

DKTE Society's
TEXTILE & ENGINEERING INSTITUTE

Rajwada, Ichalkaranji 416115
(An Autonomous Institute)

DEPARTMENT: TEXTILES

CURRICULUM
B. Tech. Textile Plant Engineering
Program

Third Year
With Effect From
2022-2023



Promoting Excellence in Teaching
Learning & Research

**Third Year B. Tech Textile Plant Engineering
Semester- V**

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	TPL331	Computer Programming	ESC	3	-	-	3	3
2	TPL332	Yarn Manufacturing Machinery - IV	PCC	3	-	-	3	3
3	TPL333	Fabric Manufacturing Machinery - IV	PCC	3	-	-	3	3
4	TPL334	Yarn & Fabric Testing	PCC	3	-	-	3	3
5	TPL335	Analysis of Mechanical Elements	ESC	3	1	-	4	4
6	TPL336	Tribology	PCC	3	-	-	3	3
7	TPP337	Computer Programming Lab	ESC	-	-	2	2	1
8	TPP338	Yarn Manufacturing Machinery - IV Lab	PCC	-	-	2	2	1
9	TPP339	Fabric Manufacturing Machinery - IV Lab	PCC	-	-	2	2	1
10	TPP340	Yarn & Fabric Testing Lab	PCC	-	-	2	2	1
11	ATL301	Computer Operating Skills	H	2	-	-	2	-
12	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 Plant Engineering (Semester – V)
TPL331: COMPUTER PROGRAMMING

Teaching Scheme: Lectures: 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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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 Petroustos- 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 Plant Engineering (Semester – V) TPL332: YARN MANUFACTURING MACHINERY - IV		
Teaching Scheme: Lectures: 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
Course Objectives: <ul style="list-style-type: none"> <input type="checkbox"/> To understand compact spinning, yarn doubling techniques and process parameters. <input type="checkbox"/> To study the construction and manufacturing techniques of fancy yarns. <input type="checkbox"/> To understand blend spinning, yarn conditioning and singeing. <input type="checkbox"/> To study the working and construction of rotor spinning. 		
Course Outcomes: At the end of the course, students will be able to <ul style="list-style-type: none"> <input type="checkbox"/> Explain compact spinning, yarn doubling techniques and process parameters. <input type="checkbox"/> Explain the construction and manufacturing techniques of fancy yarns. <input type="checkbox"/> Explain blend spinning, yarn conditioning and singeing. <input type="checkbox"/> Explain the working and construction of rotor spinning. 		
Course Contents		
Unit I	Compact Spinning and Yarn Doubling	07 Hours
A) Compact Spinning: Basics of compact spinning, different compacting techniques, compact yarn properties. B) Yarn Folding and Doubling: Object of ply twisting - Methods of ply twisting, the concept of balance of twist. Study of conventional ring doubling and Up-twister machines. Limitation of ring doubling system. C) Two for One Twister (TFO): Evolution of TFO, Basic concept, design and construction of two for one twisting machine. Drives used on TFO. Techno- economics and modern developments in TFO machines. Advantages of TFO over ring doubling. Twist and production calculation. SIRO spinning.		
Unit II	Fancy Yarns	07 hours
A) Fancy Yarn Production: Classification of fancy yarns. Different ways of fancy yarn production. Design and construction of the basic profiles such as Spiral, Gimp, Loop, Snarl, Knop, Cover, Slub, Nepy, etc. Different fancy yarn manufacturing techniques. B) Mélange yarn: Manufacturing of mélange yarn. C) Elastane Yarn: Production of elastane yarn on ring frame. Air covered elastane yarns.		
Unit III	Blend Spinning	06 Hours
A) Objectives of blending, Fibre characteristics and blend compatibility, Measures of blending, selection of blend constituents, and mechanics of blending. Blending techniques, tinting. B) Process parameter changes in cotton spinning machinery for processing of manmade fibres. Common faults in blended and 100% man-made spun yarn. C) Processing of manmade fibres and their blends on Rotor Spinning Machines.		
Unit IV	Yarn Conditioning and Singeing	03 Hours

- A) Yarn conditioning:** Objectives of yarn conditioning. Yarn Conditioning Process – conventional and modern. Yarn conditioning process cycles for various yarn types. Advantages of yarn conditioning.
- B) Yarn singeing:** Introduction. Objectives & advantages of Singeing. Singeing Process-types. Precaution during singeing.

Unit V	Principle of Rotor Spinning	07 Hours
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- A) Ring spinning** – advantages and disadvantages. New spinning - advantages and disadvantages.
- B) Working principle of Rotor spinning.** Rotor spinning preparatory machines. Historical background of rotor spinning. Structure and working of the rotor spinning machined. Drafting stages involved in rotor spinning.

Unit VI	Rotor Spinning – Construction and developments	09 Hours
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- A) Rotor spinning machine construction:** Sliver feed, Opening roller, Trash removal, Fibre transport to the rotor, Fibre transport to the rotor groove, Range of application of the rotor, Yarn formation and twist insertion, Back doubling, True twist and false twist in the yarn, Wrapper fibres, Draw-off nozzles, Rotor speed and rotor diameter, Rotor cleaning, Rotor Bearing and Drive, Yarn take-off, Package formation.
- B) Yarns monitoring in rotor spinning,**
- C) Man-made fibre and blends processing:** Fibre selection, Opening roller type and opening roller speed, Rotor type and rotor speed,
- D) Modern developments in Rotor spinning.** Open End Yarn Properties and applications.

