DKTE Society's

TEXTILE & ENGINEERING INSTITUTE

Rajwada, Ichalkaranji 416115

(An Autonomous Institute)

DEPARTMENT: TEXTILES

CURRICULUM

B. Tech. Textile Technology Program

Third Year

With Effect From

2022-2023

DKTE

Promoting Excellence in Teaching
Learning & Research

Third Year B. Tech Textile Technology
Semester- V

Sr. No.	Course Code	Name of the Course	Course Category	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	TTL331	Computer Programming	ESC	3	-	-	3	3
2	TTL332	Yarn Forming Technology - IV	PCC	3	-	-	3	3
3	TTL333	Fabric Forming Technology - IV	PCC	3	-	-	3	3
4	TTL334	Chemical Processing of Textiles - II	PCC	3	-	-	3	3
5	TTL335	Fibre Science	PCC	3	-	-	3	3
6	TTL336	Mechanics of Textile Machines	PCC	3	-	-	3	3
7	TTP337	Computer Programming Lab	ESC	-	-	2	2	1
8	TTP338	Yarn Forming Technology - IV Lab	PCC	-	-	2	2	1
9	TTP339	Fabric Forming Technology - IV Lab	PCC	-	-	2	2	1
10	TTP340	Chemical Processing of Textiles - II Lab	PCC	-	-	2	2	1
11	TTP341	Fibre Science Lab	PCC	-	-	2	2	1
12	ATL301	Computer Operating Skills	H	2	-	-	2	-
13	ATL303	Chinese Language	HSMC	2	-	-	2	2

Group Details

HSMC: Humanities, Social Science & Management Courses

BSC: Basic Science Courses

ESC: Engineering Science Courses

PCC: Professional Core Courses

PEC: Professional Electives Courses

OEC: Open Elective Courses

PST: Project / Seminar / Ind. Training

MC: Mandatory Courses

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTL331: COMPUTER PROGRAMMING

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To study database management system and SQL commands.
- To understand VB.Net IDE, various types of objects & programming constructs in VB.Net.
- To study different categories of data and data science process.
- To study data visualization tools.

Course Outcomes:

At the end of the course students have understood

- Design database management system and write SQL commands.
- Develop simple application programs in VB.Net.
- Demonstrate data science process.
- Develop application using data visualization tool.

Course Contents

Unit I	**Database Management System**	**08 Hours**

Introduction to database, database management system; Relational database management systems; Structured Query Languages (SQL) – various commands/ clauses/ operators- create table, insert into, alter table, drop table, update, delete; queries- select, from, where clause; operators- mathematical, comparison, logical; aggregate functions; clauses- order by, group by, having

Unit II	**Introduction to .Net Framework and VB.Net Language**	**08 Hours**

Introduction to .NET, .NET Framework features & architecture. Introduction to Visual Studio, VB.NET Integrated Development Environment, Project Basics, Event driven Programming.
The VB.NET Language - variables, data types, variables declaration, scope & lifetime of a variable, constants, operators and expressions, arrays, types of arrays

Unit III	**Conditional Branching, Looping and Procedures**	**08 Hours**

Conditional branching statements- simple if else, nested if else, select case; Looping statements- Do while, Do until, While and For loop; Procedures- Subroutines, Functions and their declaration; Msgbox & Input box

Unit IV	**Designing User Interface & Database Connectivity**	**06 Hours**

Working with Forms: Loading, showing and hiding forms, controlling one form within another.
Methods, properties, events and working of basic controls-Textbox, Label, Button, List box, Combo box, Checkbox, Picture Box, Radio Button, Panel, Timer, Dialog controls. Database connectivity

Unit V	**Introduction to Data Science**	**04 Hours**

Introduction, benefits & uses of data science and big data; Categories of data- structured, unstructured, natural language, machine generated data, graph based or network data, audio, image, video, streaming data; Data science process

Unit VI	**Data Visualization Methods and Tools**	**05 Hours**

Introduction- ugly, bad and wrong figures; Visualizing data- mapping data on aesthetics, types of data, scales map, data values on aesthetics; Co-ordinate system & axes- cartesian co-ordinates, nonlinear axes; Study of data visualization tools

References Books:

1. Database Management System by Korth, Sudarshan, Silberchitz; McGraw Hill Publication
2. VB.NET Programming Black Book by Steven Holzner– Dreamtech Publications.
3. Mastering VB.NET by Evangelos Petroutsos- BPB Publications
4. Introducing Data Science by Cielen, Meysman, Ali; Dreamtech Publications
5. Fundamentals of Data Visualization by Wilke, O'reilly; Shroff Publication

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTL332: YARN FORMING TECHNOLOGY - IV

Teaching Scheme: Lectures: 03 Hrs./Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- Understand the basics of compact spinning systems.
- Understand the classification, production and characteristics of fancy, specialty yarns.
- Explain the manufacturing process and characteristics of Blended Yarns.
- To know the singeing and yarn conditioning process.

Course Outcomes:

At the end of the course students have understood

- Explain the basics of compact spinning systems.
- Demonstrate the production and characteristics of fancy and specialty yarns.
- Demonstrate the manufacturing process and characteristics of Blended Yarns.
- Explain the singeing and yarn conditioning process.

Course Contents

Unit I	Compact Spinning	04Hours

Basics of Compact Spinning. Types of compact spinning systems and their working. Advantages and limitations.

Unit II	Yarn Doubling	07 Hours

A) Yarn Folding and Doubling

Object of ply twisting - Scope of ply twisting - Methods of ply twisting, concept of balance of twist. Study of conventional ring doubling machines. Calculation relating to production, efficiency and twist. Limitation of ring doubling system.

B) Study of Two for One Twisters

Evolution of TFO, Basic concepts, study of design and construction of two for one twisting machine. Machine design aspects, drives used, power requirement, calculations relating to efficiency, production and twist. Advantages over ring doubling. Techno economics. Modern developments in TFO machines.

Unit III	Fancy Yarns	06 Hours

Classification of fancy yarns - basic principle - study of productions methods - spinning techniques for the production of fancy yarns – Design and construction of the basic profiles such as Spiral, Gimp, Loop, Snarl, Knop, Cover, Slub, Neppy

Unit IV	Specialty Yarns	06 Hours

Core and cover yarns: - Principles of formation of yarn, constructional details of machine, process description, production of different types of core and cover yarns, yarn properties & end uses.

Mélange Yarns: - Concepts of producing mélange yarn. Process and sequence used for production of Mélange yarn.

Unit V	Blend Spinning	10 Hours

Fibre characteristics and spinnability, fibre properties and end uses, objectives of blending, measures of blending, migration, tinting, selection of blend constituents, and mechanics of blending, blending. techniques, and modification of cotton spinning Machineries for processing of manmade fibres. Prediction of blended yarn strength. Common faults in blended and 100% man made spun yarn.

Unit VI	Yarn Conditioning and Singeing	05 Hours

A) Principle and scope of yarn conditioning, conditioning procedure, design and operational details of yarn conditioning systems.

B) Principle and scope of yarn Singeing, Methods, operational details of yarn singeing machines.

References Books:

1. Textile Yarn, Technology, Structure and Application" – Goswami B.C., Martindale, J.G.,
2. K R Salhotra, "Spinning of manmade fibres and blends on cotton systems", The textile
3. Association, India 2004.
4. V.B.Gupta and K.K.Kothari (Ed), Man-made Fibres Production, Processing Structure, Properties and Applications, Vol. I and II, Dept. of Textile Technology, IIT, New Delhi 1988.
5. Hamburger, W. J., "The Industrial Application of the Stress-Strain Relationship", J. Textile Inst. 40, 700 (July 1949).
6. BTRA monograph series.
7. Elements of ring frame and doublings by A. R. Khare.
8. Spun Yarns, Eric Oxtoby.
9. Short Staple Spinning, Vol. I, IV, V, by W. Klein.
10. Spun Yarn Technology C.A. Lawrence.
11. Research Papers, Bulletins, Pamphlets, Marketing Manuals.
12. Processing of Manmade Fibers, W. Klein, Vol.VII
13. Two for one Twister technology and Technique for spun yarns by H. S. Kulkarni and HVS Murthy.
14. Advances in Spinning – S. M. Ishtiaque
15. NCUTE Pilot Programme in Spinning.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTL333: FABRIC FORMING TECHNOLOGY -IV

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures : 03 Hrs/Week	03	SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To explain high speed shedding mechanism
- To explain rapier weaving technology
- To explain airjet & waterjet technology
- To explain unconventional weaving methods like narrow weaving, multiphase & circular weaving

Course Outcomes:

At the end of the course students will be able to

- Differentiate between various high speed shedding mechanism
- Explain rapier weaving technology
- Explain airjet & waterjet technology
- Explain unconventional weaving methods like narrow weaving, multiphase & circular weaving

Course Contents

Unit I	High Speed Shedding Mechanism	08 Hours

Limitations of Tappet shedding motion, positive cam shedding concept and need, Positive cam shedding motion: constructional and working details. Adjustments essential during weave change and timing.

Limitation of lever and cam negative dobby, positive rotary cam concept, Rotary mechanical and electronically controlled dobby, mounting possibilities, pitch of heald frames, capacity, data transfer, adjustments during weave change, various models available in the markets.

Limitations of mechanical Jacquard, concept of electronic Jacquard, details of construction and working of electronic Jacquard, comparison between various Jacquard (Bonas, Staubli, Grosse) working principles, adjustment for various weaves, Jacquard capacity, mounting, suitability for various end uses, data transfer and management

Unit II	Rapier Weft Insertion	08 Hours

Study of weft velocity curves for looms with different methods of weft insertion. Concept of Dewas & Gabler rapier systems, their comparison with other weft insertion systems from weft acceleration & retardation point. Study of effect of reed width on loom speed.

Principles of different single & double rapier weft insertion systems (Drive), their comparison. Study of rapier heads.

Rapier machine models, machine drive, Timings of various motions, cam shedding & beat up motion, Rapier motion drive details, Details of rapier tape, head, sely construction , guiding elements, Gripper openers, cutters, stroke adjustment. Selvedge forming elements & adjustments.

