DKTE Society's

TEXTILE & ENGINEERING INSTITUTE

Rajwada, Ichalkaranji 416115

(An Autonomous Institute)

DEPARTMENT: TEXTILES

CURRICULUM

B. Tech. Textile Chemistry Program

Third Year

With Effect From

2022-2023

DKTE

Promoting Excellence in Teaching
Learning & Research

Third Year B. Tech Textile Chemistry
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	TCL331	Computer Programming	ESC	3	-	-	3	3
2	TCL332	Technology of Dyeing - I	PCC	3	-	-	3	3
3	TCL333	Technology of Printing - I	PCC	3	-	-	3	3
4	TCL334	Technology of Finishing - I	PCC	3	-	-	3	3
5	TCL335	Chemical Engineering Operation	PCC	3	-	-	3	3
6	TCL336	Textile Physics - I	PCC	3	-	-	3	3
7	TCP337	Computer Programming Lab	ESC	-	-	2	2	1
8	TCP338	Technology of Dyeing - I Lab	PCC	-	-	3	3	1.5
9	TCP339	Technology of Printing - I Lab	PCC	-	-	3	3	1.5
10	TCP340	Technology of Finishing - I Lab	PCC	-	-	2	2	1
11	ATL301	Computer Operating Skills*	MC	2	-	-	2	-
12	ATL303	Chinese Language	HSMC	2			2	2

Group Details

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

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – V)
TCL331: 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:

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

Course Outcomes:

At the end of the course students have understood

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

Course Contents

Unit I	Database Management System	08 Hours

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

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

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

Unit III	Conditional Branching, Looping and Procedures	08 Hours

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

Unit IV	Designing User Interface & Database Connectivity	06 Hours

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

Unit V	Introduction to Data Science	04 Hours

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

Unit VI	Data Visualization Methods and Tools	05 Hours

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

References Books:

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

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – V)
TCL332: TECHNOLOGY OF DYEING - I

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

Course Objectives:

- To describe the effect of pre-treatment operations on fibre substrate; dyestuff behavior, its interaction with fibres and dyeing mechanism.
- To explain application of various dyes on natural fibres and effect of process parameters.
- To describe dyeing machineries suitable for various dyeing methods.
- To describe dyeing defect, remedial means and precautions for quality parameters of natural fibre dyeing.

Course Outcomes:

At the end of the course students have understood

- Effect of pre-treatment operations on fibre substrate; dyestuff behavior, its interaction with fibres and dyeing mechanism.
- Application of various dyes on natural fibres and effect of process parameters.
- Dyeing machineries suitable for various dyeing methods.
- Dyeing defect, remedial means and precautions for quality parameters of natural fibre dyeing.

Course Contents

Unit I	Preparation of natural fibres for dyeing	06 Hours

General theory of cellulosic and protein fibres structures; Effect of different pretreatments like Scouring, Mercerization, Bleaching, degumming etc. on dyeing; Quality parameters required for fabric to be dyed, study of dyeing machinery such as Jiggers, Winches, Package dyeing machine, Continuous dyeing machine. Recent developments in dyeing machines

Unit II	Dyeing with Direct and Reactive Dyes	09 Hours

General principles of application of Direct Dyes; Parameter affecting dye absorption and levelling; Application properties of direct dyes; Batch wise application of direct dyes; Semi and fully continuous dyeing process for direct dyes; After treatments, effect of finishing treatments on hue and fastness Problems and remedies in dyeing cotton, viscose, and their blends with direct dyes Reactive Systems, Batch wise dyeing methods, Semi and fully continuous dyeing methods, washing off and after treatments; Stripping of goods dyed with reactive dyes, fastness problems

Unit III	Dyeing with water insoluble	06 Hours

Dyes Fundamental Principles of Dyes and their classification Auxiliaries, Vatting, properties of Leuco vat dyes, Dyeing, Fundamental processes, Batch wise, semi continuous and continuous dyeing process. Dyeing of Loose stock, Yarn packages, Hank, Woven Fabric, knit goods, Dyeing with Indigo, Correction of faulty dyeings. Classification and different commercial forms of sulphur dyes. Different Auxiliaries like reducing agents, anti-oxidants, sequestering agent, wetting agents and oxidizing agents. Different application methods for yarn and fabrics. Batch wise and continuous dyeing methods, problems and remedies in dyeing of cotton with sulphur dyes

Unit IV	Dyeing with ingrain dyes	06 Hours
Chemical constitution, Treatment with napthols, Intermediate treatments, Development, after treatments, dyeing of yarn and fabric with batch, semi continuous and continuous processes, stripping of azoic dyeings. Application of mineral Khaki and phthalogen blue on cellulose. Dyeing with pigment colours with batch and continuous methods.		
Unit V	**Dyeing of wool and silk**	**06 Hours**
Classification of acid dyes with mechanism; Factors affecting the acid dyeing of protein fibres; Principles of application of acid dyes to protein fibres; Dyeing of wool and silk Mechanism of dyeing; Dyeing assistants; Application of Basic dyes to silk in different characterized bath; Dyeing of wool with basic dyes; Application of Basic dyes to cellulose materials. Stripping of basic dyes; Problems and remedies in dyeing.		
Unit VI	**Dyeing with Natural Dyes**	**06 Hours**
Classification of natural dyes, sources, and different methods of application of natural dyes		

References Books:

1. Dyeing and chemical Technology of Textile Fibres by E. R. T. Trotman
2. The dyeing of cellulose fibres by Clifford Pireston
3. Textile processing and properties by T. L. Vigo
4. Chemical technology of fibres materials by F. Sadav
5. Silk Dyeing printing and finishing by Prof. M. L. Gulrajani
6. Technology of Dyeing by Dr. V. A. Shenai

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – V)
TCL333: TECHNOLOGY OF PRINTING - I

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

Course Objectives:

- To understand concept of printing, methods of printing, styles of printing, stages of printing and print fixation processes
- To understand role of print paste ingredients; To formulate print paste recipes for printing cotton using direct and reactive dyes by various styles; To explain pigment printing process
- To describe working of table screen printing process, flat bed and rotary screen printing machines
- To understand recent developments in flat bed and rotary screen printing machines; To describe inkjet printing technology

Course Outcomes:

At the end of the course students have understood

- Concept of printing, methods of printing, styles of printing, stages of printing and print fixation processes
- Role of print paste ingredients; formulation of print paste recipes for printing cotton using direct and reactive dyes by various styles; pigment printing process
- Working of table screen printing process, flat bed and rotary screen printing machines
- Recent developments in flat bed and rotary screen printing machines; inkjet printing technology

Course Contents

Unit I	Introduction	06 Hours

Historical background of printing of textiles, Preparation of cotton fabric for printing;
General: Styles of Printing, Methods of Printing, Fixation of printed textiles

Unit II	Print Paste Ingredients	08 Hours

Printing paste ingredients and their functions
Types of thickeners and their chemistry

Unit III	Printing with Direct Dyes, Reactive Dyes and Pigments	10 Hours

Printing using direct dyes: Print paste ingredients and formulations for direct and discharge style of printing on cotton.
Printing using reactive dyes: Print paste ingredients and formulations for direct, discharge and resist styles of printing on cotton.
Printing with Pigments: Classification of pigments, Print paste ingredients and formulations for pigment printing. Advantages and disadvantages of pigment printing

Unit IV	Printing Machinery	08 Hours

Table printing: specifications of tables, Working, advantages and disadvantages.
Flat Bed printing machine: Technical features, parts of machine fabric feeding, printing, gluing, drying, blanket washing. Squeeze and their types, screen exposing technique.
Rotary Screen Printing machines: Technical features, parts of machine, fabric feeding, printing, gluing, drying, blanket washing. Squeeze and their types, screen exposing technique.

Unit V	Printing Operation	03 Hours

Printing operation on flat bed and rotary printing machines; Faults in printing using these machines, their reasons and remedies

Unit VI	Recent Advancements	04 Hours

Recent developments in flat bed and rotary screen printing machine
Inkjet / Digital Printing: Concept of inkjet / digital printing, Classification mechanism of printing, requirement of ink, types of nozzles, Advantages of inkjet printing over conventional printing.

References Books:

1. Textile Printing by L.W.C. Miles.
2. An Introduction to Textile Printing by W. Clarke.
3. Technology of Printing by Dr.V.A. Shenai
4. Book of Papers, QIP Summer School on “Advances in Textile Chemical Processing: Edited by Dr. R.B. Chavan
5. Textile Printing Book of papers by Prof. R.B. Chavan.
6. Processing of silk by Prof. M.L. Gulrajani.
7. Proceedings: Recent advances in Textile Processing lectures/seminer, Dec.1982, I.I.T., Delhi.
8. Colourage, ITB International bulletin on dyeing printing and finishing

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – V)
TCL334: TECHNOLOGY OF FINISHING – I

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

Course Objectives:

- To enunciate the objects, classes and types of finishing & select the finishing process sequence according to the type of fabric and end use.
- To describe working of finishing machinery used for application of various types of finishes to fabric.
- To elucidate the importance, chemistry, mechanism, different types of finishes applied to various substrate and choose the ingredients for the same.
- To describe the various problems faced during finishing of fabric with their remedies and choose proper method for evaluation of the performance of finishes applied on various substrates.

Course Outcomes:

At the end of the course students will be able to

- Understand the objects of finishing & select the finishing process sequence according to the type of fabric and end use.
- Understand working of finishing machinery used for application of various types of finishes to fabric.
- Explain the importance, chemistry, mechanism, different types of finishes applied to various substrate and choose the ingredients for the same.
- Analyze problems with their remedies in finishing of textiles and evaluate the performance of finishes applied on various substrates.

Course Contents

Unit I	Introduction to Finishing & Finishing Machinery	06 Hours

Object of finishing, Importance of textile finishing, classification of finishing, process sequence of finishing of cotton, Wool and silk fabrics, concept and working of machinery like Calendering, Decatising, Raising, Sueding, felting, Sanforising, Stenter, Aero finishing.

Unit II	Resin Finishing	09 Hours

Mechanism of creasing and resin finishing, Types of resin finishing, concept of Anticrease, wash-n-wear and Durable Press, Role of catalysts in resin finishing, Classification of resins and catalysts, Concept of deferred cure and post cure. Limitations of resin finishing, causes of strength loss of resin finished fabric. Various approaches towards reducing the strength loss of resin finished goods. Mechanism of chlorine retention, Mechanism of formaldehyde release, various methods to reduce formaldehyde release. Eco-friendly cross-linking agents, Low and ultra-low formaldehyde resins. Resin finishing formulations for 100% Cotton garments, 100% cotton shirting, 100% cotton suiting, Evaluation of Resin Finishing.

