Polyester wool blends (P/W) process in spinning mill
3. Humidification requirements for woollen spinning

U13TXTE303 APPAREL PRODUCTION PLANNING AND	L	T	P	C
CONTROL	3	0	0	3

Course Objectives

- To gain the knowledge about Apparel Production Planning
- To know about Lay Planning
- To get exposure about various work study techniques

Course Outcomes

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

- Discuss various apparel production systems
- Illustrate product flow chart for various garments
- Schedule production planning control chart for different styles
- Calculate standard time and production targets
- Discuss various work study techniques

Course Content

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.

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

L: 45 hr

Total Hours:45

REFERENCES

1. Solinger Jacob, "Apparel Manufacturing Hand Book - Analysis, Principles and Practice", Columbia Boblin Media Corp., 1988.
2. David J.Tyler, "Materials Management in Clothing Production", 2000.
3. William K.Hodson, "Maynord's Industrial Engineering Handbook", IV edition, McGraw Hill Inc., New York, 2010.
4. Herold Carr and Barbara Lathem, " The Technology of Clothing Manufacturing", II nd Edition, Blackwell Scientific Publications, London, 1988.
5. Prodip V.Mehta, "An Introduction of Quality Control for the Apparel Industry". ASQC quality Press, Marcel Dekker Inc., Newyork, 1992.
6. Managing Quality In Apparel Industry, S.K.Bhrdwaj & Pradip V Mehta. Quality is Free,Philip Crosby.
7. V.RameshBabu " Industrial Engineering in Apparel Production" Wood Head publishing India Ltd., ISBN 13:978-93-80308-17-3, 2012.

CASE STUDY

1. Lead time study for a product from development to export and to the store warehouse.
2. Lay Lot Planning for a particular order of quantities with different width of fabric and different size combination of marker.
3. Line balancing of any trouser manufacturing in a conventional factory

U13TX7E304	STRUCTURAL MECHANICS OF YARNS	L	T	P	C
		3	0	0	3

Course Objectives

- To impart the fundamental knowledge about yarn geometry, fibre migration, mechanics of staple-fibre and filament yarns, and fabric geometry related issues concerning textile structures.
- To study the fundamentals of mechanics of textile structures

Course Outcomes

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

- Analyze the material how control mixing / blending
- Analyze evenness, strength, hairiness of fibre and yarn
- Identify packing of fibre in yarn
- Predict migration behavior of fibre
- Estimate of mechanics of filament yarn

Course Content

OPENING AND CLEANING

9 hrs

Opening and cleaning: Elementary ideas of tuft opening and dust and foreign matter separation. Analysis of piano feed regulating motion. Evaluation of Blow Room performance. Carding: Mechanics of fibre entanglement and hook formation during carding. Theories of carding. Transfer mechanism of fibres. Cylinder load and transfer efficiency. Fibre configuration and estimation of degree of disorder. Effect of different parameters on hook formation. Draw frame: Role of drawframe on yarn quality and process parameters. Hook removal in roller drafting. Combing: Theoretical aspects of combing. Fractionation in combing. Parameters affecting FEI and combing efficiency. Speed frame: Mechanism of package building and twisting in speed frame. Ring Spinning: Drives on modern ring frames. Yarn tension in ring spinning. Balloon theory in spinning.

YARN GEOMETRY

9 hrs

Basic geometry of twisted yarn – The idealized helical yarn structure. Yarn count and twist factor. Twist contraction and theoretical calculations. Limits of twists. Real and idealized yarns. Packing of fibres in yarn – Idealized packing – Derivations from ideal forms of packing. Packing in actual yarns. Specific volume of yarns. Relation between Twist, Diameter and Twist Angle.

FIBRE MIGRATION

9 hrs

Ideal migration – Observation of the paths of individual fibres – Migration in spun yarns. Characterization of migration behaviour – Tension variation as a mechanism of migration – Criteria for interchange of position – Theory of migration – Conditions for migration and frequency of migration. Forms of yarn twisting – Cylindrical and Ribbon twisting.

MECHANICS OF STAPLE FIBRE YARNS

9 hrs

Theoretical analysis of yarn geometry – Stress-strain distribution in yarn – Fibre obliquity and

slippage – Influence of fibre length, fineness and friction on fibre slippage and yarn strength – Yarn breakage. Strength of blended yarns – Hamburger's model. Analysis of tensile behaviour, Prediction of breakage, Analysis of yarn mechanics by energy method, Observed extension and breakage of staple fibre yarns.

MECHANICS OF FILAMENT YARNS

9 hrs

Theory of extension of continuous filament yarns, Analysis of tensile forces, Stress-strain relations of the filaments, Effects of large extensions, Filament behaviour at large extensions, Prediction of breakage, Load-Extension curve near break, Tenacity, Breaking extension, Initial modulus, Work of rupture.