Let-off & take up motion (Mechanical & power), their adjustments for various pick density

range, specifications of rapier & head for various applications. Specifications speed, power & machine timing for various widths.
All auxiliary motions such as brake, clutch oiling, cleaning, MIS, General electronic circuit, pick finding, multi colour weft insertion, weft-stop, warp stop, whip roller, weft brake etc.
Weft waste during selvedge formation.

Unit III	Air Jet weft Insertion	10 Hours

Machines for air jet weaving, Introduction, overview of weft insertion elements, main nozzle designs, relay nozzle designs, stretch nozzle design. Configurations, loom timing of picking elements and settings, constructional details of profile reed. Air supply and energy consumption, Air flow in nozzles and guide channel, performance of yarns in air jet insertion, Optimization of settings, Weft stops and breaks, application of air jet weaving. Drive, Pneumatic circuit for air supply. Technical features of modern air jet weaving machines, Quality of Air

Unit IV	Water Jet Weft Insertion	04 Hours

Introduction, Design requirements, Picking mechanism, weft insertion elements, loom timing and settings, features of water jet looms, applications of water jet weft insertion system. Comparison with air jet, maintenance. Technical features of modern water jet weaving machines. Comparison of various shuttle less weaving technologies with respect to reed width, loom speed, WIR and capital cost.

Unit V	Multiphase weaving	04 Hours

Multiphase: Introduction, Classification, Methods to form warp wise and weft wise sheds, methods of picking, methods of beat up, limitations of multiphase weaving, applications, features of modern multiphase weaving machines e.g. M 8300, maintenance.
Circular Weaving: Introduction, Classification as per number of shuttles, shedding, picking, beating, cloth collection, supply of warp yarn, stop motions for warp and weft, productivity. Technical features of Circular weaving machines.

Unit VI	Narrow Fabric Weaving	05 Hours

Introduction, Scope of narrow fabric weaving, applications
Technology of narrow fabric weaving – Machine construction, needle looms, warp feed systems from beams, creel for elastomeric yarns, shedding by cam and links, pattern chain preparation for different weaves, weft insertion systems(needle loom) , various selvedge forming systems on needle loom, drives to different elements.

References Books:

1. Handbook of weaving – Sabit Adanur.
2. Modern preparation and weaving machinery – A Ormerod
3. Shuttleless Looms – J. J. Vincent
4. Shuttless weaving machine – O. Talavasele, V. Svaty
5. Narrow Fabric Weaving - Sauer Lander Verlag

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTL334: CHEMICAL PROCESSING OF TEXTILES- II

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs./Week	03	SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- Introduce students with the objects of coloration of textile fibres and corresponding methodology used.
- Introduce students with the various types of machinery for dyeing of various substrates and significance of fastness properties.
- Introduce students with the objects, process and machinery used for printing of various fabrics.
- Introduce students with the objectives and effects of finishing treatments on textiles.

Course Outcomes:

At the end of the course students have understood

- The elements of dyeing, dyeing of cellulosic, polyamide, polyester, acrylic & their blends with suitable dyes.
- The working principle & procedure of dyeing machinery such as jigger, winch, padding mangle, jet and soft flow and analyse process of colour fastness property against agencies such as washing, rubbing and light fastness.
- Concept of Printing and functions of ingredients used, working of printing machines like Flat Bed, Rotary and Ink-jet.
- Understand objects of finishing, classification and objects of various mechanical and chemical finishes.

Course Contents

Unit I	**Elements of Dyeing**	**03 Hours**

Definition & Principles of dyeing, Classification of dyes based on the method of application, dye fibre interactions and concepts like exhaustion, expression, percentage shade, affinity and substantivity.

Unit II	**Dyeing of Natural Fibres**	**06 Hours**

Dyeing of cellulosic fibres with direct, vat, reactive and sulphur dyes, Principle steps involved in dyeing, Dyeing of silk and wool with acid and basic dyes. Factors affecting the dyeing process.

Unit III	**Dyeing of synthetic fibres and their blends**	**06 Hours**

Dyeing of Polyester and its blends like polyester-cotton, polyester- viscose, polyester-wool, Dyeing of acrylic and nylon. Importance of fastness, Evaluation of fastness properties like wash fastness, rubbing fastness and light fastness.

Unit IV	**Printing**	**08 Hours**

Concept of printing. Various ingredients used in preparation of printing paste. Various styles of printing such as Direct, Resist and Discharge by using direct, reactive and disperse dyes. Printing with pigments. Concept of inkjet / digital printing.

Unit V	Finishing	08 Hours

Objects of finishing, classification of finishes. Resin finishing, mechanism of resin finishing. Heat setting and weight reduction of polyester material. Concept of specialty finishes like soil release, water repellent and flame retardant finishes.

Unit VI	Machinery used in Chemical Processing	08 Hours

Introduction to package dyeing machine. Jigger dyeing machines, winch dyeing machine, padding mangles, jet dyeing and soft flow dyeing machines. Introduction to various methods of printing such as table, flat bed and rotary screen printing. Study of stenter, calendars and sanforiser.

References Books:

1. Dyeing of Polyester and Its Blends by M.L. Gulrajani.
2. Dyeing of Chemical Technology of Textile Fibres by E.R. Trotman.
3. Technology of Dyeing by V.A. Shenai.
4. Textile Printing by L.W.C. Miles.
5. Technology of Printing by V.A. Shenai.
6. An Introduction to Textile Printing by W. Clarke.
7. Textile Finishing by A.J. Hall.
8. Introduction To Textile Finishing by J.T. Marsh.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTL335: FIBRE SCIENCE

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures : 03 Hrs/Week	03	SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To describe fibre structure.
- To describe analytical techniques for study of fibre structure.
- To explain significance of mechanical properties of fibres.
- To deliberate importance and measurement of thermal and electrical properties.

Course Outcomes:

At the end of the course students will be able to

- Describe fibre structure.
- Interpret fibre structure through analytical techniques.
- Evaluate the mechanical properties of fibres.
- Measure thermal and electrical properties of fibres.

Course Contents

Unit I	Fibre structure	06 Hours

Requirements of fibre formation, molecular weight and molecular weight distribution, degree of polymerization- useful limits of polymerization, crystalline and amorphous regions, morphological models - one phase, two phase, three phase models, morphology of cotton, viscose, jute, acetate, wool, silk, nylon 6, nylon 66, polyester, acrylic, polypropylene fibre.

Unit II	Techniques for investigation of fibre structure	09 Hours

A) Optical properties of textile fibres: refractive index, double refraction, birefringence. Optical heterogeneity in fibres, factors influencing birefringence of a fibre, measurement of birefringence – Becke line method, compensator method, refractometer method, significance of birefringence, optical dichroism and its importance.
B) X-ray diffraction: Production and origin of X-rays, Bragg's law of X-ray diffraction, crystal structure, miller indices, study of fibre structure- X-ray diffractometer method, fibre diagram method.
C) Electron microscopy: Principle of electron microscope, Transmission and scanning electron microscope - Principle, working and applications.
D) Infrared Spectroscopy: Spectroscopy, Beer-Lambert law, Principles of IR-Spectroscopy, Principle and working of IR spectrophotometer, Applications, IR-Dichroism and its importance.

Unit III	Mechanical properties of fibres	09 Hours

A) Tensile properties: Terms and definitions, stress-strain curve, importance of tensile properties, factors influencing tensile properties of fibres
B) Elastic recovery: Terms and definitions, effects of test conditions on elastic recovery of fibres, recovery properties of different fibres, mechanical conditioning of fibre, swelling recovery.
C) Fibre Friction: Laws of friction in textiles, consequence of friction in textiles, measurement of friction, empirical results, nature of friction.

Unit IV	Variability and Directional Effects	06 Hours

A) Effects of variability: Weak link effect, derivation of Pierce formula, Spencer-Smith theory, composite specimen effect, variability in practice
B) Directional effects: Bending and twisting of fibres, derivations of flexural and torsional rigidity, significance of flexural and torsional rigidity, shear modulus, shear strength, general elastic deformation, compression

Unit V	Theories of mechanical properties and viscoelasticity	05 Hours

Approaches, structural effects in fibres, theories of time dependence- thermodynamic effects, Boltzmann super position principle, WLF equation, creep stress relaxation, stress-strain curve, dynamic mechanical properties, their measurement and importance. Model theory of viscoelasticity- linear viscoelasticity, viscoelastic models, features of Eyring model.

Unit VI	Thermal and electrical properties	04 Hours

A) Thermal properties: Specific heat capacity, thermal conductivity, structural changes in fibres on heating, transitions in fibre- first and second order transition, degradation and decomposition, thermal expansion of fibre, heat setting of fibre, principle and working of DSC, DTA, DMA.
B) Electrical properties: Static electricity- causes and consequences in textiles, measurement of static electricity, electric resistance, specific resistance, measurement of resistance, factors influencing the electrical resistance of fibres.

References Books:

1. Fibre science- edited by J.M. Preston, published by the textile institute, Manchester.
2. Physical methods of investigation of textiles, edited by Meredith R. And Hearle
3. J.W.S.-published by textile book published inc. New York.
4. Physics of fibres- an introductory survey-Woods H. J. Published by the institute of physics-London, 1955.
5. Applied fibre science- vol I, edited by F. Happey published by academic press, London.
6. Physical properties of textile fibres-Morton W. E. and Hearle J.W.S. Published by the textile institute Manchester.
7. Fibre microscopy-Stores J. L. Published by London national trade press.
8. Structure/property relationship in textile fibres-textile progress vol. 20, no. 4 the textile institute Manchester.
9. Instrumental analysis of cotton cellulose and modified cotton cellulose by Robert T.O'Conner.
10. Fibre science by S. P. Mishra.
11. Fibre Science Steven B. Warner.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTL336: MECHANICS OF TEXTILE MACHINES

Teaching Scheme: Lectures : 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To explain principles mechanics and mechanisms of textile machines and textile processes.
- To describe constructional details and design aspects of machine parts and mechanisms involved in machines.
- Explanation to evaluate design parameters involved in mechanisms.
- Describe selection criterion and process of selecting mechanisms as per need.

