

DKTE Society's
TEXTILE & ENGINEERING INSTITUTE

Rajwada, Ichalkaranji 416115
(An Autonomous Institute)

DEPARTMENT: TEXTILES

CURRICULUM
B. Tech. Man Made Textile Technology
Program

Third Year
With Effect From
2022-2023



Promoting Excellence in Teaching
Learning & Research

**Third Year B. Tech Man Made Textile Technology
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	TML331	Computer Programming	ESC	3	-	-	3	3
2	TML332	Textured Yarn Technology	PCC	3	-	-	3	3
3	TML333	Manmade Staple Yarn Manufacturing -IV	PCC	3	-	-	3	3
4	TML334	Chemical Processing of Textiles - II	PCC	3	-	-	3	3
5	TML335	Fibre Testing	PCC	3		-	3	3
6	TML336	Mechanics of Textile Machines	PCC	3	-	-	3	3
7	TMP337	Computer Programming Lab	ESC	-	-	2	2	1
8	TMP338	Textured Yarn Technology Lab	PCC	-	-	2	2	1
9	TMP339	Manmade Staple Yarn Manufacturing -IV Lab	PCC	-	-	2	2	1
10	TMP340	Chemical Processing of Textiles - II Lab	PCC	-	-	2	2	1
11	TMP41	Fibre Testing Lab	PCC			2	2	1
12	ATL301	Computer Operating Skills	MC	2	-	-	2	-
13	ATL303	Chinese Language	HSMC	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. Man Made Textile Technology (Semester – V) TML331: COMPUTER PROGRAMMING		
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 study database management system and SQL commands. <input type="checkbox"/> To understand VB.Net IDE, various types of objects & programming constructs in VB.Net. <input type="checkbox"/> To study different categories of data and data science process. <input type="checkbox"/> To study data visualization tools. 		
Course Outcomes:		
At the end of the course students have understood		
<ul style="list-style-type: none"> <input type="checkbox"/> Design database management system and write SQL commands. <input type="checkbox"/> Develop simple application programs in VB.Net. <input type="checkbox"/> Demonstrate data science process. <input type="checkbox"/> 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. Man Made Textile Technology (Semester – V)
TML332: TEXTURED YARN TECHNOLOGY

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 the drawing and heat setting of filaments yarns
- To explain principles and methods of manufacturing various textured yarns
- To explain structure and properties of textured
- To explain developments in texturing technologies

Course Outcomes:

At the end of the course students have understood

- Drawing and heat setting of filaments yarns
- Scientific principles and methods of manufacturing of textured yarns
- Structure and properties of textured yarns
- The developments in texturing methods

Course Contents

Unit I	Drawing and Heat Setting of filament yarns	06 Hours
Need for drawing melt spun filament yarns. Drawing behaviour of thermoplastic filament yarns, Drawing unit, Influence of drawing on structure and properties of filament yarns. Heat setting of filament yarns, Nature of set, Degree of set.		
Unit II	Classification of textured yarns.	06 Hours
Draw backs of flat filament yarns, Definition and concept of texturing, Classification and characteristics of textured yarns.		
Unit III	False Twist Draw Texturing	07 Hours
Concepts of False Twist texturing and false twist draw texturing, stretched (single heater) and modified stretched (double heater) yarns manufacturing. Sequential and simultaneous draw texturing, Comparison of sequential and simultaneous draw texturing processes.		
Unit IV	Draw Texturing Machine Details	07 Hours
Machine profiles, Twisting devices, Heaters, Cooling devices, Coning oil application, Process variables, Testing of characteristics of draw textured yarns. Defects in draw textured yarns. Technological developments in draw-texturing technology.		
Unit V	Air Jet Texturing	07 Hours
Principle of loops formation, Air-jet texturing process, Air jets, Wetting systems, Stabilizing devices, Process variables in air texturing, Measurement of characteristics of air textured yarns. Blending of filament yarns in air texturing. BCF draw texturing process, process variables. Applications of BCF yarns.		
Unit VI	Other Texturing methods	06 Hours
Edge crimping, Stuffer box crimping, Knit-de-knit, Gear Crimping, Chemical Texturing		

References Books:

1. V. B. Gupta, V. K. Kothari, Manufactured Fibre Technology, Chapman and Hall, London.1997. ISBN:9789401064736.
2. Yarn Texturing Technology by J.W.S. Hearle, L. Hollick, D.K. Wilson Woodhead Publishing Ltd, England.
3. Textile Yarn Technology, Structure and Application” – Goswami B.C., Martindale, J.G., Scardino F.L., Wiley Interscience publication, 1977, U.S.A.
4. Hes L. Ursiny P., “Yarn Texturing Technology”, Eurotex, U.K., 1994.
5. M. Acar and G.R. Wray., “An analysis of the air jet yarn texturing process Part-I: A Brief history of developments in the process”, Journal of Text. Institute, Vol.77, No.1, p19-27, (1986).
6. Wilson D.K. and Kollu T., “Production of Textured Yarns by the False Twist Technique”, Textile Progress, Vol. 21, No.3, Textile Institute, Manchester, U.K., 1991.
7. Gupta V.B. (Edr.), “Winter School on Man-made Fibers – Production, Processing, Structure, Properties and Applications”, Vol. 1, 19

DKTES Textile and Engineering Institute, Ichalkaranji Third Year B. Tech. Man Made Textile Technology (Semester – V) TML333: MAN MADE STAPLE YARN MANUFACTURING - IV		
Teaching Scheme: Lectures: 03 Hrs./Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
Course Objectives:		
<input type="checkbox"/> To understand the manufacturing process and characteristics of Blended Yarns. <input type="checkbox"/> To explain the principle of unconventional spinning and fancy yarn. <input type="checkbox"/> To describe various operations and mechanisms used. <input type="checkbox"/> 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		
<input type="checkbox"/> Demonstrate the manufacturing process and characteristics of Blended Yarns. (Knowledge). <input type="checkbox"/> Understands the basics of unconventional spinning techniques and fancy yarn (Knowledge). <input type="checkbox"/> Understand the operations and various mechanisms used. (Understand). <input type="checkbox"/> Evaluate the effect of process parameters on quality of yarns produced on unconventional spinning systems. (Analyze).		
Course Contents		
Unit I	Blend Spinning	09 Hours
<ul style="list-style-type: none"> ▪ Object of blending, Fibre characteristics and Spinnability. ▪ Measures of blending, Blend Migration, blend segregation in processing, selection of blend constituents, mechanics of blending and blending Techniques. ▪ Modification of cotton spinning machineries for processing of manmade fibres. ▪ Common faults in blended and 100% man-made spun yarn. ▪ Blend spinning of dyed fibres. 		
Unit II	Compact Spinning	04 Hours
<ul style="list-style-type: none"> ▪ Basic concept of compact spinning. ▪ Methods of compact spinning ▪ Advantages and limitations. 		
Unit III	Rotor Spinning	08 Hours
<ul style="list-style-type: none"> ▪ Principle of ROTOR SPINNING. ▪ Construction and working. ▪ Yarn formation. ▪ Raw material preparatory process requirements. ▪ Structure and Properties. 		

	<ul style="list-style-type: none"> ▪ Possibilities and merits. ▪ End application of rotor yarn. 	
Unit IV	Air Jet Spinning	06 Hours
	<ul style="list-style-type: none"> ▪ Basic concept, Principles of MJS, MTS and MVS. ▪ Stages involved, operating principle of air jet ▪ Mechanism of yarn formation, Mechanism of twisting. ▪ Raw material and preparatory process requirements. ▪ Structure, properties and end uses 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. 	
Unit V	Friction Spinning	08 Hours
	<ul style="list-style-type: none"> ▪ Introduction to the principle of friction spinning. ▪ Details of different machine zones like: drafting, opening, fibre collection, twisting and winding. ▪ Raw material preparatory process requirements. ▪ Structure and Properties. ▪ Possibilities and merits. ▪ End application of friction yarn. 	
Unit VI	Fancy Yarn	04 Hours
	<ul style="list-style-type: none"> ▪ CLASSIFICATION. ▪ Study of fancy doubler. ▪ Methods of fancy yarn production – Multi-count yarn, Multi-twist yarn, Air covered yarn, etc. 	
References Books:		
<ol style="list-style-type: none"> 1. K R Salhotra, “Spinning of man-made fibres and blends on cotton systems”, The textile Association, India 2004. 2. 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 3. Textile progress vol. 10 No.2 – The Production and properties of staple fibre, Yarns made by Recently developed Techniques by L. Hunter. 4. Air jet spinning – Textile Progress, Textile Institute Publication 5. Spun Yarn Technology by Carl A. Lawrence 6. New Spinning Systems – H. Staldar. 7. Spun Yarn Technology by Eric Oxtoby. 		