Unit III	Flame retardant Finishing	06 Hours

Concept of flameproof and flame retardancy. Limiting oxygen Index and its importance, Thermal behavior of textile fibres. Concept of solid phase and Gas phase flame retardant. Classification of flame-retardants. Mechanism of the mode of action of flame retardant. Factors affecting flame retardancy. Essential requirements of a good flame retardant. Various flame retardant finishes for cotton, wool, silk, polyester and nylon, Evaluation of flame retardant finish.

Unit IV	Antimicrobial Finishing	06 Hours

Object, requirements, types of antimicrobial finishing. Mechanism of antimicrobial finishing. Desirable properties of a good antimicrobial finishes, various antimicrobial finishes for cotton, wool, silk. Mildew- proof and rot proof finishing, Evaluation of antimicrobial finishes.

Unit V	Softeners and Hand builders	06 Hours

Desirable properties and various classes of softeners, Properties, mode of action and application of cationic, anionic, Non-ionic, reactive and emulsion type softeners. Softeners for cotton, wool, silk, jute, polyester and acrylic. Comparison of various softeners, Classification of stiffeners, examples and their application.

Unit VI	Finishing of animal fibres and bast fibres	06 Hours

Weighting of silk, various mechanical and chemical finishes for silk and wool, Mechanism of setting of wool, concept of wet setting of wool, woollenization of Jute, Various finishes for Jute and Linen. Waterproof and water repellent finishing, Bio polishing, Finishing recipes for various sorts of cotton & blended textiles, Problems and remedies in finishing.

References Books:

1. Chemical Finishing of Textiles by W. D. Schindler and P. J. Hauser
2. Textile Finishing by A.J. Hall.
3. Introduction to textile finishing by J.T. Marsh.
4. Technology of finishing – Vol. X by Dr. V.A. Shenai.
5. Silk dyeing, printing and finishing by Prof. M.L. Gulrajani.
6. Handbook of textile finishing machinery by R. S. Bhagwat.
7. Finishing, reference book of textile technologies by ACIMIT
8. Textile finishing by Heywood, SDC Publications

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – V)
TCL335: CHEMICAL ENGINEERING OPERATIONS

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

Course Objectives:

- To describe the objectives of chemical engineering operations and various unit operations
- To explain the concept of various type of drying and calculate various attributes on drying size reduction and respective equipment
- To compare various methods of mechanical separation and mixing and. pros and cons of various types of membrane-based separation techniques and their field of application
- To illustrate various types of filtration techniques

Course Outcomes:

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

- Illustrate basic objectives of chemical engineering operations and various unit operations in chemical engineering.
- Interpret the concept of various type of drying and their attributes and discriminate various types and methods of size reduction
- Distinguish various methods of mechanical separation and mixing Compute various types of membrane-based separation techniques and their field of application.
- Summarize various types of filtration techniques and their applications

Course Contents

Unit I	Unit Operations	07 Hours

a. Introduction to the chemical engineering. Definition and classification of mass transfer operations.
b. Definition and classification of diffusion. Fick's laws of diffusion. The concepts of diffusion rate, diffusion co-efficient and diffusivities.
c. Relevance of mass transfer studies to textiles. Introduction. Difference between unit operations and unit processes.
d. Study of different unit operations of chemical engineering like distillation, extraction, absorption, adsorption, evaporation, crystallization with respect to their concept,
e. principle of separation, types, performance analysis and applications from textile industry view point.

Unit II	Drying	08 Hours

a. Introduction, concept of drying. Definition, principle and purposes of drying.
b. Concept of simultaneous heat and mass transfer operations Equilibrium relationship, rate of drying.
c. Heat and mass balance of drying operation. Heat capacities of textile materials. Theory of drying. Relevance of drying to textile industry.
d. Principle and operation of various textile dryers like drum dryer, tumble dryer, tray dryer, plate dryer, stenters; study of new drying techniques like IR, RF drying. Numerical based on above

Unit III	Size Reduction	08 Hours

a. Brief introduction to mechanical operations. Definition of size reduction operations, Principle of compression, impact, attrition and cutting. classification of size reduction equipment.
b. Concept of crushing efficiency and work index. Laws of crushing and grinding.
c. Applications of the size reduction operations. Principle and operation of a ball mill, jaw crusher – concept of angle of nip and sleep, numerical based on above.

Unit IV	Mechanical Operations and Mixing	05 Hours

a. Importance of the screening of size reduced materials. Concept of particle size, particulate matter.
b. Introduction to sieve analysis. Screen efficiency, screen effectiveness. Factor affecting performance of screens; numericals based on above.
c. Brief study of mixing operation. Need of liquid mixing in textiles.
d. Brief study of mixing performance analysis; classification of mixing equipment – concept of hydro-cyclone and hydro-jig.

Unit V	Filtration	07 Hours

a. Introduction to filtration operation. Concept of filter media, cake filter and deep bed filtration,
b. Principle of constant rate and constant pressure filters, characteristics of filter medium, filter aids, various types of filters used in textiles, Factors affection filtration.
c. Advantages and uses of filtration operation, applications of filtration operation to textiles. Working principle of filtration equipment like - pressure, sand, plate and frame, vacuum, rotary drum and centrifugal filters.
d. Simple numericals based on rate of filtration.
e. Definition and need of settling processes.
f. Types and applications of settling process in reference to textile processing industry.