Course Outcomes:

At the end of the course students have understood

- Describe principles mechanics and mechanisms of textile machines and textile processes.
- Describe constructional details and design aspects of machine parts and mechanisms involved in machines.
- Evaluate design performance parameters involved in mechanisms.
- Decide selection criterion and selection process for mechanisms as per need.

Course Contents

Unit I	**Drives**	**12 Hours**

Frictional Drives: -

Introduction, Frictional drive to cheese and cone, Belt drives –Basics, Conditions of critical slippage of belts – maximum power condition, texturising by belt and friction disc, the timing belt drive, cone drum belt drives.

Positive Drives: -

Chain and sprocket drive - Gear drives – types of gears – terms used in study of gears – pitch measurement, ratio of gear trains – features of change wheels, Epicyclic gear trains – velocity ratio – differential gearing in comber and Speed frame. Planetary mechanisms in Coiling.

Cams and Eccentric: -

Introduction – Basic types of cams, types of followers, Motion of cam follower – Displacement, Velocity and Acceleration diagrams for linear, S.H.M., uniform acceleration and retardation cams. Uses of linear cam, positive cams, conjugate cams, Cylindrical Cam in Textile machines. Eccentric and its uses.

Unit II		07 Hours

Linkage Mechanisms: -

Introduction – The four-bar linkage, its geometry– Equations of Displacement, Velocity and Acceleration of a point, SHM, calculation of dwell clearance on a loom with linear cam, SHM and modified SHM, Sley eccentricity, Multiple Bar Linkage – Double Beat up mechanism, Combined ratchet and linkage mechanisms, complex combined mechanism – driving of detaching rollers of comber.

Intermittent Rotary Motion: -

Introduction – Ratchet and pawl mechanisms – Let off and take up motions in weaving machines – variation in pick spacing – Geneva wheel.

Unit III	Balancing of machines	05 Hours

Balancing of Machines: -

Introduction, Vibrations of machine, Balancing of machinery – Unbalance and its causes, Production balancing, Field balancing, Theoretical considerations in balancing – Static and Dynamic balancing, Various cases of balancing, Numerical examples based on different cases. Balancing of rotor, Cards cylinder and practical aspects of balancing. Measurement and control of unbalance- Static and Dynamic balancing machines.

Unit IV	Clutches and Brakes	05 Hours

Clutches and Brakes: -

Introduction – Clutches – Jaw / toothed clutches, Friction clutches, Materials for friction lining, Cone Clutches. Torque and power transmission capacity of clutches. Numerical problems.

Brakes - Classification of brakes, Constructional details of band, block and differential brakes, braking torque, Internal expanding brake, Application of brakes in Textile machines. Numerical examples.

Unit V	Selection and Control Mechanisms	07 Hours

Selection Mechanisms: -

Introduction – methods of storing information – the grouping of machine parts for selection – converting information into movement – some mechanical switching mechanisms – Dobby selection mechanisms – high speed mechanical switching mechanisms – additional complex mechanical switches – the movement of the information store.

Control Mechanisms: -

Introduction – the elements of control mechanisms, open loop and closed loop system – Detection of broken ends, control of yarn tension and cloth tension, detection of full and empty packages.

Unit VI	Mechanics in Spinning and Weaving Machines	03 Hours

Construction of Beater and Chamber, Inertia of Carding, Card Wires, Drafting force and friction field in roller drafting, coils spacing in speed frame, Centrifugal force of flyers, Arrangement in two rows, Yarn tension in ring spinning, Balloon theory,

Study of mechanisms in winding, Build of various packages. Screw traversing mechanism. Design of grooved drums

References Books:

1. Textile Mathematics, Vol-I By J.E. Booth, The Textile Institute, Publication.
2. Textile Mathematics, Vol-II By J.E. Booth, The Textile Institute, Publication.
3. Textile Mathematics, Vol-III By J.E. Booth, The Textile Institute, Publication.
4. Control Methodology in Textile Engineering and Economics By John W.s. Hearle, Journal of the Textile Inst. Vol.83, No.3, 1992, The Textile Institute Publication
5. Mechanics for Textile Students, By W.A. Hanton, The Textile Inst. Pubication.
6. Mechanics of Spinning Machines By R.S. Rengasamy, NCUTE Publication
7. Textile Mechanics Vol.I, By K. Slater, The Textile Inst. Publication.
8. Textile Mechanics, Vol.-II, By K. Slater, The Textile Inst. Publication.
9. An Introduction to Textile Mechanisms By P. Grosberg, The General Publishing Company.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTP337: COMPUTER PROGRAMMING LAB

Lab Scheme: Practicals: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	Design & analysis of DBMS using Oracle/ MS Access – Table creation, data insertion, update and delete.
2	Design & analysis of DBMS using Oracle/ MS Access– Data retrieval using Queries- various clauses, operators, aggregate functions.
3	Design & Implementation of user interface using VB.Net Framework.
4	VB.Net program for decision making statement.
5	VB.Net program for different loops.
6	VB.Net program for array.
7	VB.Net program for Timer, List box, Combo box control.
8	VB.Net program for Check box, Option button, Picture box control.
9	VB.Net program for Common Dialog Control.
10	VB.Net program for database connectivity.
11	Study of data visualization tool- applicaiton1.
12	Study of data visualization tool- applicaiton2.

Submission – Completed Journal.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTP338: YARN FORMING TECHNOLOGY - IV LAB

Lab Scheme: Practical: 02 Hrs./Week	Credits 01	Evaluation Scheme: CIE: 50 Marks

List of Experiments

1	Study of various compact spinning systems
2	Manufacturing of compact yarn and compare the properties with ring yarn.
2	Study the passage, gearing and calculations of ring doubler
3	Study the passage, gearing and calculations of TFO
4	Processing of blended roving on ring spinning machines
5	Demonstration of fancy Slub yarn production on Ring Frame
6	Demonstration of Multi count /Multi twist yarn production on Ring Frame
7	Demonstration and manufacturing of core spun yarn
8	Manufacturing of Elastic Air covered Yarn and study the properties of air-covered yarns
9	Demonstration of Yarn conditioning Machine
10	Comparative study of conditioned and unconditioned yarns
11	Visit to the Blend Spinning plant
12	Visit to the compact Spinning plant.

Submission – Completed Journal.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTP339: FABRIC FORMING TECHNOLOGY - IV LAB

Lab Scheme: Practicals: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks

List of Experiments

1	Study and setting of Positive Cam Shedding
2	Study of Rotary Dobby
3	Study of electronic Jacquard
4	Study of Smit flexible rapier weaving machine and fabric production with changed parameters
5	Study of Dornier rigid rapier weaving machine and fabric production with changed parameters
6	Study of Smit Air Jet weaving machine and fabric production with changed parameters
7	Study of Dobby CAD software
8	CAD software application – Creation of weaves
9	Design preparation on CAD software for Electronic Jacquard
10	Study of needle loom technology and production of fabric on them
11	Study of style change process on rapier and airjet looms
12	Visit to rapier & airjet weaving unit
13	Visit to circular loom unit

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
TTP340: CHEMICAL PROCESSING OF TEXTILES – II
LAB

Lab Scheme: Practicals: 02 Hrs./Week	Credits 01	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	Dyeing of cotton with direct dyes.
2	Dyeing of cotton with reactive dyes.
3	Dyeing of cotton with vat dyes.
4	Dyeing of cotton with sulphur dyes.
5	Dyeing of 100% polyester with disperse dye by using HTHP beaker dyeing machine.
6	Dyeing of polyester-cotton blends.
7	Dyeing of wool and silk with acid dyes.
8	Printing of cotton fabric with reactive dyes for direct and discharge style.
9	Printing of cotton fabric with pigments.
10	Evaluation of light, washing and rubbing fastness of dyed material.
11	Finishing of cotton using substantive finishes with exhaust method of application.
12	Finishing of cotton using non substantive finishes with pad method of application.

Submission – Completed Journal.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTP341: FIBRE SCIENCE LAB

Lab Scheme: Practicals: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks

List of Experiments

1	Study of norms for fibre properties.
2	Cutting combing ratio of sliver.
3	Determination of torsional rigidity of fibre.
4	Determination of flexural rigidity of fibre.
5	Assessment of performance of carding machine using AFIS.
6	Determination of moisture by oven dry and Shirley moisture meter.
7	Measurement of elastic recovery of fibre.
8	Hot air and hot water shrinkage of filament.
9	Determination of single fibre strength.
10	Study of creep.
11	Study of stress relaxation.
12	Comparison of different filaments for toughness

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – V)
ATL301: COMPUTER OPERATING SKILLS

Teaching Scheme: Lectures: **02 Hrs./Week**		Evaluation Scheme: **CIE: 50 Marks**

Course Objectives:

1. To understand the fundamentals of computers, operating systems, and office suite
2. To understand the practical application of Microsoft Office Word
3. To understand the practical application of Microsoft Office Excel
4. To understand the practical application of Microsoft Office PowerPoint

Course Outcomes:

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

1. Describe the fundamentals of computers, operating systems, and office suite
2. Make the practical application of Microsoft Office Word
3. Make the practical application of Microsoft Office Excel
4. Make the practical application of Microsoft Office PowerPoint

Course Contents

Unit I	**Introduction to Computer**	**03 Hours**

Introduction to Computers and Operating Systems, Navigate Programs & Manage Windows, Keys & Keyboard Shortcuts, Files and Folders, Snips and Screenshots, Using and Searching the Internet.

Unit II	**Microsoft Word Beginner**	**04 Hours**

Introduction to Microsoft Word, Formatting Text, and Paragraphs, Working More Efficiently, Managing Lists, Adding Tables, Inserting Graphic Objects, Preparing to Publish a Document, Controlling Page Appearance.