References Books:

1. Elements of ring frame and doublings by A. R. Kahre.
2. The Rieter Manual of Spinning – Vol 4 - Ring Spinning – W. Klein & Dr. H. Stalder
3. Fundamentals of Spinning – P. Lord / C. A. Lawarance.
4. Two for one Twister technology and Technique for spun yarns by H. S. Kulkarni and HVS Murty.
5. Fancy yarns- Their manufacture and application: R H Gong and R M Wright, The textile Institute.
6. The Rieter Manual of Spinning – Vol 6 – Alternative Spinning Systems – Dr. H. Stalder

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – V)
TPL333: FABRIC MANUFACTURING MACHINERY - IV

Teaching Scheme: Lectures : 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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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
	<p>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.</p> <p>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.</p> <p>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</p>	
Unit II	Rapier Weft Insertion	08 Hours
	<p>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.</p> <p>Principles of different single & double rapier weft insertion systems (Drive), their comparison. Study of rapier heads.</p> <p>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. Selvage forming elements & adjustments.</p> <p>Let-off & take up motion (Mechanical & power), their adjustments for various pick density</p>	

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
<p>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</p>		
Unit IV	Water Jet Weft Insertion	04 Hours
<p>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.</p>		
Unit V	Multiphase weaving	04 Hours
<p>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.</p>		
Unit VI	Narrow Fabric Weaving	05 Hours
<p>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.</p>		
References Books:		
<ol style="list-style-type: none"> 1. Handbook of weaving – Sabit Adanur. 2. Modern preparation and weaving machinery – A Ormerod 3. Shuttleless Looms – J. J. Vincent 4. Shuttleless weaving machine – O. Talavasele, V. Svaty 5. Narrow Fabric Weaving - Sauer Lander Verlag 		

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – V)
TPL334: YARN AND FABRIC TESTING

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

- To explain significance of yarn and fabric properties.
- To explain the factors affecting yarn and fabric properties.
- To explain principle and testing methodology of yarn properties.
- To explain principle and testing methodology of fabric properties.

Course Outcomes:

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

- Describe significance of yarn and fabric properties.
- Summarize the factors affecting yarn and fabric properties.
- Evaluate and interpret the results obtained for yarn properties.
- Evaluate and interpret the results obtained for fabric properties.

Course Contents

Unit I	Count and Twist in Yarn	08 Hours
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Yarn Number:

Concept, Direct and indirect systems, Measurement of yarn number - Knowles balance, Stubbs balance, Beesley balance, Quadrant balance, Relation between yarn count and yarn diameter.

Yarn Twist:

Terms and definitions, Function of twist in yarn structure, Effect of twist on yarn and fabric properties, Measurement of twist in single and double yarns – Straightened fibre method, Twist contraction method, Twist to break method, Optical method, Twist take up method.

Unit II	Mechanical Properties of Yarns and Fabric:	13 Hours
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Mechanical Properties of Yarns and Fabric:**Yarn Strength**

Terms and Definitions, Effect of fibre properties on the yarn strength, Factors affecting the tensile properties of textiles

a) **Single yarn strength** - The pendulum lever principle, Strain gauge transducer principle, Machines working on these principles, interpretation of test results.

b) **Lea Strength** - The lea CSP or Break factor & its significance – Description of lea strength tester, comparison of lea & single yarn test results, Ballistic test & its importance.

Mechanical Properties of Fabric

a) **Fabric Strength** – Importance of fabric strength test, Sampling of fabric, , Tensile strength testing –

Cut strip test, Grab test, comparison of strip test & grab test, Tear strength test, Bursting test.		
b) Abrasion Resistance of fabric – Serviceability, wear, abrasion, Factors affecting abrasion resistance, assessment of abrasion damage, BFT abrasion testing machine, Martindale abrasion tester.		
c) Pilling - Concept, mechanism of pilling, factors affecting fabric pilling, ICI Pill Box Tester.		
Unit III	Yarn Evenness	09 Hours
Concept, Classification of irregularity, causes of irregularity, Measures of irregularity, Basic irregularity, Index of irregularity. Addition of irregularity, Measurement of yarn irregularity - Visual examination, Cutting & weighing method, Electronic capacitance principle, Variation of thickness under compression, Analysis of irregularity – Variance length curves, spectrogram, Importance of yarn uniformity.		
Imperfections – Concept, Causes and importance.		
Classimat faults: Classification of faults and its causes. Principle & working of Classimat tester.		
Hairiness in spun yarn - Concept, Causes, Reduction & Measurement of hairiness- Photoelectric method		
Unit IV	Structural Properties of Fabric	04 Hours
a) Thickness – Definition, Significance, Shirley method of measurement of fabric thickness.		
b) Crimp of Yarn In Fabric: Definition, Measurement, Effect on Fabric Properties.		
c) Cover factor – Definition, Derivation of cover factor, Significance		
Unit V	Aesthetic Properties of Fabric	03 Hours
a) Fabric Stiffness – Concept, Importance of stiffness and Drape, measurement of stiffness: Shirley stiffness tester (cantilever principle), Heart loop test.		
b) Drape – Concept, Measurement of drape by Drape meter, Factors affecting stiffness and drape.		
c) Crease resistance & crease recovery – Concept, Measurement of crease recovery, Factors affecting crease recovery.		
Unit VI	Transport Properties of Fabric	02 Hours
a) Air permeability – Concept, Importance, air permeability, air resistance, air porosity, Shirley air permeability tester, Factors affecting air permeability.		
b) Water fabric relations – Concept, Importance, Water proofing & water repellency, Mechanics of wetting, Wetting time test, Spray test, Drop penetration test, Bundesmann test, Water head test.		
References Books:		
<ol style="list-style-type: none"> 1. Principles of Textile Testing, J.E.Booth, CBS Publishers & Distributors, 1996. 2. Physical properties of Textile Fibres, J. W. S. Morton & Hearle. 3. Physical Testing of textiles, B. P. Saville. 4. Handbook of Indian Standards. 5. Quality control and Testing, V. K. Kothari. 6. Textile testing Fibre, Yarn and Fabric, Arindam Basu, Published by SITRA, Coimbatore. 		