L: 45 hr

Total Hours:45

REFERENCES

1. J.W.S. Hearle, P. Grosberg and S. Backer, Structural Mechanics of Fibres, Yarns and Fabrics, Wiley-Interscience, New York, 1969.
2. B.C. Goswami, J. Martindale and Scandio, Textile Yarns: Technology, Structure and Application, Wiley-Interscience, New York, 1977.
3. J.W.S. Hearle, J.J. Thwaites and J. Amirbayat, Mechanics of Flexible Fibre Assemblies, Marryland, 1980.
4. R. Postle, S. De Jong and G.A. Carnaby, The Mechanics of Wool Structures, Ellis Horwood, 1988.
5. Lord P.R., "Handbook of yarn production" Technology. Science and Economics" Woodhead publishing limited, 2003. ISBN: 9781855736962
6. Klein W, "Technology of short staple spinning" the Textile Institute, Volume 1 to 6 1997.
7. Eric Oxtoby, "Spun yarn Technology", Butterworths, London, 1988.

CASE STUDY:

1. Analysis of tuft size on cleaning efficiency
2. Study of yarn tension on ring spinning performance.
3. Interpretation of fibre length and fineness on yarn strength.

13TXTE305

SMART TEXTILES

L	T	P	C
3	0	0	3

Course Objectives

- To understand the smart technology for textiles
- To gain knowledge about intelligent textiles and its applications
- To know about the manufacturing techniques of wearable electronic clothing.

Course Outcomes

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

- Classify the intelligent textile
- Identify the smart polymers in thermo sensitive fabric
- Summarize the various methods involved in smart fabric development
- Examine the developed fabric based on applications
- Choose appropriate fibres in fabric development for smart applications.

Course Content

BASIC CONCEPTS OF SMART TEXTILES

9 hrs

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

HEAT STORAGE AND THERMO-REGULATED TEXTILES

9 hrs

Basics of heat-storage materials, Manufacture of heat-storage and thermo-regulated textiles and clothing, Properties and clothing application, Development trends.

THERMALLY SENSITIVE MATERIALS

9 hrs

Introduction, Thermal storage and thermal insulating fibres, Thermal insulation through polymeric coatings, Design of fabric assemblies. Phase change materials – Introduction, Applications in textiles and clothing. Uses of Nano-Technology for textiles and clothing.

INTELLIGENT TEXTILES

9 hrs

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

WEARABLE TECHNOLOGY

9 hrs

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

L: 45 hr

Total Hours:45

REFERENCES

1. X.M.Tao, "Smart Fibres, Fabrics and Clothing: Fundamentals and Applications", Woodhead Publishing Ltd., England, 2001.
2. X.M.Tao, "Wearable electronics and photonics" Woodhead Publishing Ltd., England, 2005.
3. Jinlian Hu, "Shape Memory Polymers and Textiles", 1st edition, CRC, USA, 2007.
4. William D. Armstrong, "Smart Structures and Materials: Active Materials Behaviour and Mechanics", Society of Photooptics, USA, 2005.
5. Hipler, "Biofunctional Textiles and the Skin", 1st edition, S.Karger Ag, Switzerland, 2006.

CASE STUDY

1. Smart Textiles have less comfort.
2. Smart textiles are very helpful in protective applications. Do a case study
3. Knowledge of electronics is essential for developing smart textiles. Do a case study

U13GST005

**ENGINEERING ECONOMICS AND
FINANCIAL MANAGEMENT**

L	T	P	C
3	0	0	3

Course Objectives

- Acquire knowledge of economics to facilitate the process of economic decision making
- Acquire knowledge on basic financial management aspects
- Develop the skills to analyze financial statements

Course Outcomes

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

- Evaluate the economic theories, cost concepts and pricing policies
- Understand the market structures and integration concepts
- Understand the measures of national income, the functions of banks and concepts of globalization
- Apply the concepts of financial management for project appraisal
- Understand accounting systems and analyze financial statements using ratio analysis

Course Content

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 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

9 hrs

ENVIRONMENT

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

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

L: 45 hr

Total Hours:45

REFERENCES

1. Prasanna Chandra, “ Financial Management (Theory & Practice) TMH
2. Weston & Brigham, “ Essentials of Managerial Finance”
3. Pandey, I. M., “Financial Management”
4. Fundamentals of Financial Management- James C. Van Horne.
5. Financial Management & Policy -James C. Van Horne
6. Management Accounting & Financial Management- M. Y. Khan & P. K. Jain
7. Management Accounting Principles & Practice -P. Saravanavel

Course Objectives

- To impart the knowledge of textile from the perspective of human clothing interface.
- To gain knowledge about the comfort characteristics of fabric.
- To understand the physiological and field testing of clothing.