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Man Made Textile Technology (Semester – V)
TML334: CHEMICAL PROCESSING OF TEXTILES-II

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 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
<p>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.</p>		
Unit V	Finishing	08 Hours
<p>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.</p>		
Unit VI	Machinery used in Chemical Processing	08 Hours
<p>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.</p>		
References Books:		
<ol style="list-style-type: none"> 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. Man Made Textile Technology (Semester– V)
TML335: FIBRE 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 and techniques of sample selection.
- To discuss technical significance of fibre properties.
- To describe testing methodologies for evaluation of fibre properties.
- To explain moisture-textile relations and measurement of moisture.

Course Outcomes:

At the end of the course students will be able to

- To select representative sample.
- To understand technical significance of fibre properties.
- To test and interpret results of fibre properties.
- To understand moisture fibre relations.

Course Contents

Unit I	Sampling for determination of fibre properties	04 Hours
Necessity of sampling, Terms: Population, Sample, Random sample, biased sample, Factors governing sampling, Sampling methods – Zoning method, Squaring method, Cut squaring method, Core sampling method.		
Unit II	Longitudinal dimensions (Fibre length)	08 Hours
Concept, Technical Significance of fibre length, Staple length of cotton, Length- frequency diagrams, Fibre length measurement - Oil plate method , Comb sorter method, Scanning method - Digital Fibrograph.		
Unit III	Transverse dimensions (Fineness & Maturity)	08 Hours
Fibre Fineness: Concept, Measures of fineness, Technical significance of fineness, Measurement of fineness - Microscopic method, Gravimetric method, Airflow method - Sheffield Micronaire. Fibre Maturity: Concept, Measures of maturity, Technical significance of maturity, Measurement of maturity - Caustic soda method, Polarized light method, Differential dyeing method.		
Unit IV	Fibre strength	08 Hours
Terms and definitions, Stress-strain curve, Importance of Tensile properties, Factors influencing fibre strength, Types of loading, Measurement of fibre strength- Single fibre strength– Strain gauge transducer principle, Bundle fibre strength– Pendulum lever principle , Comparison of Single fibre strength and Bundle fibre strength.		
Unit V	Moisture relations and testing	05 Hours
Terms and definitions, Effect of moisture on textiles, Regain–humidity relationships, factors affecting moisture regain, Measurement of atmospheric conditions- dry and wet bulb hygrometer, hair hygrometer, electrolytic hygrometer, measurement of regain –oven dry method, methods		

based on resistance and capacitance principles.

Unit VI	Miscellaneous testing and modern fibre testing-	06 Hours
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Trash: Classification of trash, Technical significance of trash, estimation of trash content in cotton by Trash analyser.

Neps: Concept, Classification of Neps, importance, Neps in card web –Shirley template method

Fibre Quality Index and its significance.

Modern fibre testing instruments:

High Volume Instrument (HVI), Advanced Fibre Information System(AFIS).

Honey dew Content : Concept, Significance and estimation of honey dew content

References Books:

1. Principles of Textile Testing, J.E.Booth, CBS Publishers & Distributors, 1996.
2. Physical Properties of Fibres, Morton and Hearle
3. Manuals of HVI, AFIS
4. Manual of Spinning, P. Lord.
5. Physical Testing of textiles, B. P. Saville
6. Handbook of Indian Standards.
7. Textile Measuring Technology and Quality Control by Richard Furter.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Man Made Textile Technology (Semester – V)
TML336: 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
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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
<p>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.</p> <p>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.</p> <p>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.</p>		