Unit III	**Microsoft Word Intermediate and Advanced**	**09 Hours**

Microsoft Word Intermediate: Organizing Content Using Tables and Charts, Customizing Formats Using Styles and Themes, Inserting Content Using Quick Parts, Using Templates to Automate Document Formatting, Controlling the Flow of a Document, Simplifying and Managing Long Documents, Using Mail Merge to Create Letters, Envelopes and Labels.

Microsoft Word Advanced: Manipulating Images, Using Custom Graphic Elements, Adding Document References and Links, Securing a Document, Automating Repetitive Tasks with Macros.

Unit IV	**Microsoft Excel Beginner and Intermediate**	**09 Hours**

Microsoft Excel Beginner: Introduction to Excel, Creating Workbooks, Saving Workbooks, Navigating Workbooks, Page Setup & Print Options, Working with Rows, Columns and Cells,

Moving Data.

Microsoft Excel Intermediate: Formulas & Functions, Working with Sheets, Formatting Worksheets, Charts, Sorting and Filtering, Working with Views, Linking Files, Advanced Formula Creation, Pivot Tables, Additional Excel Features, Excel Shortcuts.

Unit V	Microsoft Excel Advanced	08 Hours

Introduction to Advanced Excel, Advance Excel Functions, Date and Time Functions, Text Functions, Logical Functions, Lookup Functions, Financial Functions, Statistical Functions, Connecting to External Data, Tables, Pivot Tables, Data Analysis, Graphs and Charts.

Unit VI	A Complete Guide to Microsoft PowerPoint	06 Hours

Getting Started with Microsoft PowerPoint, Working with Presentations, Working with Text, Tables, and Formatting Options, Working with Pictures, Shapes, Objects, Charts, and SmartArt, Transitions, Animations, Hyperlinks, and Actions, Working with Video and Audio in PowerPoint, Setting up and Running a Slideshow.

References Books:

1. Linda Foulkes, Learn Microsoft Office 2019: A comprehensive guide to getting started with Word, PowerPoint, Excel, Access, and Outlook, Packt Publishing Ltd., pp. 1-794, ISBN: 9781839210617
2. Derrick Richard, A Definitive Guide to Microsoft Excel 2019, Churchgate Publishing House, pp.1-241, ISBN: 9798628847794
3. Doug Lowe, PowerPoint 2019 for Dummies, John Wiley & Sons, Inc., pp. 1-371, ISBN: 9781119514190.

ATL303 : CHINESE LANGUAGE

Details of the Course Introduction

Department: Research Institute of International People-to- People Exchanges for Textile Industry of Wuhan Textile University

Credits	2	**Course Duration**	3 May, 2022-5 July, 2022
Course Title	A Chinese Culture Exploration Tour: Starting from Wuhan		
Prerequisites	No		
Course Description	This course is provided by Research Institute of International People-to-People Exchanges for Textile Industry. It is aimed at students from partner universities in the Belt and Road Alliance of Textile Higher Education who are interested in learning Chinese language and culture. The Chinese culture and its history is so rich that it is impossible to cover all the aspects in a short time. We explore Wuhan, an international metropolis with a history of 3000+ years, by combining the basic Chinese language learning and practice together. By learning this course, the students will be ableto avoid conflict and unpleasantness during their later study at a Chinese campus or contacts with Chinese.		
Delivered in	English		
Course Schedule	For Chinese language: 1. Overview of Chinese language 2. Introduction and Practice of Phonetics of Chinese language 3.Introduction of Grammar of Chinese language 4.Train and Practice of Chinese for Daily Life For culture part: 1. Wuhan City History 2. Wuhan as seen from literature and art works3.Science and technology development 4.Study in Wuhan and in China 5.Final exam		
Course Requirements	Class attendance, group discussion, oral presentation		
Teaching Methods	Lecture, seminar		
Grading	Attendance 60%, Oral presentation 20%, Exam on the date of the last lecture 20%		

Members of Teaching Team

Name	Gender	Professional Title	Responsibility
Lin Li	Female	Prof.	Course designer, Lecturer
Zhang Shangyong	Male	Dr. Prof.	Lecturer
Wu Hui	Female	Associate. Prof.	Lecturer
Li Douming	Male		Moderator
Li Liang	Female		Moderator

Third Year B. Tech Textile Technology
Semester-VI

Sr. No.	Course Code	Name of the Course	Course Category	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	TTL351	Industrial Engineering	HSMC	3	-	-	3	3
2	TTL352	Nonwoven Technology	PCC	3	-	-	3	3
3	TTL353	Uster Technology	PCC	3	-	-	3	3
4	TTL354	Unconventional Spinning Technology	PCC	3	-	-	3	3
5	TTL355	Knitting Technology	PCC	3	-	-	3	3
6	TTLOE1	Open Elective	OEC	3	-	-	3	3
7	TTP356	Industrial Engineering	HSMC	-	1	-	1	1
8	TTD357	Internship - I *	PST	-	-	-	-	3
9	TTP358	Nonwoven Technology Lab	PCC	-	-	2	2	1
10	TTP359	Uster Technology Lab	PCC	-	-	2	2	1
11	TTP360	Unconventional Spinning Technology Lab	PCC	-	-	2	2	1
12	TTP361	Knitting Technology Lab	PCC	-	-	2	2	1
13	ATL302	Professional Ethics	H	2	-	-	2	-

Group Details

HSMC: Humanities, Social Science & Management Courses
BSC: Basic Science Courses
ESC: Engineering Science Courses
PCC: Professional Core Courses
PEC: Professional Electives Courses
OEC: Open Elective Courses
PST: Project / Seminar / Ind. Training
MC: Mandatory Courses

List of Open Electives

ELLOE1: PLC & SCADA
CSLOE13: ERP & E- Commerce
MBLOE1: Costing
UALOE1: Innovations in Textiles
IELOE1: Production, Planning and Control
TQMOE1: Textile Quality Management (RSJ Inspection)

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTL351: INDUSTRIAL ENGINEERING

Teaching Scheme: Lectures : 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To explain significance of Industrial Engineering
- To explain the importance of Production planning, control and inventory control and different factors affecting on it.
- To explain work study, method study, Operational Research and how this is very useful tool to enhance the productivity and quality.
- To explain How Job evaluation and merit rating enhance the production rate?

Course Outcomes:
At the end of the course students have understood

- Understand importance of Industrial Engineering.
- Understand the factors affecting Production Planning and Control and inventory
- Understand and demonstrate method study, motion economy and operational research.
- Perform Job evaluation and merit rating for increasing the production rate.

Course Contents

Unit I	Introduction	03 Hours

Concept of Industrial Engineering, definition, development, various techniques of Industrial Engineering, Scope in Textiles

Unit II	Work Study	12 Hours

A) Work Study and Productivity- Production – Definition, Types of production, and characteristics of each type production. Definition, ways to increase productivity, measurement of productivity.

B) Method Study-Definition, steps in method study, details of every step, charts used for recording, outline chart, flow process chart & its types, two handed process chart, multiple activity chart, principles of motion economy, Micromotion Study – Contribution of Gilbreth, Therblings, Procedure, SIMO Chart.

C) Work measurement : Definition, Techniques, concept of total time, standard time, allowances, problems

Unit III	Operation Research	06 Hours

Operation Research : Definition, various techniques of OR. Basics of linear programming – Formulation of LPP by Graphical solution.

A) Project Planning- Network Analysis – PERT, CPM, and comparison.

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Unit IV	Production, Planning & Control (PPC	07 Hours

A) Production, Planning & Control (PPC)- objectives, functions.
B) Forecasting- various techniques of sales forecasting,
C) Scheduling-sequencing, scheduling, Gantt charts
D) Plant Location and Plant Layout

Unit V	Value analysis and Value engineering	04 Hours

Value analysis and Value engineering- Value, concept of value analysis, concept of value engineering, Reasons of unnecessary cost, value analysis procedure**.**

Unit VI	Job evaluation and merit rating	04 Hours

Job evaluation and merit rating- Introduction, objectives, procedure of job evaluation, methods of job evaluation methods of merit rating

References Books:

1. Work Study – ILO
2. Work Study in Textiles – ILO
3. Elements of Production Planning & Control – Samual Eilon.
4. Industrial Engineering & Management – Banga Sharma.
5. Industrial Engineering & Management – O. P. Khanna.
6. Industrial Engineering Manual of Textile Industry – Nobert Lioyd Enrick.
7. Industrial & production engineering – Sanjay S. Patil, & Nandkumar Hukeri.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTL352: NONWOVEN TECHNOLOGY

Teaching Scheme: Lectures: 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To understand the concept of Nonwoven Textiles & Market size
- To define Nonwovens as per INDA, EDANA etc and explain the merits and demerits.
- To classify Nonwovens based on different parameters.
- To study the different nonwoven technologies and their techno economics.

Course Outcomes:

At the end of the course students have understood

- The basics of nonwovens and market size in India and abroad.
- The standard definitions of nonwoven and its advantages and disadvantages.
- The classification chart of nonwoven based on raw materials, production methods etc
- Basic working mechanism/principle of various nonwoven manufacturing methods and their techno-economic analysis.

Course Contents

Unit I	**Introduction of Nonwoven**	**07 Hours**

Historical background of nonwovens, non-woven definition, stages in non-woven manufacturing. Web Forming Techniques: carding, air laid, wet process, polymer extrusion. Comparison.

Unit II	**Classification of Nonwoven**	**07 Hours**

Classification of nonwoven – On the basis of use, on the basis of manufacturing process, on the basis of web formation, on the basis of bonding.

Unit III	**Web forming Techniques**	**07 Hours**

Dry laid webs – fibre selection, fibre preparation, web formation, layering, Wet laid nonwoven – Raw materials, production process, special features of the wet laid process and its product. Spun bonded and Melt blown webs.

Unit IV	**Mechanical Bonding Techniques**	**07 Hours**

Mechanically bonded webs – needle punched nonwovens, Application of needle punching, stitch bonded nonwovens, applications. Hydro entangled nonwovens – Bonding process, water system, filtration system, web drying, properties of spun laced webs, applications.