Course Outcomes

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

- Describe thermal non thermal components of clothing comfort
- Explain the role of body components in maintaining body temperatures
- Recognize the Principles of heat transfer to and away human body
- Explain various aspects of thermal & skin sensational clothing comfort
- List the characteristics of cloth and made by a interchange properties of fibre

Course Content**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

L: 45 hr**Total Hours:45****REFERENCES**

1. Kothari, V K, "Testing and Quality Management ", CBS Book Publishers, New Delhi, 2000.
2. Li. Y, "The Science of Clothing Comfort", Textile Progress, Volume: 31, No. 1/2, Textile Institute, ISBN: 1870372247, 2001.
3. Saville B P, "Physical Testing of Textiles," The Textile Institute, Woodhead publication limited, Cambridge, ISBN: 1855733676, 1999.
4. Billie J Collier and Helen H Epps," Textile Testing and Analysis,"Prentice- Hall Inc., New Jersey , ISBN 0134882148, 1999.
5. Lyman Fourt & Norman R.S. Hollies, "Clothing: Comfort & Functions", Marcel Dekker, Inc, Newyork, ISBN: 0-8247-1214-5.
6. G.Song, "Improving Comfort in Clothing", Woodhead Publication Ltd, ISBN: 1-84569-539-9.
7. A.Das, R.Alagirusamy, IIT Delhi, "Science in Clothing Comfort", Woodhead Publication Ltd, ISBN: 1-84569-789-8.

CASE STUDY:

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

Course Objectives

- To gain knowledge about various garment wet processing techniques and machineries.
- To understand the different effects produced in garment wet processing.
- To know about garment finishing techniques.

Course Outcomes

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

- Outline the process flow for garment processing
- Explain the various dyeing, printing and finishing methods involved in garment processing
- Prepare the garment with different style using advanced finishing
- Explain the working principle of garment processing machines
- Label the garment care

Course Content**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 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.

L: 45 hr

Total Hours:45

REFERENCES

1. Trotman.E.R.”Dyeing and Chemical technology of textile fibres”,B.I.Pub.,New Delhi.1994.
2. Noemia D’ Souza ,Fabric Care, , New AGE International Pub.1998
3. NCUTE – Programme series, Finishing of Garments and Knits, held at Ichalkaranchi, IIT, Delhi.
4. NCUTE – Programme series, Garment Manufacturing Technology, IIT, New Delhi.
5. Harrison.P.W Garment Dyeing, , The Textile Institute Publication, Textile Progress, Vol .19 No.2,1988.
6. "Garment Wet Processing Technical Manual", AATCC/SDC, 1994.
7. Nicholas P Cheremisinoff, “Handbook of Chemical Processing Equipment, Butterworth-Heinemann 2000

CASE STUDY

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

Course Objectives

- To gain the knowledge about Apparel Quality Control
- To get exposure to various quality control system
- To know about various quality standards

Course Outcomes

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

- Identify the various critical defects in garments
- Discuss about seven tools of quality control in garment industry
- Explain the various statistical quality control in apparel industry
- Choose the appropriate inspection systems in garment industry
- Elaborate the various testing methods for apparels

Course Content**INTRODUCTION****9 hrs**

Introduction - Quality definition - Quality control and its necessity - inspection and importance- functions of inspection - systems of inspection- types of inspection – 100% inspection - sampling inspection - comparison of 100% inspection and sampling inspections. AQL standards; Quality assurance - Difference between quality assurance and inspection; Inspection Agencies

COST OF QUALITY AND QUALITY STANDARDS**9 hrs**

Cost of Quality – Classification of various costs under cost of Quality – Cost of Failure – Cost of Appraisal and Cost of Preventions. Quality standards, statistical quality control - control charts and their applications – importance of sampling - use of sampling techniques; concepts of ISO-9000, Quality Circles, 5-S, Six-Sigma, ISO-14000, TQM and SA-8000

QUALITY CONTROL**9 hrs**

Fabric sewability-seam strength-seam slippage-seam elasticity-stitch dimension -seam dimension-seam pucker-needle cutting-Quality control-designing fabrics - different types of defects in fabrics - major and minor faults - Fabric inspection system-4-point-10-point system. Quality control in pattern making, grading-marker making, spreading- - Quality control of trims and accessories-zippers and buttons

GARMENT INSPECTION AND TOLERANCE**9 hrs**

Quality control in sewing-stitching defects-seam defects-assembly defects Garment Inspection and measuring guide-Tolerance and quality standard for fabrics, processing, cutting, stitching in garment industry, tolerances and quality standard for finished garments. Quality control system and standards for packing and packed goods, warehousing and shipping

APPAREL TESTING**9 hrs**

Seam strength testing – Seam slippage-yarn severance testing in seam; evaluation of interlining quality- Peel bond strength test- colour fastness testing – washing, rubbing, light and

perspiration; apparel dimensional stability testing – durable press evaluation - snap/button pull strength testing –Assessment of Seam puckering

L: 45 hr

Total Hours:45

REFERENCES

1. Grover E.G. and Hamby D.S., “Hand Book of Textile Testing and Quality Control”, Wiley Eastern Pvt Ltd., New Delhi, 1969.
2. Jacco Solinger, “Apparel Manufacturing Hand Book”, Prentice Hall, 1993.
3. Prodip V.Mehta, “An Introduction of Quality Control for the Apparel Industry”. ASQC quality Press, Marcel Dekker Inc., Newyork, 1992.
4. Managing Quality In Apparel Industry, S.K.Bhrdwaj & Pradip V Mehta. Quality is Free,Philip Crosby.
5. Narayana V. and Sreenivasan N.S., “Quality Management – Concepts and Tasks”, New Age International, New Delhi, 2007.
6. Zeiri., “Total Quality Management for Engineers”, Wood Head Publishers, 2000.
7. Feighenbaum., A.V., “Total Quality Control”, McGraw Hill, New York, 1993.