Unit II		07 Hours
<p>Linkage Mechanisms: -</p> <p>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.</p> <p>Intermittent Rotary Motion: -</p> <p>Introduction – Ratchet and pawl mechanisms – Let off and take up motions in weaving machines – variation in pick spacing – Geneva wheel.</p>		
Unit III	Balancing of machines	05 Hours
<p>Balancing of Machines: -</p> <p>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.</p>		
Unit IV	Clutches and Brakes	05 Hours
<p>Clutches and Brakes: -</p> <p>Introduction – Clutches – Jaw / toothed clutches, Friction clutches, Materials for friction lining, Cone Clutches. Torque and power transmission capacity of clutches. Numerical problems..</p> <p>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.</p>		
Unit V	Selection and Control Mechanisms	07 Hours
<p>Selection Mechanisms: -</p> <p>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.</p> <p>Control Mechanisms: -</p> <p>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.</p>		
Unit VI	Mechanics in Spinning and Weaving Machines	03 Hours
<p>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,</p> <p>Study of mechanisms in winding, Build of various packages. Screw traversing mechanism. Design of grooved drums</p>		

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. Man Made Textile Technology (Semester – V)
TMP337: 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. Man Made Textile Technology (Semester – V)
TMP338: TEXTURED YARN TECHNOLOGY LAB

Lab Scheme: Practical's: 02 Hrs./Week	Credits 01	Evaluation Scheme: CIE: 50 Marks
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List of Experiments

1	Demonstration of false twist draw texturing machine.
2	Effect of process parameters on structure and properties of false twist draw textured yarns.
3	Comparison of stretched (single heater) and modified (double heater) stretched textured yarns.
4	Demonstration of the air-jet texturing machine.
5	Effect of process parameters on structure and properties of air-jet textured yarns.
6	Production and characterization of blended filament yarn using the air-jet texturing machine.
7	Demonstration of air covering machine and manufacturing of air covered yarn.
8	Effect of process parameters on the structure and properties of air-covered yarns.
9	Studies on drawing of filament yarn in hot water.
10	Studies on the microscopic appearance of different filament yarns.
11	Effect of winding machine speed/ winding tension on the crimp/loop stability of textured yarns.
12	Industrial visit

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Man Made Tech. Textile Technology (Semester – V)
TMP339: MAN MADE STAPLE YARN MANUFACTURING - IV LAB

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

1	Demonstration of tinting and channelization of material in spinning
2	Processing of blended roving on ring spinning machines
3	Study of various compact spinning systems.
4	Manufacturing of compact yarn and compare the properties with ring yarn.
5	Study the construction of rotor spinning machine.
6	Study the construction and working of air-jet spinning machine.
7	Production of yarn on air-jet machine and comparing it with ring yarn.
8	Effect of total draft on air-jet yarn properties.
9	Effect of Nozzle pressure on air-jet yarn properties.
10	Manufacturing of Elastic Air covered Yarn and study the properties of air-covered yarns
11	Demonstration of fancy Slub /Multi count /Multi twist yarn production on Ring Frame
12	Visit to the Blend Spinning plant

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Man Made Textile Technology (Semester – V)
TMP340: CHEMICAL PROCESSING OF TEXTILES – II 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	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. Man Made Textile Technology (Semester– V)
TMP341: FIBRE TESTING LAB

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

1	Study of Zoning technique for selection of fibre sample.
2	Fibre Length by using Grease Plate Method.
3	Comb Sorter method for estimation of fibre length parameters.
4	Fibre Fineness by Cut-Weight Method.
5	Measurement of fibre fineness by airflow principle.
6	Fibre Maturity Measurement by Caustic Soda Method
7	Determination of trash content in cotton using Trash Analyzer.
8	Study of fibre parameters on AFIS.
9	Study of single fibre strength.
10	Determination of Neps in Card web by Shirley Template.
11	Determination of moisture content and regain by oven dry method.
12	Determination of moisture content by Shirley Moisture meter

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Man Made 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
<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	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.		
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 Man Made Textile Technology
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	TML351	Industrial Engineering	HSMC	3	-	-	3	3
2	TML352	Man Made Fibre Science	PCC	3	-	-	3	3
3	TML353	Yarn & Fabric Testing	PCC	3	-	-	3	3
4	TML354	High Performance Fibres & Composites	PCC	3	-	-	3	3
5	TML355	Manmade Fabric Forming Technology -IV	PCC	4	-	-	4	4
6	TMLOE1	Open Elective	OEC	3	-	-	3	3
7	TMP356	Industrial Engineering	HSMC	-	1	-	1	1
8	TMP357	Internship - I *	PST	-	-	-	-	3
9	TMP358	Yarn & Fabric Testing Lab	PCC	-	-	2	2	1
10	TMP359	Manmade Fabric Forming Technology -IV Lab	PCC	-	-	2	2	1
11	ATL302	Professional Ethics	HSMC	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

TQM0E1: Textile Quality Management (RSJ Inspection)

IELOE4: Smart Supply Chain for Textiles
(Swiss Textile Machinery Association)
W. E. F. 2024-25

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Man Made Textile Technology (Semester – VI)
TML351: INDUSTRIAL ENGINEERING

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

Unit II	Work Study	12 Hours
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- 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
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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.