Unit V	**Thermal Bonding Technique**	**07 Hours**

Thermally bonded nonwovens – binder, binding fibres, binding powder, binding webs, methods of thermal bonding – Hot calendaring, belt calendaring, oven bonding, ultrasonic bonding, radiant heat bonding.Applications.

Unit VI	Chemical Bonding Technique	06 Hours
Chemically bonded nonwoven – Latex binder, other types of nonwoven binders, formulation, order of formulation, bonding technology. Application of chemical bonded nonwovens.		

References Books:

1. Non-Woven – Process, Structure, Properties and Applications, T. Karthik, Prabha Karan C & R. Rathinamoorthy, Woodhead Publishing India Pvt. Ltd., 2016.
2. Handbook of Nonwovens, 1st Edition By: S Russell, Woodhead Publishing 2007
3. Nonwoven Process Performance & Testing – Turbak
4. Nonwovens Technology Market & Product Potential, Proceedings of the Seminar IIT New Delhi,2007
5. NPTEL on Nonwoven Technology
6. Nonwovens: Monogram by BTRA
7. Nonwovens BY DR.P.K. Banerjee
8. Manual of Nonwovens by Krcma

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTL353: USTER TECHNOLOGY

Teaching Scheme: Lectures : 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To explain concept of quality in textiles.
- To explain importance and various approaches of fibre testing.
- To explain importance and principles of measurement of irregularity in textile materials.
- To describe Yarn faults and online monitoring of the same.

Course Outcomes:

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

- Describe concept of quality in textiles.
- Describe, Analyze and interpret the importance of fibre quality parameters.
- Describe, Analyze and interpret the irregularity in textile materials.
- Describe, Classify, Evaluate and monitor the yarn faults.

Course Contents

Unit I	Quality Management:	05 Hours

Quality management, key points for quality management in spinning mill, definitions of quality, ensuring quality, five practical insights, general problem-solving approach.

Purpose of measurement of quality characteristics in textile supply chain, bench marking, quality profile, USTER statistics as bench marks.

Quality characteristics of fiber testing systems, raw material management, lay down rules, bale management, fibers and spinning process.

Unit II	Fibre Quality Monitoring: Fibre Bundle Tests	07 Hours

Purpose of fiber testing, bundle testing, instrument for fiber bundle testing, explanation of abbreviations – staple diagram vs fibrogram, upper half mean length, uniformity index, short fiber index, micronaire, maturity index, strength, elongation, reflectance, yellowness, color grade, trash count, trash grade, trash area, SCI, moisture.

Unit III	Fibre Quality Monitoring: Single Fibre Tests	05 Hours

Single fiber testing system, fiber neps, seed coat neps, length, short fiber content, maturity, immature fiber content, fiber fineness, trash and dust, instrument for the measurement of single fibers, process control using single fiber testing in blow room, card, comber.

Unit IV	Yarn Quality Monitoring:	10 Hours

Offline measurement of yarns, roving's and slivers, unevenness determination, properties of diagram normal diagram, cut length diagram, short, medium and long term variation, variance length curve, index of irregularity, determination of frequently occurring yarn faults, definition of thin, thick and neps, determination of periodic mass variation, spectrogram, comparison of diagram and spectrogram, normal spectrogram and ideal spectrogram, influence of periodic faults on the spectrogram, machine faults in the spectrogram.

Unit V	Yarn Hairiness, Shape and other Properties	04 Hours

Determination of yarn hairiness, hairiness index, hair length, cause of hairiness and hairiness variation, determination of diameter, density and roundness of the yarn, determination of dust and trash particles in yarn.

Unit VI	Yarn faults and online monitoring	08 Hours

Random occurring faults, objectionable faults, yarn body, NSLT outliers, quality outliers, identification and elimination of outliers, yarn faults and yarn clearer, capacitance and optical clearing, curve optimization, distinction between frequent and seldom occurring yarn faults, online monitoring systems, disturbing thick and thin places, yarn count variation, winding defects.

References Books:

1. Textile measuring technology and quality control by Mr. Richard Furter
2. Structural mechanics of fibres, yarns and fabrics by Hearle, Grosberg and Backer.
3. Textile fibres yarns and fabrics by E. R. Kaswell.
4. Physical testing and quality control, by K. Slater.
5. Principle of textile testing by J. E. Booth.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTL354: UNCONVENTIONAL SPINNING TECHNOLOGY

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs/Week	03	SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To explain the principles of unconventional spinning systems.
- To describe operations and various mechanisms used.
- To understand the recent developments of all unconventional spinning techniques.
- To analyze the effect of process parameters on quality of yarns produced on unconventional spinning systems.

Course Outcomes:

At the end of the course students have understood

- Illustrate the basics of unconventional spinning systems (Knowledge).
- Understand the operations and various mechanisms used (Understand).
- Understand the recent developments in unconventional spinning machines(knowledge).
- To evaluate the effect of process parameters on quality of yarns produced on unconventional spinning systems (Analyze).

Course Contents

Unit I	Rotor Spinning	09 Hours

Limitation of ring spinning system. Classifications and principles of unconventional spinning systems. Fibre separation and transportation, Fibre deposition and twist insertion and winding. Structure, properties and applications of rotor yarns.
Technological developments in spinning and processing of rotor spun yarns, effect of process parameters on yarn qualities

Unit II	Air Jet Spinning	09 Hours

Basic concept, evolution of air jet spinning. Principles of MJS, MTS and MVS. Stages involved operating principle. Mechanism of yarn formation, Raw material and preparatory process requirements. Technical Specifications and working of different air jet spinning systems. Structure and properties of yarns. Effect of process parameters like: total draft, nozzle pressure; take up ratio, delivery speed, and raw material parameters on quality of air-jet yarn. Developments Techno economics of air-jet spinning. End uses.

Unit III	Friction Spinning	06 Hours

principle of friction spinning. Details of different machine zones like: drafting opening, fibre collection, twisting and winding. Raw material preparatory process requirements. Technical specifications and comparison of different friction spinning. Structure and Properties
Developments in Friction Spinning. Applications of friction spun yarns

Unit IV	SIRO Spinning	04 Hours

Principle and importance and working of SIRO spinning. Structure, Properties and Applications. Advantages and limitations of SIRO spinning. Concept of Compact SIRO spinning. Advantages over SIRO Spinning. Case studies.

Unit V	Self-Twist Spinning and Wrap Spinning	06 Hours

A) Principle of self-twisting and yarn formation mechanism. Concept and importance of phase shifting. Structure and Properties. Advantages and limitations. Yarn applications.

B) Concept of wrap yarn manufacturing. Working of wrap spinning. Structure and Properties. Applications.

Unit VI	Twist-Less Spinning	04 Hours

Drawbacks of twisted yarns. Concept of twist-less spinning. Different techniques of twist-less yarn manufacturing such as: BOBTEX, TWILLO and TEK-JA process. Raw material requirements. Structure and Properties of each twist less yarns. Advantages and limitations. End uses.

References Books:

1. Hand Book of Yarn Production by P. R. Lord
2. Spun Yarn Technology by Carl A. Lawrence
3. Spun Yarn Technology by Eric Oxtoby.
4. Textile Yarn, Technology, Structure and Application" – Goswami B.C., Martindale, J.G.,
5. Short Staple Spinning, Vol. I, IV, V, by W. Klein.
6. 13. The Economics of Science and Technology of yarn production – Vol.-I and II
7. Air jet spinning – Textile Progress, Textile Institute Publication.
8. Research Papers, Bulletins, Pamphlets, Marketing Manuals.
9. Advances in Spinning – S. M. Ishtiaque
10. NCUTE Pilot Programme in Spinning.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester –VI)
TTL355: KNITTING TECHNOLOGY

Teaching Scheme:	Credits	Evaluation Scheme:
Lectures: 03 Hrs./Week	03	SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To explain basic terms, circular knitting machine details
- To explain circular weft knitted fabric structure and calculations
- To explain flat knitting machine details
- To explain warp knitting machine details, calculations and warp knitted fabric structure

Course Outcomes:

At the end of the course students have understood -

- Basic terms, circular knitting machine details
- Circular weft knitted fabric structure and calculations
- Flat knitting machine details
- Warp knitting machine details, calculations and warp knitted fabric structure

Course Contents

Unit I	Circular Weft Knitting	09 Hours

Introduction to Knitting:
Types of knitted fabrics, their applications, properties and basic structure of warp and weft knitting. Terms and definitions used in knitting. Comparison of knitting with woven fabric with respect to production and properties. Concept of hand knitting. Evolution of knitting from hand to machine knitting. Concept of flat and circular knitting.

Circular Weft Knitting:
Passage of yarn through circular weft knitting machine.
Essential elements of knitting machine – yarn supply arrangement, loop forming arrangement and fabric take down mechanism.
Knitting cycle of weft knitting machine.

Unit II	Weft Knitting – Fabric Structure	07 Hours

Principle stitches such as Knit, Tuck, Miss and their representation and their effect on fabric properties.
Types and properties of knitted fabrics such as single jersey, double jersey (Interlock, Rib and Purl). Manufacturing process of these fabrics. Conditions for the use of delayed and synchronized timings.
Concept of representing fabric design, needle order, cam order.
Basic designs and the derivatives of Single Jersey fabric – 1 x 1 cross - miss, lapique, longitudinal tuck stripes, plain pique.
Basic design and the derivatives of Rib – milano, half milano, cardigan, half cardigan, double cardigan, Swiss double pique and French double pique.
Basic design and derivatives of Interlock- Interlock Pique, Texi pique, Pintuck, Interlock super-roma, Bourrelet

Unit III	Flat Knitting	04 Hours

Basic elements and their functions of flat knitting machine. Hand and machine operated flat knitting machines and their knitting actions.

Machine operation for various stitches such as Miss, Tuck, Transfer, and Drop Stitch.