CASE STUDY:

1. Catalogue making for different types of defects in garments and its root cause analysis, fish bone method of corrective action plan.
2. Stitching problems and its relevant/suitable methods, machine controls.
3. Study on garment testing’s and its importance in the functional and aesthetic appeal of the product feature.

U13TX7E404	STRUCTURAL MECHANICS OF FABRICS	L	T	P	C
		3	0	0	3

Course Objectives

- To learn about the mechanics of weaving preparatory processes
- To gain knowledge about the mechanics of various loom motions
- To gain knowledge about the mechanics of various models of fabric geometry

Course Outcomes

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

- Discuss the mechanics of winding
- Describe weaving mechanism
- Analyze cloth geometry
- Evaluate woven fabric properties
- Explain the objective measurement of fabrics

Course Content

WEAVING PREPARATION

9 hrs

Mechanics of package building during winding, Performance of sensors, Splicing and yarn tension during unwinding, Yarn tension controlling devices, Cone angle and traverse in sectional warping, Stretch control in sizing, Weft package sloughing and its control.

WEAVING

9 hrs

Kinematics of sley and heald motion, Shed depth and interference factor, Shedding cam design, Mechanism of picking, Shuttle retardation and its importance, Causes of pick variation, Cloth fell equation, Bumping condition.

FABRIC GEOMETRY

9 hrs

Engineering approach to the analysis of fabric, Pierce geometrical model, relationship between h, p, c, Crimp interchange, Jammed Structure, concept of similar cloth. Minimum possible cover factor. Race track geometry, close limit of weaving concept of pierce elastic thread model, Geometry of plain knitted fabric.

OTHER MODELS AND DEFORMATION

9 hrs

Elements of woven fabric geometry, Pierce and Olofsson models. Saw tooth and Bilinear models. Form factor, degree of set, extension behaviour of woven fabric, prediction of modulus, tensile properties in bias direction. Mechanics of nonwoven fabrics.

FABRIC PROPERTIES

9 hrs

An elementary idea about tensile, bending, shear and drape behaviour of fabric. An elementary idea about fabric objective measurement technology.

L: 45 hr

Total Hours:45

REFERENCES

1. J.W.S. Hearle, P. Grosberg and S. Backer, “Structural Mechanics of Fibres, Yarns and Fabrics”, Wiley-Interscience, New York, 1969.
2. Peirce F T and Womersley J R, “Cloth Geometry”, reprint, The Textile Institute, Manchester 1978.
3. Marks R and Robinson A T C, “Principle of Weaving”, The Textile Institute, Manchester, 1986.
4. Winding, “BTRA Monograph series”, The Bombay Textile Research Association, Bombay, 1981.
5. “Warping and Sizing, BTRA Monograph Series”, The Bombay Textile Research Association, Bombay, 1981.
6. Booth J E, “Textile Mathematics vol. 3 1st ed”, The Textile Institute, Manchester 1975.
7. Journals: Textile Research Journal, Princeton, USA and Journal of Textile Institute, Manchester, UK.

CASE STUDY:

1. Study the effect on yarn tension on the performance of winding
2. Study the influence of fabric structure on crimp
3. Compare the objective evaluation methods on fabric quality

U13TXTE405	MARKETING AND MERCHANDISING	L	T	P	C
		3	0	0	3

Course Objectives

- To know the concepts of marketing and merchandising.
- To understand the consumer behaviour.
- To know the pricing techniques of textile products.
- To know the export documentation procedures

Course Outcomes

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

- Describe the marketing concept in textile industry
- Define the marketing segmentation
- Summarize the export documentation for export the product
- Recall the pricing methods and their application
- Discuss the sourcing strategies in textile marketing

Course Content

MARKETING AND CONSUMER BEHAVIOR MARKETING 9 hrs

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.

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.