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – V)
TPL335: ANALYSIS OF MECHANICAL ELEMENTS

Teaching Scheme: Lectures : 03 Hrs/Week Tutorial : 01 Hrs/Week	Credits 04	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
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Course Objectives:

- To study various types of stresses and strains in materials under different loading conditions.
- Describe effect of stresses due to various types of loading in different sections and effect of stresses and strains in some textile components
- Explain different stresses, strains, strain energy and strength of joints under different loading conditions.
- Describe tensile, compressive, impact strength, hardness etc. of materials.

Course Outcomes:

At the end of the course students have understood

- Identify different stresses and strains under different loading conditions.
- Calculate effect of stresses due to various ways of loading in different sections and effect of stresses and strains in some textile components.
- Estimate stresses, strains, strain energy and strength of joints under different loading conditions.
- Identify tensile, compressive, impact strength, hardness etc. of materials.

Course Contents

Unit I	Simple stresses and Strains	09 Hours
a) Strength and elasticity of material, simple stresses, strains, behavior of brittle and ductile material under tension. Relation between elastic constant, Poisson's ratio, volumetric strain, principle of complementary shear stress. b) Strain energy and impact loading- concept of strain energy, strain energy in bending, stresses due to impact.		
Unit II	Shear force and bending moment	05 Hours
Shear force and bending moment for simply supported beams, overhanging beams, cantilevers with point loads and uniformly distributed loads. SFD and BMD.		
Unit III	Stresses in Beams	14 Hours
a) Bending stress – Symmetric bending of beams, standard beam sections, built up sections, design problems. Study of bending in drafting roller. b) Direct and bending stresses – Uniaxial bending, concept of biaxial bending, kern of section, chimneys subjected to wind pressure. c) Distribution of shears stresses in beams of standard sections. d) Torsion – Torsion of circular shafts, transmission of power through shafts. Power transmitted by shaft. Study of torsion in Textile m/c. shaft.		

Unit IV	Welded and Riveted Joints	06 Hours
Analysis and design of welded joints for direct loads.		
Unit V	Slope and deflection of beams	06 Hours
Calculation of slope and deflection for simple beams with point loads and udl, Macaulay's method.		
Unit VI	Testings of materials	02 Hours
Material properties, tension, compression, shear, hardness, fatigue, endurance limit, Testing procedure.		
References Books:		
<ol style="list-style-type: none"> 1. Strength of Materials: Ramamrutham. 2. Elements of Strength of Materials : S.P.Timoshenko and D.H. Young 3. Mechanics of Structures : S.B. Junnarkar 4. Strength of Materials : Vazirani and Ratwani 5. Introduction to Machine Design: V. B. Bhandari 6. Strength of Materials : R. K. Bansal 		

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – V)
TPL336: TRIBOLOGY

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

- To teach working principles and process parameters of friction, wear lubrication and types of lubricants.
- To describe properties, selection criterion, mechanism of action and applications of types of oils, greases, solid lubricants and gas lubrication.
- Explanation of constructional details and selection of lubrication systems. Informing about lubrication practices.
- To teach Lubricant conservation, testing, lubrication, management, environmental issues, handling and storage.

Course Outcomes:

At the end of the course students have understood

- Describe working principles and process parameters of friction, wear lubrication and types of lubricants.
- To describe properties, selection criterion, mechanism of action and applications of types of oils, greases, solid lubricants and gas lubrication.
- Identify constructional details and selection of lubrication systems. To know and suggest lubrication practices.
- To know importance of Lubricant conservation, testing, lubrication, management, environmental issues, handling and storage.

Course Contents

Unit I	Basics of Lubrication and Types of Lubricants	08 Hours
	<p>Definition of Tribology, meaning of lubrication, friction, liquid lubrication, hydrodynamic lubrication, boundary lubrication, hydrostatic lubrication, Dry or solid lubrication etc.</p> <p>Problem related to lubricant selection, basic types, selection of feeding system.</p>	
Unit II	Selection of Lubricating Oils and Oil Feed systems	09 Hours
	<p>Important oil properties, classification, viscosity, boundary lubrication, oil stability, contamination, Compatibility etc. Synthetic oils, natural oils, emulsions. Lubricating oils used in textile machines.</p> <p>Oil Feed Systems: - Advantages of oil feed, various systems like total loss system, oil mist system, wick and pad etc. Problems of oil changing, selection of right system. Lubrication systems used in textile machines.</p>	