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. Man Made Textile Technology (Semester– VI)
TML352: MAN MADE FIBRE SCIENCE

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 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
<p>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.</p> <p>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.</p> <p>C) Electron microscopy: Principle of electron microscope, Transmission and scanning electron microscope - Principle, working and applications.</p> <p>D) Infrared Spectroscopy: Spectroscopy, Beer-Lambert law, Principles of IR-Spectroscopy, Principle and working of IR spectrophotometer, Applications, IR-Dichroism and its importance.</p>		
Unit III	Mechanical properties of fibres	09 Hours
<p>A) Tensile properties: Terms and definitions, stress-strain curve, importance of tensile properties, factors influencing tensile properties of fibres</p> <p>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.</p> <p>C) Fibre Friction: Laws of friction in textiles, consequence of friction in textiles, measurement of friction, empirical results, nature of friction.</p>		

Unit IV	Variability and Directional Effects	06 Hours
<p>A) Effects of variability: Weak link effect, derivation of Pierce formula, Spencer-Smith theory, composite specimen effect, variability in practice</p> <p>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</p>		
Unit V	Theories of mechanical properties and viscoelasticity	05 Hours
<p>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.</p>		
Unit VI	Thermal and electrical properties	04 Hours
<p>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.</p> <p>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.</p>		
References Books:		
<ol style="list-style-type: none"> 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. Man Made Textile Technology (Semester – VI)
TML353: 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
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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
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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
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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
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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:

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. Man Made Textile Technology (Semester – VI)
TML354: HIGH PERFORMANCE FIBRES & COMPOSITES

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 describe the concept and requirements of high performance fibres
- To explain the manufacturing process of commonly used high performance fibres
- To explain structure, properties and applications of commonly used high performance fibres
- To explain the concept, manufacturing and characteristics of fibre reinforced composites

Course Outcomes:

At the end of the course students have understood

- The concept and requirements of high performance fibres and speciality yarns
- The manufacturing process of commonly used high performance fibres
- The structure, properties and applications of commonly used high performance fibres
- The manufacturing and characteristics of fibre reinforced composites

Course Contents

Unit I	Introduction to high performance fibres	06 Hours
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Concept and requirements of high performance fibres.

Introduction to PAN and pitch based carbon fibres – their production, properties and applications.

Unit II	Aramid Fibres	06 Hours
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Introduction, polymer preparation, spinning of fibres, structure and properties and applications of meta and para aramid fibres

Unit III	Gel spun high performance polyethylene & Fully aromatic polyester fibre	07 Hours
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Introduction, manufacture, fibre characteristics and applications, solid state extrusion of high molecular weight polyethylene fibres.

Fibre manufacture, properties and applications of fully aromatic polyester fibres.

Unit IV	Glass & Ceramic Fibres:	07 Hours
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Introduction, fibre manufacture, properties and applications of glass fibres.

Silicon carbide based fibres, Alumina based fibres. Single crystal oxide fibres

Unit V	Chemical & Thermal resistant fibres	07 Hours
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Manufacture, fibre characteristics and applications of PBI, PBO, Chlorinated fibres: PVDC
 Fluorinated Fibres: PTFE, PVF, PVDF and FEP Poly (etheretherketones): PEEK Poly (phenylenesulphide): PPS Poly (ether imide): PEI fibres.

Unit VI	Fibre Reinforced Composites	06 Hours
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Overview of composites, Classification of composites, Matrix and reinforcing materials, Fibre reinforced composites - manufacturing methods, Characteristics of composites

References Books:

1. High Performance Fibres, Edited by J. W. S. Hearle, Published by wood head publishing Ltd., England in association with Textile Institute Manchester
2. Hand book of Fibres Science and Technology, High Technology Fibres, Edited by Manachem Lewin and Jack Preston.
3. New fibers. T. Hongu and G. O. Phillips Ellis Horwood Ltd, Chichester
4. Kevlar aramid fiber. By H.H. Yang. John Wiley and Sons, Chichester, New York,
5. Fiber reinforced Composites Materials, Manufacturing, And Design, P.K. Mallick, 3rd ed. Taylor & Francis
6. High-Performance and Specialty Fibers, Editors: Technology, Japan, Society of Fiber Science & (Ed.)