Design with and without needle selection, bed racking, new formed and transfer loop for hand and power operated machines. Concept of seamless knitting

Unit IV	Warp Knitting Technology	06 Hours

Comparison of weft and warp knitting. Passage of yarn through warp knitting machine.
Essential elements of warp knitting machine such as yarn supply arrangement, loop forming mechanism and fabric take down mechanism.
Knitting cycle of Tricot and Raschel warp knitting machine. Patterning Mechanism

Unit V	Warp Knitted Fabric Structure	08 Hours

Principle stitches of warp knitting like Tricot, Pillar or chain, In-Lay, blind, 2 and 1 lapping, longer lapping, Atlas stitch,
Study and representation of single bar fabric,
Study and representation of two guide-bar fabrics like Full Tricot, Locknit, Satin, Reverse Locknit, Shark Skin and Queen's cord
Study and representation of three and multi guide-bar structures.
Weft insertion techniques, Terry technique, Net fabric manufacturing

Unit VI	Calculations, quality control and Advances in Knitting	05 Hours

Circular Knitting Calculations – Fabric weight (grams per square meter and grams per meter, estimation of width of fabric), Circular knitting machine production calculations (length and weight per unit time)
Calculation of warp Knitting – basic terms used like rack, run-in, run-in ratio, etc. Fabric weight calculation, Warp Knitting Machine Production calculations (length and weight per unit time)
Fabric defects in Knitting and their remedies. Yarn quality requirements for knitting
Concept of jacquard used in weft knitting & loop transfer
Advanced features of knitting machine

References Books:

1. Knitting Technology by Prof. D. B. Ajgaonkar
2. Circular Knitting by Dr. Chandrashekhar Iyer, Mammel and Schach
3. Knitting Fundamentals, Machines, Structure and Developments by N. Anbumani
4. Knitting Technology by Mr. D. Spenser
5. Warp Knitting by Dr. S. Raz
6. Flat Knitting by Dr. S. Raz

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTLOE1- ELLOE1: PLC & SCADA (OPEN ELECTIVE)

Teaching Scheme: Lectures : 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 100 Marks

Course Objectives:

- Identify the main parts of a PLC and describe their functions
- To develop architecture of SCADA explaining each unit in detail.
- To Develop ability to write programs for simple real time applications
- To apply knowledge gained about PLCs and SCADA systems to identify few real-life industrial applications.

Course Outcomes:

At the end of the course students have understood

- Describe working of various blocks of basic industrial automation system
- Use various PLC functions and develop small PLC programs
- Summarize Supervisory Control & Data acquisition system
- Describe different sensors used with PLC

Course Contents

Unit I	Transducers & Sensors	07 Hours

Position Sensors: Limit switch, photoelectric switches, proximity sensors, pressure switches, incremental & absolute encoders, decoders & relays.

Unit II	Programmable Logic Controllers (PLC)	07 Hours

Introduction, definition and history of PLC, PLC system and components of PLC input output module, PLC advantages and disadvantages.

Unit III	Ladder diagram & PLC programming fundamentals	06 Hours

Basic components and other symbols, fundamentals of ladder diagram, machine control terminology, update – sole ladder – update, light control example, internal relays, disagreement circuit, majority circuit, oscillator, holding (sealed or latches) contacts, always ON always OFF contacts, Nesting of ladders.

Unit IV	PLC programming	07 Hours

PLC input instructions, outputs, coils, indicators, operational procedures, contact and coil input output, programming example, fail safe circuits, simple industrial applications.

PLC Functions: PLC timer functions – Introduction, timer functions, industrial applications, industrial process timing applications PLC control functions – PLC counters and its industrial applications

Unit V	Applications of PLC	07 Hours

Ladder Program for Sequential Process, Batch Process , Traffic Light, Drilling Process , Counting Applications, Heater applications, Timer Applications

Unit VI	Introduction to SCADA Systems	05 Hours
Introduction, definitions and history of Supervisory Control and Data Acquisition, typical SCADA system Architecture, Communication requirements, Desirable Properties of SCADA system, features, advantages, disadvantages and applications of SCADA.		

References Books:

1. Programmable logical controller, Reis Webb, Prentice Hall
2. Mechatronics – W. Bolton, Pearson education
3. Programmable Logic Controllers, Webb & Reis, PHI
4. Programmable Logic Controllers, John & Fredric Hackworth, Pearson
5. Introduction to Programmable Logic Controllers, Gary Dunning, Thomson
6. SCADA : Supervisory Control And Data Acquisition By : Stuart Boyer ISA
7. SCADA Nptel

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTLOE1- CSLOE13: ERP AND E-COMMERCE (OPEN ELECTIVE)

Teaching Scheme: Lectures : 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- Introduce students the basic concepts of ERP System and its implementation
- Introduce students the functionality of SAP-R/3.
- Elaborate various business models of E-commerce
- Illustrate e-commerce marketing, online retail strategies and social networks.

Course Outcomes:

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

- Explain the basic concepts of ERP System and its implementation
- Describe the functionality of SAP-R3.
- Elaborate various business models of E-commerce
- Illustrate e-commerce marketing, online retail strategies and social networks

Course Contents

Unit I	ERP Introduction	06 Hours

Overview, Accommodating Variety, Integrated Management Information, Supply Chain and Resource Management, Integrated Data Model, Scope, Technology and Benefits of ERP, Building an MIS, Business as a System, Core Process in a Manufacturing Company, Entities forming data Model in a Manufacturing Company

Unit II	ERP Implementation	07 Hours

Overview, Role of Consultants, Vendors and Users, Customization, Precautions, Post Implementation Option, ERP Implementation Methodology, Guidelines for ERP Implementation

Unit III	Getting Started with SAP R/3	06 Hours

Introducing SAP, SAP's Markets, SAP R/3 architecture, SAP Applications, SAP Modules

Unit IV	Introduction to E-Commerce	07 Hours

E-commerce: The Revolution is Just Beginning, A Brief History, E-commerce Business Models: Major Business to Consumer (B2C) Business Models, Major Business to Business (B2B) Business Models, Mobile E-commerce (M-Commerce), How E-commerce changes Business - Strategy, Structure and Process.

Unit V	E-Commerce Marketing and Online Retail	07 Hours

Consumer Online: The Internet Audience and Consumer Behavior, Basic Marketing Concepts, Internet Marketing Technologies, B2C and B2B E-commerce Marketing and Business Strategies, The online Retail Sector, Analyzing the Viability of Online Firms.
E-commerce in Action: E-Retailing Business Models, Common Themes in Online Retailing.
The Service Sector: Offline and Online, Online Financial Services, Online Travel Services, Online Career Services

Unit VI	Social Networks, Auctions and Portals	06 Hours

Social Networks and Online Communities, Social Network features, Online Auctions-Benefits and types of Auctions, E-commerce Portals.

References Books:

1. Enterprise Resource Planning Concepts and Practice – Vinay Kumar Garg, N. K. Venkitakrishnan, Second Edition, PHI Publication
2. E-Commerce: Business, Technology, Society - Kenneth C. Laudon, Thirteenth Edition, Pearson Publication
3. E-Commerce: An Indian perspective - S. J. Joseph, Fifth Edition, PHI Publication

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTLOE1- MBLOE1: COSTING (OPEN ELECTIVE)

Teaching Scheme: Lectures: 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To understand concept of cost accounting and Cost Audit.
- To understand Accounting for Martial and Labour.
- To understand accounting for Overhead & Preparation of cost sheet.
- To understand Job costing, Contract costing, Process costing and Batch costing.

Course Outcomes:

At the end of the course students have understood

- Describe concept of cost accounting & Cost Auditing.
- Analyze various Material and Labour cost.
- Analyze overheads & Prepare Cost Sheet.
- Explain Job costing, Contract costing, Batch costing & Process costing.

Course Contents

Unit I	**Introduction to Cost Accounting**	**06 Hours**

Meaning & Definition of Cost, Classification & Elements of Cost, Nature, scope, objectives, functions & benefits of costing. Difference between Cost Accounting & Financial Accounting

Unit II	**Accounting for Materials**	**06 Hours**

Meaning, objective, Material Cost Control & its Importance, techniques of inventory control, Material Stock Levels and calculation of stock levels ((Maximum, Minimum, Re-order, Average and Danger Level)

Unit III	**Accounting for Labour**	**08 Hours**

Meaning, Need for Overhead Cost Control, Classification for labour cost. Labour turnover- meaning, causes & control. Overtime, Idle time – Causes & Remedy. Principles & methods of remuneration and incentive schemes

Unit IV	**Accounting for Overhead**	**06 Hours**

Meaning, classification, apportionment and allocation of overheads. Machine hour rate- meaning, bases, Advantages, disadvantages

Unit V	**Unit & Output Costing**	**07 Hours**

Meaning of Cost Sheet, Elements of Cost under unit or output costing Format of Cost Sheet, Preparation of cost sheet. Cost Audit –Meaning, Importance and Techniques of Cost Audit

Unit VI	**Methods of Costing**	**08 Hours**

Job Costing- Meaning, Procedure & application Contact Costing- Meaning, Procedure, & application Difference between job and contract Costing. Batch Costing- Meaning, procedure, & application Process Costing- Meaning & application, Normal and Abnormal losses, joint and byproducts

References Books:

1. Jawahar Lal, Seema Shrivastava- “Cost Accounting” Mc Graw Hill Education; 4 edition (25 September 2008)
2. S.P. Jain- “Advanced Cost Accounting: Cost Management”-Kalyani Publishers
3. M N Arora, “Cost Accounting –Principles and Practices”, Vikas Publishing House.
4. Jain S.C. and Narang K.L. “Advanced Cost Accounting”
5. Khan and Jain, “Management Accounting”, Tata McGraw Hill Publishing, New Delhi 1993-3rd Edition
6. N.L and Ramanathan, “Management Accounting”, 5th edition, New Delhi, Sultan Chand, 1992. Horngreen Charles

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTLOE1- UALOE1: INNOVATION IN TEXTILES (OPEN ELECTIVE)

Teaching Scheme: Lectures: 03 Hrs./Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

5. To understand the fundamentals of innovation
6. To describe the innovation process
7. To understand the people, project, and program management tools and strategies
8. To promote practical thinking and apply the learnings in innovation

Course Outcomes:

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

5. Understand the fundamentals of innovation
6. Describe the innovation process
7. Understand the people, project, and program management tools and strategies
8. Think practically and apply the learnings in innovation

Course Contents

Unit I	**Introduction to Innovation**	**07 Hours**

a. Terms and Definitions.
b. Fundamental differences between Creativity, Invention, Discovery, and Innovation.
c. Importance of Innovation.
d. Types of Innovation.
e. Assignment 1: Searching examples of Invention, discovery & creativity.