Unit III	Grease Lubrication	06 Hours
<p>Nature and composition of grease, grease manufacturing, mechanism of action of grease, properties of grease, advantages and disadvantages, selection and application, methods of application. Anti-seizes and anti-scuffing compounds. Lubricating greases used in textile machines.</p>		
Unit IV	Solid and Gas Lubrication	07 Hours
<p>Mechanism of solid lubrication, advantages and disadvantages MoS₂, PTFE, Nylons, Acetals, metals, composites etc. selection of solid lubricants. Solid Lubricants used in textile machines. Principles of gas bearings, properties of gas, advantages and disadvantages, examples of gas bearing use.</p>		
Unit V	Lubricant testing and Monitoring	06 Hours
<p>Object, functional, chemical, physical tests. Standards and specification, precision of tests.</p> <p>Objects of lubricant monitoring, SOAP, Particle Test and Ferro-graphy, oil monitoring by lab. testing, Spot tests. Testing of grease. Failure investigation.</p>		
Unit VI	Lubricant Handling and disposal	06 Hours
<p>Oil Conservation, Lubricant Handling and Storage -</p> <p>Handling of used oil, Disposal of emulsions and contaminated oils, Laundering, refining and reuse. Care in lubricant handling, storage and applications.</p> <p>Revision and Discussion about SEE</p>		
References Books:		
<ol style="list-style-type: none"> 1. Lubrication – by A.R. Lansdown. 2. Basic Lubrication Theory – by Alastair Cameron. 3. Recent Advances in Tribology – Proceeding of X National Conference on Industrial Tribology, 1983 4. Maintenance Management Vol.4, - IMME Publication. 		

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – V)
TPP337: COMPUTER PROGRAMMING LAB

Lab Scheme: Practicals: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks
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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 Plant Engineering (Semester – V)
TPP338: YARN MANUFACTURING MACHINERY – IV LAB

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

1	Study of TFO – passage, gearing, calculations related to twist, speed, production.
2	Study of Ring-doubler – passage, gearing, calculation related to twist, speed and production.
3	Production of SIRO yarn.
4	Production of slub yarns using fancy yarn making device.
5	Manufacture of multi-twist and multi-count yarn.
6	Production and study of yarn on Air Covering Machine.
7	Production of Lycra core yarn on ring frame
8	Study of different compacting techniques on ring frame.
9	To study of yarn conditioning machine.
10	Study of Rotor spinning machine and constructional details of rotor
11	Comparative study of OE yarn and ring yarn.
12	Mill visit–Study of Two for One twister, compact spinning, yarn conditioning, etc.

Submission – Completed Journal.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – V)
TPP339: FABRIC MANUFACTURING MACHINERY - IV LAB

Lab Scheme: Practicals: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks
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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 Plant Engineering (Semester – V)
TPP340: YARN AND FABRIC TESTING LAB

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

1	Determination of yarn Linear Density.
2	Determination of twist in single yarn.
3	Determination of twist in double yarn.
4	Determination of single yarn strength.
5	Determination of yarn lea strength.
6	Evaluation of yarn unevenness by cut weight principle.
7	Estimation of crease recovery angle
8	Estimation of drapability of fabric
9	Evaluation of stiffness of fabric.
10	Determination of fabric strip strength.
11	Determination of tearing strength of fabric.
12	Assessment of air permeability of fabric.

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (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
<p>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.</p> <p>Microsoft Word Advanced: Manipulating Images, Using Custom Graphic Elements, Adding Document References and Links, Securing a Document, Automating Repetitive Tasks with Macros.</p>		
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	<p>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 able to avoid conflict and unpleasantness during their later study at a Chinese campus or contacts with Chinese.</p>		
Delivered in	English		
Course Schedule	<p>For Chinese language:</p> <ol style="list-style-type: none"> 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 <p>For culture part:</p> <ol style="list-style-type: none"> 1. Wuhan City History 2. Wuhan as seen from literature and art works 3. 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 Plant Engineering
Semester- VI**

Sr. No.	Course Code	Name of the Course	Group	Teaching Scheme				Credits
				Theory Hrs/ Week	Tutorial Hrs/ Week	Practical Hrs/ Week	Total	
1	TPL351	Industrial Engineering	HSMC	3	-	-	3	3
2	TPL352	Theory of Textile Machines - I	PCC	3	-	-	3	3
3	TPL353	Design of Textile Machines - I	PCC	3	-	-	3	3
4	TPL354	Yarn Manufacturing Machinery - V	PCC	3	-	-	3	3
5	TPL355	Fabric Manufacturing Machinery - V	PCC	3	-	-	3	3
6	TPLOE1	Open Elective	OEC	3	-	-	3	3
7	TPP356	Industrial Engineering	HSMC	-	1	-	1	1
8	TPP357	Internship - I *	PST	-	-	-	-	3
9	TPP358	Design of Textile Machines - I Lab	PCC	-	-	2	2	1
10	TPP359	Yarn Manufacturing Machinery - V Lab	PCC	-	-	2	2	1
11	TPP360	Fabric Manufacturing Machinery - V Lab	PCC	-	-	2	2	1
12	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

TQM OE1: Textile Quality Management (RSJ Inspection)