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Man Made Textile Technology (Semester –VI)
TML355: MANMADE FABRIC FORMING TECHNOLOGY - IV

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

- To explain basic terms, circular knitting machine details
- To explain circular weft knitted fabric structure and calculations
- To explain flat knitting machine and warp knitting machine details, calculations and warp knitted fabric structure details
- To explain unconventional weaving technologies like multiphase, circular and narrow fabric weaving

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 and warp knitting machine details, calculations and warp knitted fabric structure details
- Unconventional weaving technologies like multiphase, circular and narrow fabric weaving

Course Contents

Unit I	Circular Weft Knitting	12 Hours
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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	09 Hours
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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-

<p>roma, Bourrelet</p> <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>Fabric defects in Knitting and their remedies. Yarn quality requirements for knitting</p> <p>Concept of jacquard used in weft knitting & loop transfer</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	09 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 and Calculations	09 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, Lock-nit, Satin, Reverse Lock-nit, Shark Skin and Queen's cord</p> <p>Study and representation of three and multi guide-bar structures.</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>		
Unit VI	Unconventional Weaving Methods	09 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</p> <p>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> <p>Narrow Fabric: 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 selvage forming systems on needle loom, drives to different elements</p>		

References Books:

1. Knitting Technology by Prof. D. B. Ajgaonkar
2. Circular Knitting by Dr. Chandrashekar 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
7. Modern preparation and weaving machinery – A Ormerod
8. Shuttleless Looms – J. J. Vincent
9. Shuttleless weaving machine – O. Talavasele, V. Svaty
10. Narrow Fabric Weaving - Sauer Lander Verlag

DKTES Textile and Engineering Institute , Ichalkaranji Third Year B. Tech. Man Made Textile Technology (Semester – VI) TMLOE1- 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. Man Made Textile Technology (Semester – VI)
TMLOE1- 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. Man Made Textile Technology (Semester – VI) TMLOE1- 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:		
<input type="checkbox"/> To understand concept of cost accounting and Cost Audit. <input type="checkbox"/> To understand Accounting for Material and Labour. <input type="checkbox"/> To understand accounting for Overhead & Preparation of cost sheet. <input type="checkbox"/> To understand Job costing, Contract costing, Process costing and Batch costing.		
Course Outcomes:		
At the end of the course students have understood		
<input type="checkbox"/> Describe concept of cost accounting & Cost Auditing. <input type="checkbox"/> Analyze various Material and Labour cost. <input type="checkbox"/> Analyze overheads & Prepare Cost Sheet. <input type="checkbox"/> 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. Man Made Textile Technology (Semester – VI)
TMLOE1- 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. Man Made Textile Technology (Semester – VI)
TMLOE1- 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. Man Made Textile Technology (Semester – VI)
TMP356: 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. Man Made Textile Technology (Semester – VI) TMP357: 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	07 Hours
	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.	
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. Man Made Textile Technology (Semester – VI)
TMP358: 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. Man Made Textile Technology (Semester – VI)
TMP359: MANMADE FABRIC FORMING TECHNOLOGY - IV 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 Needle loom for its passage, different motions and chain perpetration for different weaves
2	Study of single jersey circular weft knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation.
3	Study of double jersey circular weft knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation.
4	Study and design setting of warp knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion, Production calculation.
5	Study of flat knitting machine – yarn supply arrangements, loop forming mechanism, takedown motion. Design setting on power operated flat knitting machine
6	Design setting on single and double jersey circular weft knitting machine- Machine operation, cam and needle arrangements, yarn feeding and take down setting
7	Demonstration of various gauges used on the knitting machine
8	Analysis of plain single jersey knitted fabric
9	Analysis of plain 1x1rib and 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
12	Visit to Circular weaving unit observe its working and collect technical information

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Man Made Textile Technology (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. 		