Unit II	**Type of Innovators, Innovation Metrics**	**07 Hours**

a. Thinking Profiles
b. Discipline of Innovation.
c. Innovation Metrics: NPVI, IP, Market Share, Profit margins, Innovation pipeline etc.
d. Assignment 2: Textile specific examples

Unit III	**Innovation Process – Part I**	**06 Hours**

a. Identifying Unmet needs.
b. Ideation,
c. A Reverse-Innovation.
d. Technology Fusion and the New R&D
e. Assignment 3: Identification of real-life textile specific problem

Unit IV	**Innovation Process – Part II**	**06 Hours**

a. Business Case & Concept Development.
b. Quick prototyping/pilot techniques.
c. Idea Validation & Launch.
d. Assignment 4: Data collection for the most innovative textiles

Unit V	Managing Innovation	07 Hours

a. Stages of a project, types of projects and stage-gate process
b. Power tools: Charter, milestone plan, bowling chart, risk-countermeasure, budget plan.
c. Managing Open Innovation & Innovation Dilemmas
d. Assignment 6: Use of project management tools in textiles

Unit VI	Introduction to Intellectual Property	06 Hours

a. Difference between Patent, Trade secrets and Trademarks
b. Fundamentals of Intellectual Property
c. Patent search
d. Patent claims
e. Assignment 7: Patent write-up for textile specific innovation

References Books:

1. Clayton M. Christensen, Management of Innovation and Change, Harvard Business Review Press, 2013, ISBN: 9781422196021
2. Linda A. Hill, Greg Brandeau, Emily Truelove, Kent Lineback, Collective Genius: The Art and Practice of Leading Innovation, Harvard Business Review Press, 2014, ISBN: 9781422130025
3. Scott D. Anthony, The Little Black Book of Innovation: How It Works, How to Do It, Harvard Business Review Press, 2011, ISBN: 9781422171721
4. Vijay Govindarajan, The Three-Box Solution: A Strategy for Leading Innovation, Harvard Business Review Press, 2016, ISBN: 9781633690141
5. David Robertson, Kent Lineback, The Power of Little Ideas: A Low-Risk, High-Reward Approach to Innovation, Harvard Business Review Press, 2017, ISBN: 9781633691681
6. Clayton M. Christensen, Erik A. Roth, Scott D. Anthony, Seeing What's Next: Using Theories of Innovation to Predict Industry Change, Harvard Business Review Press, 2004, ISBN: 9781591391852
7. Govindarajan, Vijay, Reverse Innovation: Create Far from Home, Win Everywhere, Harvard Business Review Press, Year: 2012. ISBN: 9781422157640
8. Scott D. Anthony, Mark W. Johnson, Joseph V. Sinfield, Elizabeth J. Altman, The Innovator's Guide to Growth: Putting Disruptive Innovation to Work, Harvard Business Review Press, 2008. ISBN: 9781591398462
9. HBR's 10 Must Reads on Innovation (with featured article "The Discipline of Innovation," by Peter F. Drucker), Series: HBR's ten must reads on innovation, Harvard Business Review Press, Year: 2013. ISBN: 9781422189856,
10. Mohamed Zairi (Eds.), Best Practice. Process Innovation Management, Butterworth-Heinemann; 1999. ISBN: 9780750639538.
11. Karten B., Project management simplified: a step-by-step process, CRC Press; 2016. ISBN: 9781498729352.
12. Abidemi Badiru, Industrial Project Management: Concepts, Tools and Techniques. CRC Press; 2007. ISBN: 9780849387739.
13. Kim Chandler McDonald, Innovation: How innovators think, act and change our world, Kogan Page Limited. ISBN: 9780749469672.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTLOE1- IELOE1: PRODUCTION, PLANNING AND CONTROL (OPEN ELECTIVE)

Teaching Scheme: Lectures : 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To understand importance of production planning and control.
- To provide students with knowledge of production planning and different activities of its control.
- To explain the fundamentals of industrial planning, control, constrains and inventory.
- To introduce students to various applications of different techniques of production and planning control.

Course Outcomes:

At the end of the course students have understood

- Describe and discuss concepts of production and planning
- Able to calculate process capacity and planning.
- Select methods to control the production and inventory.
- Analyze the problems relegated to process planning and production control.

Course Contents

Unit I	Production Planning and Control	08 Hours

Introduction, Need for PPC, Scope of PPC, Activities carried out under PPC, Production Planning and Production Control, Objectives of PPC, Functions of PPC, Comparison between Production Planning and Production Control, Information Requirement of PPC , Production Procedure, Organization for PPC, Manufacturing Methods and PPC, Problems of Production Planning and Control, Company planning Importance of capacity planning, Long –chart form capacity planning, Concept of aggregate planning ,Optimization of size formula

Unit II	Process and capacity planning	06 Hours

Introduction, Framework for Process Engineering, Process and Equipment Selection, Application of Bea in the Choice of Machines or Process, Machine Requirements, Machine Output, Manpower Planning, Line Balancing, Process Planning

What is capacity planning, How it should be done, Central planning and factory planning, Materials follow up to ensure planning as per schedule, Planning review – Deviation v/s plan (Variance of analysis), Production planning tools (Technology) fast read etc.

Unit III	Production Control	07 Hours

Introduction, Outline of Production Control, Loading, Sequencing and Scheduling, Loading, Priority Sequencing, Sequencing Problems Assignment Model, Scheduling, Dispatching, Progressing,

Unit IV	Introduction of Just in Time (JIT) Manufacturing	05 Hours
Introduction, Seven Wastes, Basic Elements of JIT, Benefits of JIT,JIT Philosophy, Kanban System, Comparison between JIT and MRP, Implementation of JIT		
Unit V	**Theory of Constrains (TOC)**	**05 Hours**
Introduction, Synchronous Manufacturing, Performance Measurements, Bottlenecks and Unbalanced Capacity, Managing Bottlenecks, Components of Production Cycle Time, Goldrafts Theory of Constraints, Cost Accounting System for TQC, Comparison of TOC with JIT and MRP, VAT Classification of Firms		
Unit VI	**Inventory, Need of Inventory**	**05 Hours**
Benefit of Inventory, Models of Inventory, Periodic Inventory model, Maintaining inventory, ABC analysis of inventory. QR model		

References Books:

1. Industrial Engineering and production management by Martand Telsang- S Chand and Company Ltd.
2. Industrial Engineering and production operation management by Sanjay Patil and Nandkumar Hukkeri

DKTES Textile and Engineering Institute , Ichalkaranji

Third Year B. Tech. Man Made Textile Technology (Semester – VI)

TQMOE1: TEXTILE QUALITY MANAGEMENT (RSJ INSPECTION) (OPEN ELECTIVE)

Teaching Scheme: Lectures : 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks

Course Objectives:

- To Explain Sampling standards, methods & Acceptable Quality Limits used to decide on conformity of shipment/ goods against specified requirements.
- To Explain Fabric, General & Container loading Inspection procedures.
- To Explain Product Safety / Regulatory requirements, Product Performance (Testing) requirements.

Course Outcomes:

On completion of course, students will be able to

- Apply the sampling standards methods & Acceptable Quality Limits to make decision on acceptance/ rejection of shipment/ goods.
- Execute/ Perform Fabric, General (Apparel/ Home Furnishing) & Container loading Inspections.
- Demonstrate the knowledge on requirement of Product Safety / Regulatory and Product Performance (Testing).

Course Contents

Unit I	Course Introduction and Ethics and Conduct Code, Code of Conduct	04 Hours

- Course Content & Evaluation System
- Professional conduct
- Awareness & Importance of Companies Ethics & Conduct Code and Code of Conduct.

Unit II	Fabric Inspection Procedure	08 Hours

- Sampling Methods & Allowable Points per roll & Total Inspection Quantity
- Sampling procedure, deciding on allowable points per roll & total inspection quantity
- Awareness on 4 points & 10 points system.
- Fabric inspection procedure following 4 points system.
- Defect size based assigning of points in 4 points system.
- Points per roll & total inspection quantity calculations.
- Other parameter checks like width, length, skew/ bow, EPI & PPI, GSM, etc...

Unit III	Product Safety / Regulatory requirements and Different Product Performance (Testing) requirements (Apparel & Home Furnishing)	08 Hours

- Information related to product safety standards/ regulatory requirements. Labelling requirements, etc.
- Different Apparel products example Wear, Women, Men wears, Fashion accessories, etc.
- Different home furnishing products example Bedding, Bath, Curtains, etc.
- General Size specifications & allowable tolerances, testing requirements, packing & packaging.

Unit IV	Sampling Methods, AQL Chart Reading & Understanding and Sampling Calculations	10 Hours

- Understanding different sampling methods/ standard like Single sampling, Double sampling and Multiple sampling.
- Different levels of sampling i.e. General Level I, II & III and Special Level S1, S2, S3 & S4.
- Chart reading for sampling & AQL.
- Application of AQL to make result decision.
- Examples of sampling calculations applying the different sampling methods/ standard.
- Examples of sampling calculations for complex lots.

Unit V	General Inspection Procedure – FRI	12 Hours

- Hours) General Inspection Procedure.
- Multiple different criteria's or sections of inspection
- How to perform these checks.
- About potential risks that are controlled or eliminated due to these checks and more.

Unit VI	Container Loading	06 Hours

- Procedure to follow for vacant container check. Supervision check & records to maintain during container loading.
- Sealing of loaded container.