L: 45 hr

Total Hours:45

REFERENCES

1. Evans. J. R. “Marketing: Marketing In The 21st Century”, 8th edition, 2003.
2. Philip Kotler, “Marketing Management”, PHI publications, 2004.
3. S.Shivaramu, “Export Marketing – A practical Guide to Exporters”, McGraw-Hill Book Company, 1985.
4. Ruth E.Glock and Grace L.Kunz, “Apparel manufacturing and sewn product analysis”, Prentice Hall, New Jersey, 2000.
5. D. Sinha, “Export Planning and Promotion”, IIM, Calcutta, 1981.
6. Tuhin K. Nandi, “Import–Export Finance”, IIM, Calcutta, 1989.
7. J.A. Jarnow, M.Guerreiro, B.Judelle, “Inside the Fashion Business”, MacMillan Publishing Company ISBN: 0-02-360000-4., 1987.
8. Ruth E.Glock, Grace I.Kunz, “Apparel Manufacturing: Sewn Product Analysis”, Pearson Education, Fourth Edition, 2005.
9. Elaine Stone, Jean A. Samples, “Fashion Merchandising”, McGraw-Hill Book Company, ISBN: 0–07–061742–2., 1985.
10. S.Shivaramu. “Export Marketing” – A Practical Guide to Exporters”, Wheeler Publishing, ISBN: 81-7544-166-6, 1996.

CASE STUDY:

4. Study on the consumer behavior in textile marketing
5. Study on the export documentation and processing
6. Study on the impact of globalization and effect on export marketing
7. Study on the export documentation and processing.

U13GS7006	PRODUCT DESIGN AND DEVELOPMENT	L	T	P	C
		3	0	0	3

Course Objectives

- Acquire knowledge on the various stages of a product development process
- Develop skills for using the various tools and techniques for developing products
- Acquire knowledge on project management techniques

Course Outcomes

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

- Understand the process to plan and develop products
- Understand the process of collecting information and developing product Specifications
- Understand the concept generation, selection and testing processes
- Understand the concepts of product architecture, industrial design and design for Manufacture
- Understand the basics of prototyping, economic analysis and project planning and Execution processes

Course Content

INTRODUCTION - DEVELOPMENT PROCESSES AND 9 hrs

ORGANIZATIONS - PRODUCT PLANNING

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

A generic development process, concept development: the front-end process, adapting the generic product development process, the AMF development process, product development organizations, the AMF organization.

The product planning process, identify opportunities. Evaluate and prioritize projects, allocate resources and plan timing, complete pre project planning, reflect all the results and the process.

IDENTIFYING CUSTOMER NEEDS - PRODUCT 9 hrs

SPECIFICATIONS

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

Specifications, establish specifications, establishing target specifications setting the final specifications.

CONCEPT GENERATION - CONCEPT SELECTION - CONCEPT 9 hrs

TESTING

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

interpreting the result, reflecting on the results and the process.

PRODUCT ARCHITECTURE - INDUSTRIAL DESIGN - DESIGN 9 hrs FOR MANUFACTURING

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

Assessing the need for industrial design, the impact of industrial design, industrial design process, managing the industrial design process, is assessing the quality of industrial design.

Definition, estimation of manufacturing cost, reducing the cost of components, assembly, supporting production, impact of DFM on other factors.

PROTOTYPING - PRODUCT DEVELOPMENT ECONOMICS - 9 hrs MANAGING PROJECTS

Prototyping basics, principles of prototyping, technologies, planning for prototypes.

Elements of economic analysis, base case financial mode,. Sensitive analysis, project trade-offs, influence of qualitative factors on project success, qualitative analysis.

Understanding and representing task, baseline project planning, accelerating projects, project execution, postmortem project evaluation.

L: 45 hr

Total Hours:45

REFERENCES

1. Product Design and Development: Karl. T. Ulrich, Steven D Eppinger,. Irwin McGrawHill.
2. Product Design and Manufacturing: A C Chitale and R C Gupta, PHI
3. New Product Development: Timjones. Butterworth Heinmann,, Oxford. UCI.
4. Product Design for Manufacture and Assembly: Geoffery Boothroyd, Peter Dewhurst and Winston Knight.

U13TX7E501

ADVANCED KNITTING

L	T	P	C
3	0	0	3

Course Objectives

- To gain knowledge about recent developments in knitting
- To get exposure about Modern knitting machine

Course Outcomes

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

- Explain different Needle Selection Techniques in weft knitting
- Discuss the yarn quality requirements for weft knitting
- Summarize the Dimensional properties of knitted fabric
- Compare Tricot & Rachel knitting machine
- Illustrate specialty warp knit structure

Course Content

WEFT KNITTING

9 hrs

Needle Selection Techniques in weft knitting - storage and positive feeding devices - Patterning for multitrack machines.

KNITTING DYNAMICS

9 hrs

Yarn tension and knitting forces - effect of cam shape, increase in number of feeders and increase in linear speed - needle breakages.

FABRIC GEOMETRY AND DEVELOPMENTS IN CIRCULAR KNITTING

9 hrs

Tightness factor – Dimensional properties - Spirality - Relaxation - shrinkage. Ring and rotor yarn quality requirements for weft knitting - High Pile and Socks Knitting Machines.

WARP KNITTING AND FABRIC GEOMETRY

9 hrs

Tricot & Rachel Two, Three & Multibar Machines – Pattern Control Mechanisms - Pattern Wheels and Chain Links. Dimensional characteristics of warp knits, Warp knitted fabric geometry - relation between loop length and construction - fabric relaxation and shrinkage.