DKTES Textile and Engineering Institute , Ichalkaranji Third Year B. Tech. Textile Plant Engineering (Semester – VI) TPL351: INDUSTRIAL ENGINEERING		
Teaching Scheme: Lectures : 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
<p>Course Objectives:</p> <ul style="list-style-type: none"> <input type="checkbox"/> To explain significance of Industrial Engineering <input type="checkbox"/> To explain the importance of Production planning ,control and inventory control and different factors affecting on it. <input type="checkbox"/> To explain work study, method study , Operational Research and how this is very useful tool to enhance the productivity and quality. <input type="checkbox"/> To explain How Job evaluation and merit rating enhance the production rate? 		
<p>Course Outcomes:</p> <p>At the end of the course students have understood</p> <ul style="list-style-type: none"> <input type="checkbox"/> Understand importance of Industrial Engineering . <input type="checkbox"/> Understand the factors affecting Production Planning and Control and inventory <input type="checkbox"/> Understand and demonstrate method study, motion economy and operational research. <input type="checkbox"/> Perform Job evaluation and merit rating for increasing the production rate. 		
Course Contents		
Unit I	Introduction	03 Hours
<p>Concept of Industrial Engineering, definition, development, various techniques of Industrial Engineering, Scope in Textiles</p>		
Unit II	Work Study	12 Hours
<p>A) Work Study and Productivity- Production – Definition, Types of production, and characteristics of each type production. Definition, ways to increase productivity, measurement of productivity.</p> <p>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.</p> <p>C) Work measurement : Definition, Techniques, concept of total time, standard time, allowances, problems</p>		
Unit III	Operation Research	06 Hours
<p>Operation Research : Definition, various techniques of OR. Basics of linear programming – Formulation of LPP by Graphical solution.</p> <p>A) Project Planning- Network Analysis – PERT, CPM, and comparison.</p>		

Unit IV	Production, Planning & Control (PPC)	07 Hours
<p>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</p>		
Unit V	Value analysis and Value engineering	04 Hours
<p>Value analysis and Value engineering- Value, concept of value analysis, concept of value engineering, Reasons of unnecessary cost, value analysis procedure.</p>		
Unit VI	Job evaluation and merit rating	04 Hours
<p>Job evaluation and merit rating- Introduction, objectives, procedure of job evaluation, methods of job evaluation methods of merit rating</p>		
References Books:		
<ol style="list-style-type: none"> 1. Work Study – ILO 2. Work Study in Textiles – ILO 3. Elements of Production Planning & Control – Samuel Eilon. 4. Industrial Engineering & Management – Banga Sharma. 5. Industrial Engineering & Management – O. P. Khanna. 6. Industrial Engineering Manual of Textile Industry – Nobert Lloyd Enrick. 7. Industrial & production engineering – Sanjay S. Patil, & Nandkumar Hukeri. 		

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – VI)
TPL352: THEORY OF TEXTILE MACHINES- I

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

- To discuss need of motion transmission by various means.
- To Describe construction of machine and mechanisms
- Enumerate force, torque, power and other terms of mechanisms.
- To explain method to compare and select suitable machine accessories and system.

Course Outcomes:

At the end of the course students have understood

- Explain need of motion transmission, types of drives, select suitable drive.
- Explain & use mechanism for particular use and calculate parameters.
- Estimate force, torque, power, tension and related variables in cams, plain bearings, drives
- Select suitable ring, travellers, spindles, weighting system for spinning process.

Course Contents

Unit I	Mechanism	07 Hours
Mechanism, inversion. Study of four bar mechanism, single slider crank mechanism, double slider crank mechanisms and their inversions. Straight Line Mechanisms – Pantograph, Scott Russell mechanism, Peaucellier mechanism, Harts' mechanism, Intermittent motion mechanisms – ratchet and pawl mechanism and Geneva mechanism. Examples from textile machines – Straight-line motion mechanisms in rapier loom, crank and rack operated straight line motion, planetary straight-line motion and radial cam operated motion, screw traversing motion for rapier movement.		
Unit II	Velocity and Acceleration in Mechanisms	07 Hours
Relative velocity method, velocity diagram for different mechanism, acceleration diagrams for various mechanisms. Coriolis component of acceleration, application of velocity and acceleration diagrams to sley motion. Numerical examples based on velocity and acceleration diagrams.		
Unit III	Cams	06 Hours
Types of cams and followers, profile of cam for give characteristics of follower, specified contour cams, tangent and circular arc type cams. Spring force on follower, torque on cam shaft. Conjugate cam. Application of cams and cam mechanisms in Textile Machines.		
Unit IV	power transmission Drives	07 Hours
Belt drives – flat, vee and rope belts. Length of belt, velocity ratio, slip, creep, initial tension in belt, limiting tension ratio, centrifugal tension, power transmission, condition for maximum power transmission. Chain drives used in machines.		
Unit V	Friction	07 Hours
Introduction – types – laws of friction. Friction in pivot bearings, Power lost in friction, coil friction – application in yarn tensioning devices, let off motion, yarn friction meters.		