Unit VI	Membrane separation techniques	07 Hours

a. Introduction, types of membranes, Merits and demerits of these operations over the conventional mass-transfer operations.
b. Principle of operation, separation size range, rate expressions
c. Applications of the membrane technologies like reverse osmosis, dialysis, electro-dialysis, ultra-filtration, micro filtration

References Books:

1. 'Mass Transfer Operations' by Treybal, McGraw-Hill publication. (1955)
2. 'Introduction to Chemical Engineering', by Badger and Banchero, McGraw Hill publication (1955)
3. Transport Phenomena by Beek and Muttzall, Byron Bird R., Wiley publication. (1975).
4. 'Theory of Coloration of Textiles' by Bird and Boston, Dyers Company Publications Trust, (1975).
5. The Physical Chemistry of Dyeing, Volume-III, by R.H. Peters, Elsevier publication (1975).
6. 'Chemical Engineers' Handbook, by Perry, McGraw-Hill publication.
7. 'Unit Operations in Environmental Engineering' by R. Elangovan, M. K. Saseetharan,
8. New Age International (P) Ltd., Publishers.
9. 'Coulson and Richardson's Chemical Engineering' Volumes 1-6, Asian Books Pvt Ltd.
10. 'Unit Operations – I [Fluid flow and Mechanical Operations] K A Gavhane, Nirali Prakashan (2016)

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – V)
TCL336: TEXTILE PHYSICS - I

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

Course Objectives:

- To explain significance 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

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. Textile Chemistry (Semester – V)
TCP337: COMPUTER PROGRAMMING LAB

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

List of Experiments

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

Submission – Completed Journal.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – V)
TCP338: TECHNOLOGY OF DYEING-I LAB

Lab Scheme: Practicals: 03 Hrs/Week	Credits 1.5	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	Dyeing of the cotton fabric with direct dyes in OBBD machine
2	Different after treatments on direct dyed fabric
3	Dyeing of cotton yarn with HE brand reactive dyes in package dyeing machine
4	Dyeing of the cotton fabric with cold brand reactive dyes in jigger dyeing machine
5	Dyeing cotton knit goods with reactive dyes on a soft flow dyeing machine
6	Dyeing of cotton fabric with different padding methods like cold pad batch, pad bake and pad steam
7	Dyeing of cotton yarn with vat dyes in package dyeing machine
8	Dyeing of cotton with azoic colours
9	Dyeing of cotton knits in winch with sulphur dye
10	Dyeing of wool and silk with Basic Dye
11	Dyeing of wool and silk with Acid Dye
12	Dyeing of cotton with Mineral Khaki

Submission – Completed Journal.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – V)
TCP339: TECHNOLOGY OF PRINTING – I LAB

Lab Scheme: Practicals: 03 Hrs/Week	Credits 1.5	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	Tie and dye style of printing
2	Batik Style of printing
3	Direct style of printing with direct dye
4	Discharge style of printing on direct dyed ground
5	Direct style of printing with reactive dyes by using various fixation methods
6	Direct style of printing with reactive dyes by using various thickeners
7	Discharge and resist style of printing on reactive dyed ground
8	Direct style of printing with pigments
9	Direct style of printing with pigments by using various thickeners
10	Direct style of printing with azoics
11	Development of table printing screens
12	Visit to printing units

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – V)
TCP340: TECHNOLOGY OF FINISHING- I LAB

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

List of Experiments

1	Application of OBA on textiles.
2	Finishing of textiles for imparting soft, medium and stiff handle.
3	Application of Resin finishing of cotton.
4	Application of Flame Retardant finish on textiles
5	Application of Antimicrobial Finish on cotton.
6	Application of various types of softeners on textiles.
7	Chemical finishing of Silk.
8	Finishing of bast fibres.
9	Application of water repellent finish on textiles.
10	Bio polishing of cotton.
11	Application of soil release finish on polyester.
12	Weight reduction of polyester.

Submission – Completed Journal.

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

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

Course Objectives:

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

Course Outcomes:

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

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

Course Contents

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

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

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

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

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

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

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

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

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

Moving Data.

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

Unit V	Microsoft Excel Advanced	08 Hours

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

Unit VI	A Complete Guide to Microsoft PowerPoint	06 Hours

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

References Books:

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

ATL303 : CHINESE LANGUAGE

Details of the Course Introduction

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

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

Members of Teaching Team

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

Third Year B. Tech Textile Chemistry
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	TCL351	Industrial Engineering	HSMC	3	-	-	3	3
2	TCL352	Technology of Dyeing - II	PCC	3	-	-	3	3
3	TCL353	Technology of Printing - II	PCC	3	-	-	3	3
4	TCL354	Technology of Finishing - II	PCC	3	-	-	3	3
5	TCL355	Textile Physics - II	PCC	3	-	-	3	3
6	TCLOE1	Open Elective	OEC	3	-	-	3	3
7	TCP356	Industrial Engineering	HSMC	-	1	-	1	1
8	TCD357	Internship - I **	PST	-	-	-	-	3
9	TCP358	Technology of Dyeing - II Lab	PCC	-	-	3	3	1.5
10	TCP359	Technology of Printing - II Lab	PCC	-	-	3	3	1.5
11	TCP360	Textile Physics - II Lab	PCC	-	-	2	2	1
12	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
TQMOE1: Textile Quality Management (RSJ Inspection)

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCL351: INDUSTRIAL ENGINEERING

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

Course Objectives:

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

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

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

Course Contents

Unit I	Introduction	03 Hours

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

Unit II	Work Study	12 Hours

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

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

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

Unit III	Operation Research	06 Hours

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

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

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Unit IV	Production, Planning & Control (PPC	07 Hours

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

Unit V	Value analysis and Value engineering	04 Hours

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

Unit VI	Job evaluation and merit rating	04 Hours

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

References Books:

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

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCL352: TECHNOLOGY OF DYEING - II

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

Course Objectives:

- To describe synthetic fibre characteristics, dyeing behavior and mass colouration.
- To describe dyes used for synthetic fibres, their properties, subclassification and dyeing mechanism.
- To describe methods, effect of process parameters and machines used for dyeing of synthetic and their blends.
- To describe dyeing of textiles in various physical forms and quality parameters.