SPECIALITY WARP KNITS

9 hrs

Weft insertion - co-we-nit - cut presser – Laying-in - fall plate – double needle bar warp knitting machines – Jacquard knitting. Warp knitted technical textiles. Testing and Quality Control of Weft and Warp knitted fabrics. Various defects in knitting.

L: 45 hr

Total Hours:45

REFERENCES

1. Spencer D J, “Knitting Technology”, Woodhead Publishing Limited, 2005.
2. Raz S, “Warp Knitting Technology”, Verlag Melliand Textilberchte, GMBH, Heidelberg, 1987.
3. Gottlieb N, “The Production and Properties of Warp knitted fabrics”, Textile Progress, Vol.7, No.2, 1975.
4. Ajakankar, “The Knitting Technology” anbumani book universal publishing company.
5. Fundamentals and advances in knitting technology wood head publishing limited, 2012.
6. Advances in knitting technology, wood head publishing, 2011.
7. N. Anbumani, “Knitting Technology”.

CASE STUDY:

1. Problems associated with knitting
2. Cost control in knitting industry
3. Special knit structure for technical textiles

U13TXTE502 TEXTILE PRODUCT ENGINEERING

L	T	P	C
3	0	0	3

Course Objectives

- To impart knowledge about product engineering
- To understand the concept of product design.
- To know about simulation techniques.

Course Outcomes

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

- Outline about the fundamentals of product engineering
- Explain on the market research and customer requirement analysis
- Design the major textile products
- Use the concept of textile materials simulation
- Design and develop a specific textile material

Course Content

PRODUCT ENGINEERING

9 hrs

Scope and objectives, Product design procedure, Selection of raw material and product, Product analysis, Production aspect, Product design, Consideration of a good product design, Design specifications, Preliminary design, Maintainability, Reliability and Redundancy, Final design, Modular design, Computer aided design, Process selection, Product life cycle, Criteria for product success.

MARKET RESEARCH & CUSTOMER REQUIREMENT ANALYSIS

9 hrs

Product Research - Market Research, Material Research, Equipment and process research, Benchmark analysis, Customer requirement analysis. Product Appraisal - Functional and aesthetic analysis, Manufacturing and economical analysis.

TEXTILE PRODUCT DESIGN

9 hrs

Concept of fibre-assembly-structure engineering(FASE) and the logic of textile-product designing-executional logic for designing textile products and manufacturing methods. Constitution of data bases for basic structural design, data base of a FASE-application-Printed and constructed designs-Product Range- Design for essential and desirable properties of textiles-Fibre, yarn, fabric specification and finishing performance of textile products.

SIMULATION OF SPECIFIED PROPERTIES

9 hrs

Special yarns, Woven fabrics, Non-woven fabrics, Simulation of material, Texture by using computer graphics, Concept of overall designing procedure.

PRODUCT DEVELOPMENT

9 hrs

Design of non-woven for filtration, Development of needle punched fabrics for geo technical applications, Design of Suture threads, twines & ropes, Geo textiles, Parachute.

L: 45 hr

Total Hours:45

REFERENCES

1. J. Wilson, "Hand book of Textile Design: Principles, Process and Practice", Woodhead publishing Limited, 2001.
2. T. Matsuo and M. N. Suresh, "The Design Logic of Textile Products", Textile Progress Volume: 27, Number: 3, The Textile Institute Publication, 1998.
3. George Dieter, "Engineering Design", McGraw Hill, 4th Edition, 2008.
4. Dale H. Besterfield, "Total Quality Management", Prentice Hall, 1995.
5. Proceedings of the Seminar on "Non- woven: Technology, Market and Product Potential", IIT, New Delhi, 2005.
6. Ken Hurst, "Engineering Design Principles", Elsevier Science and Technology Books, May 1999.
7. Richard Birmingham, Graham Cleland, Robert Driver & David Maffin, "Understanding Engineering Design", Prentice Hall of India, 1998.

CASE STUDY:

1. Product development based on specific end use
2. Study on the properties of needle punched fabric
3. Suture thread and its properties

U13TXTE503 ENVIRONMENTAL MANAGEMENT IN TEXTILE INDUSTRY	L	T	P	C
	3	0	0	3

Course Objectives

- To understand the impact of pollution.
- To attain the knowledge on various pollutants in textile industry.
- To get exposure on pollution in various textile process.
- To gain knowledge on the pollution control measures.

Course Outcomes

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

- Outline the sources of pollution
- Examine the pollution problems in textile industry
- Summarize the pollution control measures in textile industry
- Describe environment management systems (EMS)
- Choose eco-friendly dyes and chemicals in wet processing of fabric

Course Content

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 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.

L: 45 hr

Total Hours:45

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.

CASE STUDY

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.