Unit VI	Study of Roller weighting system and drafting systems -	05 Hours
Roller weighting in spinning, mechanism of drafting systems. Study of high speed rings, spindles and travelers. Study of yarn tension in spinning.		
References Books:		
<ol style="list-style-type: none">1. Theory of Machines – Dr. R.K. Bansal.2. Theory of Machines – Ballaney3. Mechanics of Textile Machines – Hunton4. Textile Mechanisms – Grosberg5. Book of Papers of NCUTE Programme.6. Theory of Machines – Thomas Bevan7. Theory of Machines – R.S. Khurmi		

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – VI)
TPL353: DESIGN OF TEXTILE MACHINES - I

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

- To know the concept of machine design, understand general design procedure & manufacturing considerations in design. To know the concept of Principal planes & Principal stresses and the procedure for evaluating the same. To get familiar with theories of failure & their concerned expressions.
- To understand the design procedure of shafts for various loading conditions. To get familiar with design procedure of various types of keys and couplings.
- To get familiar with design procedure of springs. To understand the design procedure of welded, bolted & riveted joints for eccentric loading conditions.
- To understand design procedure of flywheels & pulleys. To get conversant with computer aided drafting system. To study the functions of seals- its types, materials, construction, working & applications.

Course Outcomes:

At the end of the course students will be able

- To explain the concept of machine design, describe general design procedure & manufacturing considerations in design. To derive necessary expressions for Principal planes & Principal stresses and calculate the same. State & explain theories of failure, derive their concerned expressions & solve numerical based on it.
- To design shafts for different loading conditions. To design various types of keys and couplings.
- To design different types of springs. To design welded, bolted & riveted joints for eccentric loading conditions.
- To design pulleys & flywheels. To describe features of computer aided drafting system. To explain with sketch different types of seals & their applications.

Course Contents

Unit I	Introduction to machine design and selection of engineering materials	03 Hours
Concept of machine design, General design procedure, criteria for selection of material in design.		
Unit II	Principal stresses and strains	06 Hours
Normal stress, shear stress, Principal stresses and planes, Principal strains, Mohr's circle diagram, Theories of failure- Max. Normal stress theory, Max. Shear stress theory, Distortion energy theory (statement only).		
Unit III	Design of shafts, keys & couplings	12 Hours
A) Design of shafts - Shafts subjected to bending stresses, torsional stresses and their combination, ASME code for shaft design, material selection for shaft, design of shaft for torsional rigidity,		

design consideration of drafting rollers.

B) Design of keys - Design of square & flat keys.

C) Design of couplings - Design of muff coupling, rigid flanged coupling and flexible coupling.

Unit IV	Design of springs & joints	10 hours
<p>A) Design of springs - Introduction, types of springs, design of helical compression, tension, torsion & leaf springs, nipping of leaf springs, spring materials.</p> <p>B) Design of joints - Design of welded & bolted joints for eccentric loading conditions.</p>		
Unit V	Design of pulleys and flywheels	06 Hours
<p>Function of flywheel, Torque analysis, design of solid disk & rimmed flywheel. Design of flat belt and V- belt pulleys, selection of pulleys.</p>		
Unit VI	Introduction to mechanical seals & Computer aided drafting	02 Hours
<p>A) Mechanical seals - Functions, types of seals, failure of seals, seal materials, application of seals.</p> <p>B) Introduction to computer aided drafting – Features of Auto CAD system, basic Auto CAD commands.</p>		
References Books:		
<ol style="list-style-type: none"> 1. Introduction to Machine Design by V. B. Bhandari. 2. Design of Machine elements by V. B. Bhandari. 3. A Textbook of Machine Design by R.S. Khurmi & J. K. Gupta. 4. Machine Design by P. Kanniah. 5. Mechanics of Spinning Machines by R. Rengaswamy. 		

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester –VI)
TPL354: YARN MANUFACTURING MACHINERY - V

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

- Explain the manufacturing process of synthetic fiber.
- Explain texturing process, process parameters and yarn characteristics.
- Explain the texturing machines, accessories and techniques.
- Explain unconventional spinning technologies, scope and advantages.

Course Outcomes:

At the end of the course students have understood

- Understand the manufacturing process of synthetic fiber
- Understand texturing process, process parameters and yarn characteristics.
- Understand the texturing machines, accessories and techniques.
- Understand unconventional spinning technologies, scope and advantages.

Course Contents

Unit I	Synthetic Fiber	08 Hours
Structural Principles of Textile Fibers-. Concept of monomer, polymer, Requirements of polymer to form fibre, Molecular orientation and crystallinity Melt Spinning- General features of the melt spinning process for filament yarn and staple fibre production		
Unit II	Synthetic Fiber	05 Hours
Principles of Solution Spinning Process - Preparation of spinning solution, Wet spinning process, Dry jet wet spinning process Overview of the processes to- Polyester Fiber, Polyamide fiber, Polypropylene Fiber		
Unit III	Texturizing	07 Hours
Definition and concept of texturizing, classification and characteristics of textured yarns. Methods of production of stretch (single heater) and modified stretch (double heater) yarns by conventional methods. Edge crimping, Stuffer box crimping, Knit-de-knit, Gear Crimping, Chemical Texturizing. Draw Texturizing concept, sequential and simultaneous draw texturizing, Study of simultaneous draw texturizing process. Draw Texturizing Machine Details: - Machine profiles, twisting devices, Heaters, cooling devices, Coning oil application, Process variables, Defects in draw textured yarns. Quality of draw textured yarns, technological developments in draw-texturizing technology. Double density machine and multiple input shaft machines		
Unit IV	Air Jet Texturizing	05Hours
Principle of loops formation, Air-jet texturizing machine, air- jets, wetting systems, stabilizing devices, process variables in air texturizing, Quality of air textured yarns, blending of filaments in air texturizing.		