Course Outcomes:

At the end of the course students have understood

- Synthetic fibre characteristics, dyeing behavior and mass colouration.
- Dyes used for synthetic fibres, their properties, subclassification and dyeing mechanism.
- Methods, effect of process parameters and machines used for dyeing of synthetic and their blends.
- Dyeing of textiles in various physical forms and quality parameters.

Course Contents

Unit I	Mass Colouration and Tow Dyeing	06 Hours

Mass colouration of polyester and Nylon with different methods colour addition in polymerization, chips coating, Master batch addition, chips dyeings and Injection during Melt Spinning, Mass colouration of acrylic fibre, Tow dyeing of polyester and acrylic. Advantages and limitations of mass colouration

Unit II	Theory of Dyeing with Disperse Dye	07 Hours

Disperse dyes, dispersions, Dye solubility, size of particles, theory of cellulose acetate dyeing mechanism, Affinity, Temperature influence, Influence of Heat Treatment influences, Polyester dyeing mechanism, Dyeing in vapour phase, Dyeing kinetics with disperse dyes. Dyeing with carriers

Unit III	Polyester Dyeing	06 Hours

Preparation of fabric for dyeing, Carrier dyeing of Polyester, Industrial practices of carrier dyeing, Advantages and limitations of carrier dyeing, High temperature dyeing process, HT dyeing equipments, Effects of different auxiliaries, Control and rectification of various problems in High temperature dyeing, Oligomers Problem. Thermo fixation Process – Preparation of fabric for dyeing, Preparation of pad liquor, Padding and dyeing, Thermotixatron equipments required for dyeing. Dyeing of micro denier polyester, CDPET and texturised polyester

Unit IV	Nylon and Acrylic Dyeing	06 Hours
Dyeing theory of Nylon, Dyeing with acid and metal complex dyes, leveling agents, swelling agents, High and low temp. dyeing, dyeing with disperse and reactive dyes. Faults and remedies in Nylon Dyeing. Preparation of acrylic for dyeing. Dyeing of acrylic fibre, yarn and fabric, Effect of different parameters on dyeing. Effect of different auxiliaries in dyeing. Defitherm process. Dyeing of acrylic with disperse dyes. Stripping of cationic dyes		
Unit V	**Dyeing of Other Synthetic Fibres and Various Blends**	**10 Hours**
Dyeing of cellu-acetate and tri acetate, dyeing of modified and unmodified polypropylene, Dyeing of PVA, PVC and polyurethane Fabrics. Batch and continuous dyeing process of poly / cellulose blends, Dyeing of poly / wool, polyester / Acrylic, Polyamide / Wool, Acrylic /Wool, Acrylic / Silk, Dyeing with one colour and two colour synthetic fibre blends Polyamide / acrylic, Dyeing of polyester / modified polyester blend, polyester / Lycra, Acrylic / cellulosic		
Unit VI	**Dyeing of special Fabric**	**04 Hours**
Dyeing of Knitted goods, Garment dyeing, Terry Towel dyeing, Processing of top dyed goods		

References Books:

1. Textile processing and properties by Tyrone L. Vigo
2. Processing of poly/cotton blends by G. G. Kulkarni and S. S. Trivedi
3. Dyeing of polyester and its blends by Prof. M. L. Gulrajani
4. Chemical processing of synthetic fibres by Dr. K. V. Datya and A.A. Vaidya
5. Technology of dyeing by Dr. V. A. Shenai
6. Chemical technology in the pretreatment process of textile by Dr. S. R. Karmakar

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCL353: TECHNOLOGY OF PRINTING - II

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

Course Objectives:

- To explain polyester printing process, print formulation for various styles; To discuss printing process of polyester and its blends
- To explain Nylon printing process, print formulations; To discuss silk and wool printing using various dyes and style
- To explain concept of transfer printing process.
- To describe brasso and carbonized printing process on P/C blend. To discuss carpet printing process.

Course Outcomes:

At the end of the course students have understood

- To explain polyester printing process, print formulation for various styles; To discuss printing process of polyester and its blends
- To explain Nylon printing process, print formulations; To discuss silk and wool printing using various dyes and style
- To explain concept of transfer printing process.
- To describe brasso and carbonized printing process on P/C blend. To discuss carpet printing process.