U13TXTE504	ADVANCES IN GARMENT PROCESSING	L	T	P	C
	MACHINERY	3	0	0	3

Course Objectives

- To gain knowledge about modern Fibre and yarn dyeing machines
- To get exposure on recent fabric and garment dyeing machine
- To get knowledge on Advanced printing machine

Course Outcomes

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

- Outline the process flow for garment processing machines
- Explain the various dyeing, printing and finishing methods involved in garment processing
- Prepare the garment with different style using advanced finishing machine
- Explain the working principle of garment processing machines
- Schedule the routine maintenance of the garment machines

Course Content

FIBRE AND YARN DYEING

9 hrs

Advances in fibre dyeing machine - Advances in package dyeing machine- importance of winding in yarn dyeing — calculation of winding density — various yarn dyeing defects caused by package dyeing machine - detailed maintenance schedule for package dyeing machines.

FABRIC DYEING

9 hrs

Advances in Beam dyeing - Advances in soft flow dyeing machines, Advances in jet dyeing machines — Developments in jiggers, Continuous dyeing machineries & its developments - Various dyeing defects caused by the above machineries.

MECHANICAL FINISHING

9 hrs

Hydro extractor, Fabric opener RF dryer, Yarn dryer, Knitted fabric dryer, Hot flue dryer, Stenter & its type. Sanforizing machine, Compacting machines, peach finishing machines.

PRINTING

9 hrs

Preparation of screens for Rotary Printing machines. Principle and working of fully automatic flat bed screen printing machine –Rotary Printing machine- Transfer Printing machine-Garment Printing machines- Various practical problems & possible remedies in the above Printing machineries.

GARMENT DYEING

9 hrs

Garment dyeing machines, Tumble dryer, Fusing machines, Backfilling machine, Importance of maintenance in processing machineries, Machineries used for foam application.

L: 45 hr

Total Hours:45

REFERENCES

1. "Garment Wet Processing Technical Manual", AATCC/SDC, 1994.
2. J N Shah, "Guide to wet textile processing machines", Woodhead Publishing, India, 2014.
3. Bhagwat R.S., 'Wet Processing Machineries'. Mahajan Publications, 2000.
4. Usenko V. Processing of Manmade fibres, M.I.R. Publishers, Moscow, 1975.
5. Gokhale S.V. & Dhingra A.K. maintenance in chemical processing department of textile mills, ATIRA. 1994.
6. Patel, Textile Wet processing machineries- ATIRA. 1995.
7. Harrison.P.W Garment Dyeing, , The Textile Institute Publication, Textile Progress, Vol .19 No.2, 1988.

CASE STUDY:

1. Problems associated with garment processing
2. Techno economic study for garment processing machinery
3. Energy conservation techniques followed in garment processing industry

U13TXTE505

**COMPUTER APPLICATIONS IN
TEXTILES**

L	T	P	C
3	0	0	3

Course Objectives

- To impart the knowledge of role of computer system on fibre & yarn production.
- To impart the knowledge of role of computer systems in fabric & apparel production
- To understand the role of computer in textile business & quality control.

Course Outcomes

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

- List the functions & characteristics of input and output devices
- Classify different data base systems used in textile industry
- Summarize the computer aided textile machines
- Discuss the scope of application of computers to the process of textile industry
- Explain the use of computers to enhance finance accounts, marketing in textile business

Course Content

INTRODUCTION

9 hrs

Basic architecture and functions of different components of computers. Overview of spreadsheets - word processing programs - DBMS and their application to the field of textile technology- Role of microprocessors in textiles. Various sensors used in textile industry.

ROLE OF COMPUTER SYSTEMS ON FIBER AND YARN PRODUCTION 9 hrs

Online monitoring of machine and process performance in manmade fiber production - cotton blending - opening and cleaning. Online nep monitoring in cards. Working of open loop and closed loop auto levellers in modern draw frame. Principle of operation of RINGDATA & RING-i systems.

ROLE OF COMPUTERS SYSTEMS IN FABRIC AND APPAREL PRODUCTION 9 hrs

Basics of online monitoring of machine and process performance at different stages of fabric production- Computerized yarn clearing on modern winding machines - Online process control systems in sizing process. – Online monitoring of loom working. Loom data systems. Scope for application of computers to the process of textile chemical processing. Introduction to Computer aided Weaving and Garment designing - Basic features of various software.

ROLE OF COMPUTER SYSTEMS IN QUALITY CONTROL 9 hrs

BIAS software for control of cotton mixing cost- Engineering Fiber Selection (EFS) – Linear programming in cotton mixing. Computers in fiber testing instruments- HVI & AFIS. Computerized yarn & fabric quality evaluation- Basics of UT4 & UT5, CYROS, OASYS & Fabricscan. Introduction to ANN and Image processing with reference to textile industry.

ROLE OF COMPUTERS IN TEXTILE BUSINESS 9 hrs

Identification of areas for the application of computers in finance, accounts, marketing and

human resource management in textile business. Robotics in textile industry. MIS& ERP in textiles. Computer aided embroidery machines. Integrated Knitting machines.