Unit V	Unconventional Spinning Technologies	08 Hours
<p>Air Jet Spinning: - Basic concept, evolution of air jet spinning, Raw material requirement, stages involved, operating principle of air jet spinning, Principles of MJS, MTS and MVS, Specifications and working of different air jet spinning systems, Yarn properties, process variables, limitations.</p> <p>Friction Spinning: - Operating principle and raw material requirements, stages involved in friction spinning, working principle of different friction spinning systems, Development in various stages of friction spinning. Yarn properties, application, process variables.</p>		
Unit VI	Unconventional Spinning Technologies	06 Hours
<p>Cover spinning, SIRO spinning, Self- twist spinning, Twist less spinning. Raw material requirements, operating principles and yarn properties produced from these spinning systems, Advantages and limitations of these spinning systems.</p>		
<p>References Books:</p>		
<ol style="list-style-type: none"> 1. V. B. Gupta, V. K. Kothari, Manufactured Fibre Technology, Chapman and Hall, London.1997. ISBN: 9789401064736. 2. A.A. Vaidya, Production of Synthetic Fibres, Prentice Hall of India Pvt. Ltd., New Delhi, 1988. ISBN: 9780876925782 3. Yarn Texturing Technology by J.W.S. Hearle, L. Hollick, D.K. Wilson Woodhead Publishing Ltd, England. 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. The Textile Institute Manual of Textile Technology – Short staple spinning Series Vol.V – New Spinning System by W. Klein. 6. Textile progress vol. 10 No.2 – The Production and properties of staple fibre, Yarns made by Recently developed Techniques by L. Hunter. 		

DKTES Textile and Engineering Institute, Ichalkaranji Third Year B. Tech. Textile Plant Engineering (Semester – VI) TPL355: FABRIC MANUFACTURING MACHINERY - V		
Teaching Scheme: Lectures: 03 Hrs./Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
Course Objectives:		
<ul style="list-style-type: none"> <input type="checkbox"/> To explain basic terms, circular knitting machine details <input type="checkbox"/> To explain circular weft knitted fabric structure and calculations <input type="checkbox"/> To explain flat knitting machine details <input type="checkbox"/> To explain warp knitting machine details, calculations and warp knitted fabric structure 		
Course Outcomes:		
At the end of the course students have understood -		
<ul style="list-style-type: none"> <input type="checkbox"/> Basic terms, circular knitting machine details <input type="checkbox"/> Circular weft knitted fabric structure and calculations <input type="checkbox"/> Flat knitting machine details <input type="checkbox"/> Warp knitting machine details, calculations and warp knitted fabric structure 		
Course Contents		
Unit I	Circular Weft Knitting	09 Hours
<p>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.</p> <p>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.</p>		
Unit II	Weft Knitting – Fabric Structure	07 Hours
<p>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, lapiq ue, 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</p>		

Unit III	Flat Knitting	04 Hours
<p>Basic elements and their functions of flat knitting machine. Hand and machine operated flat knitting machines and their knitting actions.</p> <p>Machine operation for various stitches such as Miss, Tuck, Transfer, and Drop Stitch.</p> <p>Design with and without needle selection, bed racking, new formed and transfer loop for hand and power operated machines. Concept of seamless knitting</p>		
Unit IV	Warp Knitting Technology	06 Hours
<p>Comparison of weft and warp knitting. Passage of yarn through warp knitting machine.</p> <p>Essential elements of warp knitting machine such as yarn supply arrangement, loop forming mechanism and fabric take down mechanism.</p> <p>Knitting cycle of Tricot and Raschel warp knitting machine. Patterning Mechanism</p>		
Unit V	Warp Knitted Fabric Structure	08 Hours
<p>Principle stitches of warp knitting like Tricot, Pillar or chain, In-Lay, blind, 2 and 1 lapping, longer lapping, Atlas stitch,</p> <p>Study and representation of single bar fabric,</p> <p>Study and representation of two guide-bar fabrics like Full Tricot, Locknit, Satin, Reverse Locknit, Shark Skin and Queen's cord</p> <p>Study and representation of three and multi guide-bar structures.</p> <p>Weft insertion techniques, Terry technique, Net fabric manufacturing</p>		
Unit VI	Calculations, quality control and Advances in Knitting	05 Hours
<p>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)</p> <p>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)</p> <p>Fabric defects in Knitting and their remedies. Yarn quality requirements for knitting</p> <p>Concept of jacquard used in weft knitting & loop transfer</p> <p>Advanced features of knitting machine</p>		
References Books:		
<ol style="list-style-type: none"> 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 Plant Engineering (Semester – VI) TPLOE1- 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: <ul style="list-style-type: none"> <input type="checkbox"/> Identify the main parts of a PLC and describe their functions <input type="checkbox"/> To develop architecture of SCADA explaining each unit in detail. <input type="checkbox"/> To Develop ability to write programs for simple real time applications <input type="checkbox"/> 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 <ul style="list-style-type: none"> <input type="checkbox"/> Describe working of various blocks of basic industrial automation system <input type="checkbox"/> Use various PLC functions and develop small PLC programs <input type="checkbox"/> Summarize Supervisory Control & Data acquisition system <input type="checkbox"/> 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:		
<ol style="list-style-type: none">1. Programmable logical controller, Reis Webb, Prentice Hall2. Mechatronics – W. Bolton, Pearson education3. Programmable Logic Controllers, Webb & Reis, PHI4. Programmable Logic Controllers, John & Fredric Hackworth, Pearson5. Introduction to Programmable Logic Controllers, Gary Dunning, Thomson6. SCADA : Supervisory Control And Data Acquisition By : Stuart Boyer ISA7. SCADA Nptel		