References Books:

1. Testing and Quality Management, V. K. Kothari
2. Principles of Textile Testing, J. E. Booth
3. The Fundamentals of Quality Assurance in the Textile Industry, Stanley Bernard Brahams
4. Handbook of Textile Testing and Quality Control, Elliot B. Grover, D.S. Hamby
5. Statistics for Textile Engineers, J. R. Nagla
6. Statistics for Textile and Apparel Management, J. Hayavadana
7. Statistical Techniques, Design of Experiments and Stochastic Modeling, Anindya Ghosh, Bapi Saha Prithwiraj Mal
8. Fabric Inspection and Grading, Dan Powderly
9. Ready-to-wear apparel analysis, Patty Brown; Janett Rice

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTP356: INDUSTRIAL ENGINEERING

Teaching Scheme: Tutorial: 01 Hr/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks

List of Tutorials

1	Determination of standard time
2	Study of plant layout and location
3	Determination of objective function through LPP
4	Study of CPM
5	Study of PERT
6	Study of job evaluation and merit rating
7	Study of PPC

Submission – Minimum three tutorials from above list.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTD357: INTERNSHIP-I

Teaching Scheme:	Credits	Evaluation Scheme:
Training Period four weeks during Winter vacation	03	CIE: 50 Marks SEE: -- Marks Total: 50 Marks

Course Objectives:

1. To expose the students to the industrial practice, environment its work culture and industrial practices.
2. To expose the students to machineries, processes and modern tools used in industries.
3. To develop understanding of techniques like Production Planning, Quality Assurance, Maintenance practices, Environment and Pollution Control, Management Information System.
4. To provide hands-on training on machineries and equipments

Course Outcomes:

Students will be able to

1. Understand the industrial, environment, work culture and industrial practices.
2. Understand the machineries, processes and modern tools used in industries.
3. Reproduce the techniques like Production Planning, Quality Assurance, Students will be able to maintenance practices, Environment and Pollution Control, Management Information System.
4. Acquire skills and techniques to work in industries.

Course Contents

Unit I	**Training in Spinning, Weaving, Knitting, Machinery Manufacturing, Yarn, Fabric, Garment Chemical Processing, Machinery Manufacturing, Erection and Commissioning, Garment Manufacturing, Synthetics Fibre and Yarn Manufacturing, Technical Textiles, Non-Wovens, R & D Lab, Marketing etc. for study of:**	
	Process Flow Chart, Visit to various departments and study of machineries, Important adjustments and settings, Speed of Important Parts, Modern Developments in machines/process, Chemicals, Dyes used for carrying out various process, Process parameters and effect on quality of product, Actual Production and Efficiency, Production Planning and Control, Maintenance Practices, maintenance tools and gauges, maintenance schedule, Study of lubrications, Process Control and Quality Control activities, Roles and responsibilities of various categories of workers/technical Staffs, Labour allocation.	
Unit II	**Special Studies**	
	Management information systems, Waste study, Costing, Production planning and control, Target achievement, Information regarding humidification plant, Utility, Electrical supply, Store, purchase, Marketing, Sales, Samples, Lay-out of Plant.	**07 Hours**
Unit III	**Project**	
	Objectives, Procedures, Observations, Analysis and conclusion of the project carried out.	

References Books:

Specific guideline points given in daily diary.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTP358: NONWOVEN TECHNOLOGY LAB

Lab Scheme: Practicals: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks

List of Experiments

1	To study different processes involved in manufacturing of nonwoven fabric
2	To study blow room line for nonwoven
3	To study carding process for nonwovens
4	To collect samples of different nonwovens
5	To identify and analyze nonwoven fabrics
6	To study testing instruments for nonwoven physical testing
7	To study testing instruments for nonwoven chemical testing
8	To study testing instruments for nonwoven Other testing like weatherometer etc.
9	To study cross lapper
10	To test raw material required for nonwovens
11	To study needle loom for nonwovens
12	To study production of nonwovens with other methods

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTP359: USTER TECHNOLOGY LAB

Lab Scheme: Practicals: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	Study and collection of Uster norms
2	Performance assessment of blowroom / Card by using AFIS.
3	Comparison of dry and wet tenacity of yarn.
4	Study of yarn friction.
5	Study of effect of specimen length on tensile properties of yarn.
6	Twist measurement by optical and twist up to break method.
7	Study of yarn diameter.
8	Grading of Yarn Appearance by ASTM Method.
9	Determination of evenness by Cut weight Method
10	Study of Classimat faults
11	Analysis of variance – length curve and spectrogram
12	Determine Yarn Hairiness

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
First Year B. Tech. Textile Technology (Semester – VI)
TTP360: UNCONVENTIONAL SPINNING TECHNOLOGY LAB

Lab Scheme: Practical: 02 Hrs./Week	Credits 01	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	Study of Rotor spinning – Constructional details, Passage, Driving arrangement and Calculations.
2	Study of Air Jet spinning – Constructional details, Passage, Driving arrangement and Calculations.
3	Production of yarn on air-jet machine and comparing it with ring yarn.
4	Effect of condenser on air-jet yarn properties.
5	Effect of main draft on air-jet yarn properties.
6	Effect of Nozzle (N1) pressure on air-jet yarn properties.
7	Effect of Nozzle (N2) pressure on air-jet yarn properties.
8	Effect of Feed ratio on air-jet yarn properties.
9	Production of SIRO yarn and compare it with TFO yarn.
10	Production of compact SIRO yarn and compare it with TFO double yarn.
11	Production of compact SIRO yarn and compare it with single compact yarn.
12	Mill Visit

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester – VI)
TTP361: KNITTING TECHNOLOGY LAB

Lab Scheme: Practical: 02 Hrs./Week	Credits 01	Evaluation Scheme: CIE: 50 Marks

List of Experiments

1	Study of single jersey circular weft knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation.
2	Study of double jersey circular weft knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation.
3	Study and design setting of warp knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation.
4	Study of flat knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion. Design setting on power operated flat knitting machine
5	Design setting on single and double jersey circular weft knitting machine- Machine operation, cam and needle arrangements, yarn feeding and take down setting
6	Demonstration of various gauges used on the knitting machine
7	Analysis of plain single jersey knitted fabric
8	Analysis of plain 1x1 rib fabric
9	Analysis of plain interlock fabric
10	Analysis of derivatives of single jersey fabric / double jersey fabric
11	Visit to circular knitting unit to observe its working and collect technical information

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Technology (Semester-VI)
ATL302: PROFESSIONAL ETHICS

Teaching Scheme: Lectures: **02 Hrs./Week**		Evaluation Scheme: **CIE: 50 Marks**

Course Objectives:

1. To create awareness on professional ethics and human values.
2. To inculcate professionalism and imbibe ethical values.
3. To apply ethical code and ethical theories in professional life.
4. To understand business, environmental, computer and research ethics, IPR and CSR.

Course Outcomes:

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

1. Understand professional ethics and human values
2. Explain professionalism and ethical values
3. Apply ethical code and ethical theories in professional life.
4. Understand business, environmental, computer and research ethics, IPR and CSR.

Course Contents

Unit I	**Basic Concepts**	**06 Hours**

Introduction, Basic Terminologies, Morals, values and Ethics, Integrity, Work ethic, Service learning, Respect for others, living peacefully, Caring, Sharing, Honesty, Courage, Valuing time, Cooperation, Commitment, Empathy, Self-confidence, Character.

Unit II	**Profession and Professionalism**	**07 Hours**

Senses of 'Engineering Ethics,' Variety of moral issues, Types of inquiry, Moral dilemmas, Moral Autonomy, Kohlberg's theory, Gilligan's theory, Consensus and Controversy, Professions and Professionalism, Professional Ideals and Virtues, Uses of Ethical Theories, CSR.

Unit III	**Engineering and Ethics**	**06 Hours**

Engineering as Experimentation, Engineers as responsible Experimenters, Research Ethics, Codes of Ethics, Industrial Standards - A Balanced Outlook on Law, The Challenger Case Study

Unit IV	**Risk Assessment**	**06 Hours**

Safety and Risk, Assessment of Safety and Risk, Risk Benefit, Analysis, Reducing Risk, The Government Regulator's, Approach to Risk and Case Studies.

Unit V	Ethical Rights	07 Hours

Collegiality and Loyalty, Respect for Authority, Collective Bargaining, Confidentiality, Conflicts of Interest, Occupational Crime, Professional Rights, Employee Rights, Intellectual Property Rights (IPR), Discrimination.

Unit VI	Ethics and Profession	07 Hours

Multinational Corporations, Business Ethics – Environmental Ethics, Computer Ethics - Role in Technological Development, Weapons Development, Engineers as Managers, Consulting Engineers, Engineers as Expert Witnesses and Advisors, Honesty, Moral Leadership, Sample Code of Conduct.

References Books:

1. Mike W. Martin, Roland Schinzinger, Ethics in Engineering, 4th Edition, McGraw-Hill, New York, 2017. ISBN: 9780071112932.
2. Elaine Englehardt, Ray James, Michael J. Rabins, Charles Harris Jr., Michael Pritchard, Engineering Ethics Concepts and Cases, 6th edition, Wadsworth Publishing Co Inc., 2018. ISBN: 978-1337554503.
3. Jayasree Suresh and B. S. Raghavan, Human Values and Professional Ethics, 4th Edition, S. Chand Publications, 2003. ISBN: 978-8121924528
4. R. Subramanian, Professional Ethics, 2nd Edition, Oxford University Press, 2017. ISBN: 978-0199475070.
5. R. S. Naagarazan, A Textbook on Professional Ethics and Human Values, 1st edition, New Age International Private Limited, 2020. ISBN: 9389802431.
6. Govindarajan M., Engineering Ethics, Prentice Hall India Learning Private Limited, 2004. ISBN: 9788120325784.
7. P.S. Bajaj, Raj Agrawal, Business Ethics: An Indian Perspective, 1st edition, Dreamtech Press, 2004. ISBN: 9788177221671.