L: 45 hr

Total Hours:45

REFERENCES

1. Hu J, “Computer Technology for Textile & Apparel ”, WoodHead Publishers, ISBN : 1 84569 729 4
2. Information Technology in Production and Trading of Textiles- NCUTE Programmes series, 2001.
3. Jayaraman S., “Computer Science and Textile Science, Textile Progress, Volume 26 No.3, Textile Institute, Manchester, U.K., 1995.
4. Computers in the World of Textiles – Textile Institute, Compilation of paper presented at annul work conference September 26-29, 1984, ISBN: 9780900739699
5. Barella A., “Online quality control in Spinning and Weaving”, Textile Progress, Volume 17 No.1, Textile Institute, Manchester, U.K, 1998.
6. Sigmon DM, Grady PL, Winchester SC, “Computer Integrated Manufacturing and Total Quality Management” Textile Progress, Vol 27 No4, ISBN – 1 87037 216 6
7. Stepfen Grey, “ CAD/CAM in Clothing and Textiles”, Gower Publishing Limited 1998, ISBN 0 566 07673X

CASE STUDY

1. Computer Integrated Manufacturing – An Indispensable tool for Garment Industry
2. Digitally printed Textiles and Image Quality
3. Flexible automation Textile Manufacturing

Course Objectives

- To gain the knowledge about various home textiles products
- To get exposure to carpet manufacturing Technology
- To know about Furnishing textiles

Course Outcomes

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

- Classify the home textile products
- Discuss the various carpet manufacturing methods
- Summarize the quality standards for various home textile product
- Explain the applications of home textiles in hospital
- Discuss the quality requirements of floor coverings

Course Content**FURNISHING****9 hrs**

Introduction of Textile Furnishing - Definition – Different Type of Furnishings Materials – Woven and non-woven – Factors affecting Selection of Home Furnishings.- Advances in period style in, Different styles, and use of Colours, design & texture in home furnishing. Developments in living room furnishing including upholstery, Wall Hangings, Cushion, Cushion Covers, Bolster and Bolster Covers

FLOOR COVERINGS AND BED LINENS**9 hrs**

Recent Developments in manufacturing of floor coverings -Hard Floor Coverings, Resilient Floor Coverings, Soft Floor Coverings, Rugs, Cushion and Pads – Use and Care. Advances in the production of - Different Types of Bed Linen – Sheets – Blankets – Blanket Covers – Comforts – Comfort Covers – Bed Spreads – Mattress and Mattress Covers – Quilting-Pads – Pillows- Uses and care

CURTAINS AND DRAPERIES**9 hrs**

Home decoration -Draperies – Choice of Fabrics – Calculating the amount of Material Needed – Different type of Doors and Windows – Their applications – Curtains – Types of Curtains, Method of Finishing Draperies – Tucks of Pleats. Uses of Drapery Rods, Hooks, Tape Rings and Pins.

CARPETS**9 hrs**

Fundamentals of Carpets: Classification of Carpets, history, textures and other relevant features. Materials used in carpet: Fibres/ Yarns/ Fabrics used, Familiarization with terms used to describe Quality and construction of Carpet, regionally, nationally and internationally. Basic principles of Hand knotted carpet-Hand woven carpets-Tufted carpets-Chemical coating of carpets -Gradation system of carpets

KITCHEN, TABLE, HOSPITAL LINENS AND TOWELS

9 hrs

Kitchen: - Definitions types of Kitchen linens, Dish cloth, Hand Towels -Kitchen apron, Bread basket, Napkins, Gloves, Fridge handle covers, Fridge cover, Mixi cover, their use and care.

Table Linens:-Definitions , Different types of Table linens, Table Mats ,Table cloth and hand Towels – types, selection use and care.

Hospital: - Hospital Linen & their importance, Nature of fabric suitable for Hospital for different purpose, colour of linen & their effect on patient mind etc.

L: 45 hr

Total Hours:45

REFERENCES

1. Alexander.N.G., “Designing Interior Environment”, Mas Court Brace Covanorich, Newyork, 1972.
2. Donserkery.K.G., “Interior Decoration in India”, D.B.Taraporeval Sons and co. Pvt Ltd., 1973.
3. Wingate I.B., & Mohler J.E., Textile Fabrics & Their Selection, Prentice Hall Inc, New York, 1984.
4. Elsasser, Virginia Hencken, “Know Your Home Furnishings”, Fairchild Books & Visuals, September, 2003.
5. Cargill, Katrin, “Home Furnishing Workbook: Featuring 32 Step-by-step Textile Furnishing Projects”, Rayland Peters and Small, USA, 2001.
6. Whitmore Maureen, “The Home Furnishings Workbook”, Randall International November, 1999.
7. Advances in Carpet Manufacture by K. K. Goswami, Woodhead Publishing.2011

CASE STUDY:

1. Quality problems and remedies in Home Textiles
2. Cost control in Home Textiles
3. New Product development

DEPARTMENT OF TEXTILE TECHNOLOGY

VISION

To provide world class human resources to Indian 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 *upholding professional ethics* and contribute their might in *transforming India into a world leader* in technological advancement and prosperity.