DKTES Textile and Engineering Institute, Ichalkaranji Third Year B. Tech. Man Made Textile Technology (Semester – VI) IELOE4: SMART SUPPLY CHAIN FOR TEXTILES		
Teaching Scheme: Lectures: 03 Hrs/Week	Credits 03	Evaluation Scheme: SE-I: 25 Marks SE-II: 25 Marks SEE: 50 Marks
Course Objectives:		
<ol style="list-style-type: none"> 1. Impart comprehensive knowledge of the smart supply chain in textiles. 2. Develop understanding and management of quality and defects in textile production. 3. Familiarize participants with intelligent machinery and solutions by Swiss manufacturers. 4. Introduce advanced spinning mill management and yarn profiling techniques. 		
Course Outcomes:		
At the end of the course, students will be able to		
<ol style="list-style-type: none"> 1. Explain quality parameters in textiles. 2. Analyze and prevent defects in textile production. 3. Explain KPIs in spinning mills for optimal operations. 4. Design yarn profiles to meet specific textile applications. 		
Course Contents		
Unit I	Basic Concepts of Textiles	06 Hours
<ul style="list-style-type: none"> • Fundamental concepts of textiles and their role in the supply chain • Understanding raw materials, yarns, fabrics, and their properties • Efficient communication across interfaces in the textile trade • Real-life examples of reducing misunderstandings in textile processes • Swiss contributions to basic textile knowledge and advancements. 		
Unit II	Quality in Textiles	06 Hours
<ul style="list-style-type: none"> • Key criteria for defining and assessing quality in textiles • Practical examples of quality standards for yarns, fabrics, and garments • Tools and methods for quality evaluation • Case studies on quality management practices in textile production • Contributions of Swiss companies to maintaining textile quality. 		
Unit III	Defects in Textile Fabrics and Their Prevention	06 Hours
<ul style="list-style-type: none"> • Classification of defects by material selection, yarn properties, and fabric production • Identification and analysis of common defects in textile fabrics • Preventive measures and corrective actions for defect management • Practical examples of defect prevention in production processes • Solutions from Swiss manufacturers to minimize defects. 		
Unit IV	Machinery for Individual Process Steps	06 Hours
<ul style="list-style-type: none"> • Overview of machinery used in each stage of textile production • Intelligent solutions from Swiss manufacturers like Benninger, Bräcker, Loepfe, Graf, and 		

Heberlein <ul style="list-style-type: none"> • Case studies on machinery applications in yarn preparation, weaving, and finishing • Role of automation and digital technologies in textile machinery • Future trends and innovations in textile machinery. 		
Unit V	Intelligent Spinning Mill Management	06 Hours
<ul style="list-style-type: none"> • Key Performance Indicators (KPIs) in ring spinning and their significance • Techniques to manage and optimize KPIs at various stages of production • Intelligent systems for spinning mills by Swiss manufacturers (e.g., Bräcker, Rieter, Saurer) • Case studies on the impact of intelligent spinning mill management • Integration of automation and data analytics in spinning mills 		
Unit VI	Yarn Profiling for Specific Textile Applications	06 Hours
<ul style="list-style-type: none"> • Understanding the relationship between application requirements and yarn profiles • Factors influencing yarn properties for various textile applications • Practical examples: single jersey T-shirt, sweatshirt, socks, denim, and more • Advanced profiling techniques for performance optimization • Contributions of Swiss companies like Rieter, Saurer, and Uster in yarn profiling. 		
References Books:		
<ol style="list-style-type: none"> 1. Textile Engineering: An Introduction by Yasir Nawab, Sheraz Ahmad (2018), Springer. ISBN: 9789811320118. 2. Textile Quality Assurance by Patricia A. Annis (2012), Fairchild Books. ISBN: 9781609011018. 3. Advances in Spinning Technology by Carl A. Lawrence (2010), Woodhead Publishing. ISBN: 9781845694289. 4. Textile Defect Classification and Prevention by R. Alagirusamy, Apurba Das (2020), Woodhead Publishing. ISBN: 9780128205410. 5. The Global Textile and Clothing Industry: Technological Advances and Future Challenges by Roshan Shishoo (2012), Woodhead Publishing. ISBN: 9781845699888. 6. Handbook of Sustainable Textile Production by Marion I. Tobler-Rohr (2011), Wiley. ISBN: 9781119994834.. 		