Course Contents

Unit I	Printing of Polyester	10 Hours

Preparation of 100% polyester fabric for printing, paste formulation, selection criteria of dyes, chemistry of print formulation; Direct, discharge and resist styles of printing on 100% polyester, Mechanism of various discharging and resisting agents used in printing; Shop floor practices, problems and remedies in printing

Unit II	Printing of Polyester and their Blends	06 Hours

Single dye applications on P/C blended fabrics; Pigment printing of polyester and P/C blended fabrics; Selection criteria for binders and synthetic binders; Printing with Fluorescent pigments

Unit III	Printing of Polyamides	04 Hours

Preparation of Nylon fabric for printing, Paste formulations, for printing of nylon with acid, metal complex and disperse dyes; Shop floor practices, problems and remedies in nylon printing

Unit IV	Printing of Silk and Wool	04 Hours
Preparation of silk and wool fabric for printing, Paste formulations for printing of silk and wool with acid, metal complex and reactive dyes, Printing with natural dyes.		
Unit V	**Transfer Printing**	**09 Hours**
Concept of transfer printing; Melt transfer, Film release transfer, Semi wet transfer, Heat/vapour transfer. Features of paper, ink and dyes for transfer printing, Machinery used for printing paper: Gravure printing, Flexographic printing, Lithographic printing, Machinery used for transfer printing- Flat bed presses, Continuous/ calendar type trasnferprinting, Vacuum transfer printing, Advantages and disadvantages of transfer printing		
Unit VI	**Brasso, Carbonized Printing and Carpet Printing**	**06 Hours**
Concept of Brasso printing, paste formulations, commercial practices, Problems and remedies in Brasso printing, Concept of Carbonized prints, paste formulation, commercial practices. Concept of carpet printing, Study of machinery used for carpet printing.		

References Books:

1. Textile Printing by L.W.C. Miles
2. An Introduction to Textile Printing by W. Clarke
3. Technology of Printing by Dr.V.A. Shenai
4. Book of Papers, QIP Summer School on “Advances in Textile Chemical Processing: Edited by Dr. R.B. Chavan
5. Textile Printing Book of papers by Prof. R.B. Chavan
6. Processing of silk by Prof. M.L. Gulrajani
7. Proceedings: Recent advances in Textile Processing lectures/seminer, Dec.1982, I.I.T., Delhi
8. Colourage, ITB International bulletin on dyeing printing and finishing

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Third Year B. Tech. Textile Chemistry (Semester – VI)
TCL354: TECHNOLOGY OF FINISHING – II

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

Course Objectives:

- To explain the mechanism and application method of Heat setting, antipilling & soil release finish.
- Illustrate the chemistry and methods of application of OBA and spin finishes.
- To explain various minimum application techniques & foam finishing.
- To describe the various problems faced during finishing of fabric with their remedies and choose proper method for evaluation of the performance of finishes applied on various substrates.

Course Outcomes:

At the end of the course students will be able to

- Differentiate among heat setting conditions to be adopted for various fabrics & summarize parameters affecting soil release property and pilling tendency in fabrics.
- Describe the chemistry and methods of application of OBA and spin finishes.
- Apply various minimum application techniques and foam finishing.
- Explain the importance, chemistry, mechanism, different types of finishes applied to various substrate and choose the ingredients for the same.

Course Contents

Unit I	Heat Setting	07 Hours

Objects, types of setting, Mechanism of temporary set and permanent set, Structural changes brought about by heat setting. Concept of grey intermediate and post heat setting. Heat Setting conditions of various yarns and fabrics. Industrial practices of heat setting of polyester and its blends. Various methods to determine the degree of heat setting.

Unit II	Antipilling and Soil release Finishing	06 Hours

Causes of pill formation, Factors affecting pilling tendency, various physical and chemical methods to reduce pilling, Evaluation of efficiency of antipilling finishing. Type of soils, mechanism of soil impingement and soil retention. Mechanism of soil release. Soil release finishing of synthetics & its blends, Evaluation of soil release finishing.

Unit III	Spin Finishing	05 Hours

Object of spin finish. Concept of Tribo-electric series and its importance. Spin finishing ingredients and their functions. Various methods of application of spin finishes. Spin finishing of textured polyester. Problems and remedies in spin finishing.

Unit IV	Optical Brightening agent	07 Hours

Mechanism of whitening action. Concept of saturation and subjective brightness, whitening with a bluing agent, Essential requirements of a good OBA. Chemical classes of OBA. Methods of application of OBA on natural, synthetic fibres and their blends. Stripping of OBA.

Unit V	Foam Finishing	08 Hours

Various Minimum application techniques, Foam Finishing: - Concept of foam and blow ratio. Properties of foam, Factors affecting the stability of foam. Methods to determine the stability of foam. Disperse and condensation methods of preparation of foam. Various techniques of foam application. Drawbacks of foam finishing.

Unit VI	Special Finishes & Recent Advances in Finishing	06 Hours

Finishing recipe for PET, polyester/cellulosic blends, P/W blend, etc. Finishing sequence for Acrylic & its blends, nylon & its blends, Cotton/Lycra blends. Modern evaluation methods like KAWABATA and FAST system. Silk like polyester, Antistatic finishes. Finishing of micro denier polyester goods. Recent developments in finishing like nano- finishes, micro-encapsulation. Introduction to finishing of technical textiles.