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – VI)
TPLOE1- 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
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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
<p>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</p>		
Unit VI	Social Networks, Auctions and Portals	06 Hours
<p>Social Networks and Online Communities, Social Network features, Online Auctions-Benefits and types of Auctions, E-commerce Portals.</p>		
<p>References Books:</p>		
<ol style="list-style-type: none"> 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 Plant Engineering (Semester – VI)
TPLOE1- 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
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Course Objectives:

- To understand concept of cost accounting and Cost Audit.
- To understand Accounting for Material 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 Contract 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 Plant Engineering (Semester – VI)
TPLOE1- 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
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Course Objectives:

- To understand the fundamentals of innovation
- To describe the innovation process
- To understand the people, project, and program management tools and strategies
- To promote practical thinking and apply the learnings in innovation

Course Outcomes:

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

- Understand the fundamentals of innovation
- Describe the innovation process
- Understand the people, project, and program management tools and strategies
- Think practically and apply the learnings in innovation

Course Contents

Unit I	Introduction to Innovation	07 Hours
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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
	<ul style="list-style-type: none"> 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:		
	<ol style="list-style-type: none"> 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 Plant Engineering (Semester – VI)
TPLOE1- 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
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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, constraints 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 Be a 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:		
<ol style="list-style-type: none"> 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: <ul style="list-style-type: none"> <input type="checkbox"/> To Explain Sampling standards, methods & Acceptable Quality Limits used to decide on conformity of shipment/ goods against specified requirements. <input type="checkbox"/> To Explain Fabric, General & Container loading Inspection procedures. <input type="checkbox"/> To Explain Product Safety / Regulatory requirements, Product Performance (Testing) requirements. 		
Course Outcomes: On completion of course, students will be able to <ul style="list-style-type: none"> <input type="checkbox"/> Apply the sampling standards methods & Acceptable Quality Limits to make decision on acceptance/ rejection of shipment/ goods. <input type="checkbox"/> Execute/ Perform Fabric, General (Apparel/ Home Furnishing) & Container loading Inspections. <input type="checkbox"/> 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
<ul style="list-style-type: none"> • Course Content & Evaluation System • Professional conduct • Awareness & Importance of Companies Ethics & Conduct Code and Code of Conduct. 		
Unit II	Fabric Inspection Procedure	08 Hours
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • 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
<ul style="list-style-type: none"> • Procedure to follow for vacant container check. Supervision check & records to maintain during container loading. • Sealing of loaded container. 		
References Books:		
<ol style="list-style-type: none"> 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 Plant Engineering (Semester – VI)
TPP356: INDUSTRIAL ENGINEERING

Teaching Scheme: Tutorial: 01 Hr/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks
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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 Plant Engineering (Semester – VI) TPP357: INTERNSHIP-I		
Teaching Scheme: Training Period four weeks during Winter vacation	Credits 03	Evaluation Scheme: CIE: 50 Marks SEE: -- Marks Total: 50 Marks
Course Objectives:		
<ol style="list-style-type: none"> 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		
<ol style="list-style-type: none"> 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 Plant Engineering (Semester – VI)
TPP358: DESIGN OF TEXTILE MACHINES - I LAB

Lab Scheme: Practical: 02 Hrs/Week	Credits 01	Evaluation Scheme: CIE: 50 Marks
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List of Assignments

1	Introduction to Machine design & Selection of materials.
2	Principal stresses & strains.
3	Design of shafts, keys & couplings.
4	Design of springs & joints.
5	Design of pulleys & flywheels.
6	Study of mechanical seals & Auto CAD commands.

Submission – Completed journal & drawing sheets.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – VI)
TPP359: YARN MANUFACTURING MACHINERY - V LAB

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

1	Demonstrations of pilot melt spinning unit and production of filament yarn
2	Demonstrations of laboratory solution spinning machine and production of filament yarn
3	Measurement of MFI of given polymer using KAYJAY MFI testing apparatus.
4	Study of air jet spinning machine.
5	Processing of any blend on cotton system
6	Study of draw texturing machine.
7	Study of effect of process parameters on quality of draw textured yarn.
8	Study of air texturing machine.
9	Study of effect of process parameters on quality of air textured yarns.
10	Study of SIRO spinning.
11	Study of effect of process parameters on air jet spun yarns.
12	Visit to the texturizing plant.

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Plant Engineering (Semester – VI)
TPP360: FABRIC MANUFACTURING MACHINERY - V LAB

Lab Scheme: Practical: 02 Hrs./Week	Credits 01	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks
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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 Plant Engineering (Semester-VI)
ATL302: PROFESSIONAL ETHICS

Teaching Scheme:
Lectures: **02 Hrs./Week**

Evaluation Scheme:
CIE: 50 Marks

Course Objectives:

5. To create awareness on professional ethics and human values.
6. To inculcate professionalism and imbibe ethical values.
7. To apply ethical code and ethical theories in professional life.
8. To understand business, environmental, computer and research ethics, IPR and CSR.

Course Outcomes:

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

5. Understand professional ethics and human values
6. Explain professionalism and ethical values
7. Apply ethical code and ethical theories in professional life.
8. 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:		
<ol style="list-style-type: none"> 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. 		