References Books:

1. Chemical processing of synthetic and its blends by Dr. K.V. Datye and A.A. Vaidya.
2. Low liquor dyeing and finishing – The Textile Institute, Manchester.
3. Chemical after treatments of textiles by Marks, Atlas and wooding.
4. Chemical processing of polyester/cellulosic blends by R.M. Mittal and S.S. Trivedi.
5. Technology of Finishing Vol. X, by Dr. V.A. Shenai.
6. Finishing, reference book of textile technologies by ACIMIT
7. Chemical Finishing of Textiles, by W.D. Schindler and P.J. Hauser, Woodhead Publishing Ltd.
8. Textile finishing by A.J. Hall.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCL355: TEXTILE PHYSICS-II

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

Course Objectives:

- To explain significance of 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

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

Mechanical Properties of Yarns and Fabric:

Yarn Strength

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

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

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

Mechanical Properties of Fabric

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

Cut strip test, Grab test, comparison of strip test & grab test, Tear strength test, Bursting test.

b) Abrasion Resistance of fabric – Serviceability, wear, abrasion, Factors affecting abrasion resistance, assessment of abrasion damage, BFT abrasion testing machine, Martindale abrasion tester.

c) Pilling - Concept, mechanism of pilling, factors affecting fabric pilling, ICI Pill Box Tester.

Unit III	Yarn Evenness	09 Hours

Concept, Classification of irregularity, causes of irregularity, Measures of irregularity, Basic irregularity, Index of irregularity. Addition of irregularity, Measurement of yarn irregularity - Visual examination, Cutting & weighing method, Electronic capacitance principle, Variation of thickness under compression, Analysis of irregularity – Variance length curves, spectrogram, Importance of yarn uniformity.

Imperfections – Concept, Causes and importance.

Classimat faults: Classification of faults and its causes. Principle & working of Classimat tester.

Hairiness in spun yarn - Concept, Causes, Reduction & Measurement of hairiness- Photoelectric method

Unit IV	Structural Properties of Fabric	04 Hours

a) Thickness – Definition, Significance, Shirley method of measurement of fabric thickness.

b) Crimp of Yarn In Fabric: Definition, Measurement, Effect on Fabric Properties.

c) Cover factor – Definition, Derivation of cover factor, Significance

Unit V	Aesthetic Properties of Fabric	03 Hours

a) Fabric Stiffness – Concept, Importance of stiffness and Drape, measurement of stiffness: Shirley stiffness tester (cantilever principle), Heart loop test.

b) Drape – Concept, Measurement of drape by Drape meter, Factors affecting stiffness and drape.

c) Crease resistance & crease recovery – Concept, Measurement of crease recovery, Factors affecting crease recovery.

Unit VI	Transport Properties of Fabric	02 Hours

a) Air permeability – Concept, Importance, air permeability, air resistance, air porosity, Shirley air permeability tester, Factors affecting air permeability.

b)Water fabric relations – Concept, Importance, Water proofing & water repellency, Mechanics of wetting, Wetting time test, Spray test, Drop penetration test, Bundesmann test, Water head test.

References Books:

1. Principles of Textile Testing, J.E.Booth, CBS Publishers & Distributors, 1996.
2. Physical properties of Textile Fibres, J. W. S. Morton & Hearle.
3. Physical Testing of textiles, B. P. Saville.
4. Handbook of Indian Standards.
5. Quality control and Testing, V. K. Kothari.
6. Textile testing Fibre, Yarn and Fabric, Arindam Basu, Published by SITRA, Coimbatore.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCLOE1- ELLOE1: PLC & SCADA (OPEN ELECTIVE)

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

Course Objectives:

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

Course Outcomes:

At the end of the course students have understood

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

Course Contents

Unit I	Transducers & Sensors	07 Hours

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

Unit II	Programmable Logic Controllers (PLC)	07 Hours

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

Unit III	Ladder diagram & PLC programming fundamentals	06 Hours

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

Unit IV	PLC programming	07 Hours

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

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

Unit V	Applications of PLC	07 Hours

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

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

References Books:

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

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCLOE1- CSLOE13: ERP AND E-COMMERCE (OPEN ELECTIVE)

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

Course Objectives:

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

Course Outcomes:

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

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

Course Contents

Unit I	ERP Introduction	06 Hours

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

Unit II	ERP Implementation	07 Hours

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

Unit III	Getting Started with SAP R/3	06 Hours

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

Unit IV	Introduction to E-Commerce	07 Hours

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

Unit V	E-Commerce Marketing and Online Retail	07 Hours

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

Unit VI	Social Networks, Auctions and Portals	06 Hours

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

References Books:

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

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCLOE1- MBLOE1: COSTING (OPEN ELECTIVE)

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

Course Objectives:

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

Course Outcomes:

At the end of the course students have understood

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

Course Contents

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

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

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

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

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

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

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

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

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

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

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

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

References Books:

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

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCLOE1- UALOE1: INNOVATION IN TEXTILES (OPEN ELECTIVE)

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

Course Objectives:

- 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

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

Unit II	Type of Innovators, Innovation Metrics	07 Hours

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

Unit III	Innovation Process – Part I	06 Hours

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

Unit IV	Innovation Process – Part II	06 Hours

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

Unit V	Managing Innovation	07 Hours

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

Unit VI	Introduction to Intellectual Property	06 Hours

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

References Books:

1. Clayton M. Christensen, Management of Innovation and Change, Harvard Business Review Press, 2013, ISBN: 9781422196021
2. Linda A. Hill, Greg Brandeau, Emily Truelove, Kent Lineback, Collective Genius: The Art and Practice of Leading Innovation, Harvard Business Review Press, 2014, ISBN: 9781422130025
3. Scott D. Anthony, The Little Black Book of Innovation: How It Works, How to Do It, Harvard Business Review Press, 2011, ISBN: 9781422171721
4. Vijay Govindarajan, The Three-Box Solution: A Strategy for Leading Innovation, Harvard Business Review Press, 2016, ISBN: 9781633690141
5. David Robertson, Kent Lineback, The Power of Little Ideas: A Low-Risk, High-Reward Approach to Innovation, Harvard Business Review Press, 2017, ISBN: 9781633691681
6. Clayton M. Christensen, Erik A. Roth, Scott D. Anthony, Seeing What's Next: Using Theories of Innovation to Predict Industry Change, Harvard Business Review Press, 2004, ISBN: 9781591391852
7. Govindarajan, Vijay, Reverse Innovation: Create Far from Home, Win Everywhere, Harvard Business Review Press, Year: 2012. ISBN: 9781422157640
8. Scott D. Anthony, Mark W. Johnson, Joseph V. Sinfield, Elizabeth J. Altman, The Innovator's Guide to Growth: Putting Disruptive Innovation to Work, Harvard Business Review Press, 2008. ISBN: 9781591398462
9. HBR's 10 Must Reads on Innovation (with featured article "The Discipline of Innovation," by Peter F. Drucker), Series: HBR's ten must reads on innovation, Harvard Business Review Press, Year: 2013. ISBN: 9781422189856,
10. Mohamed Zairi (Eds.), Best Practice. Process Innovation Management, Butterworth-

Heinemann; 1999. ISBN: 9780750639538.
11. Karten B., Project management simplified: a step-by-step process, CRC Press; 2016. ISBN: 9781498729352.
12. Abidemi Badiru, Industrial Project Management: Concepts, Tools and Techniques. CRC Press; 2007. ISBN: 9780849387739.
13. Kim Chandler McDonald, Innovation: How innovators think, act and change our world, Kogan Page Limited. ISBN: 9780749469672.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCLOE1- IELOE1: PRODUCTION, PLANNING AND CONTROL (OPEN ELECTIVE)

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

Course Objectives:

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

Course Outcomes:

At the end of the course students have understood

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

Course Contents

Unit I	Production Planning and Control	08 Hours

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

Unit II	Process and capacity planning	06 Hours

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

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

Unit III	Production Control	07 Hours

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

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

References Books:

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

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Man Made Textile Technology (Semester – VI)
TQMOE1: TEXTILE QUALITY MANAGEMENT (RSJ INSPECTION) (OPEN ELECTIVE)

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

Course Objectives:

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

Course Outcomes:

On completion of course, students will be able to

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

Course Contents

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

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

Unit II	Fabric Inspection Procedure	08 Hours

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

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

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

packaging.

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

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

Unit V	General Inspection Procedure – FRI	12 Hours

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

Unit VI	Container Loading	06 Hours

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

References Books:

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

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCP356: INDUSTRIAL ENGINEERING

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

List of Tutorials

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

Submission – Minimum three tutorials from above list.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCD357: INTERNSHIP-I

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

Course Objectives:

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

Course Outcomes:

Students will be able to

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

Course Contents

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

References Books:

Specific guideline points given in daily diary.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCP358: TECHNOLOGY OF DYEING-II LAB

Lab Scheme: Practicals: 03 Hrs/Week	Credits 1.5	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	Carrier dyeing in OBBD machine
2	High temperature dyeing in of polyester fabric in H. T. Beaker dyeing machine
3	Polyester dyeing by thermosol method
4	Dyeing of P/C blended shirting using disperse / reactive system by exhaust method
5	Dyeing of P/C blended shirting using disperse / vat system by exhaust method
6	Dyeing of P/C blended shirting with disperse / reactive method by continuous method
7	Dyeing of P/C blended shirting with disperse / vat method by continuous method
8	Dyeing of P/V blend shirting using disperse / reactive by two bath method
9	Dyeing of P/V blend shirting using disperse / reactive by one bath method
10	To study the effect of dispersing agent, levelling agent, defoming agent and rate of heating / cooling, fabric speed in dyeing of polyester
11	Dyeing of polyester / acrylic, polyester / wool blend
12	Dyeing of Nylon and its blends

Submission – Completed Journal.

DKTES Textile and Engineering Institute, Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCP359: TECHNOLOGY OF PRINTING – II LAB

Lab Scheme: Practicals: 03 Hrs/Week	Credits 1.5	Evaluation Scheme: CIE: 50 Marks SEE: 50 Marks

List of Experiments

1	Direct style of printing on polyester using disperse dye: fixation of prints by Steaming
2	Direct style of printing on polyester by using disperse dye: various fixation methods
3	Discharge style of printing on polyester- White discharge
4	Discharge style of printing on polyester- Colour discharge
5	Resist style of printing on polyester by chelation method
6	Printing of silk with acid /basic dyes
7	Printing of wool with metal complex dyes
8	Printing of P/C blended fabrics by using disperse - reactive system
9	Transfer printing on polyester
10	Brasso style of printing on P/C blends
11	Carbonizing printing
12	Visit to printing units

Submission – Completed Journal.

DKTES Textile and Engineering Institute , Ichalkaranji
Third Year B. Tech. Textile Chemistry (Semester – VI)
TCP360: TEXTILE PHYSICS - II LAB

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

List of Experiments

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

Submission – Completed Journal.

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

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

Course Objectives:

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

Course Outcomes:

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

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

Course Contents

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

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

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

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

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

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

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

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

Unit V	Ethical Rights	07 Hours

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

Unit VI	Ethics and Profession	07 Hours

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

References Books:

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