FOR JOB ROLES

Textile is one of the essential need of the human being. Textiles are present around us in clothing materials, house hold articles, automobile, aircraft, medical products, geo textiles, and various industrial applications. It is impossible to live without textiles. Textile industry is the largest industry in India which offer many employment opportunities and is growing at a rate of 20 - 30% CAGR. As the per-capita consumption of textile materials in India is far below the global average, the industry will continue to show robust growth in the next 10 - 15 years. This will create millions of job opportunities in Textile industries at all levels.

Textile Technology course explores different Textile materials, their properties, important application and processing to make final products.

VHSE course in Textile Technology provides the candidates with hands-on and theoretical knowledge that prepares them for technician-level jobs in the textile and allied industries. This is a great opportunity to learn in-demand job skills.

GOVT/ SEMI GOVT SECTOR	PRIVATE SECTOR	SELF EMPLOYMENT
• Lab assistant • Trades man polytechnic colleges • Technical assistant textile mill • Technical assistant in textile research organization	• Skilled Technician in Textile Industry • Junior technician • Lab technician • QC inspector • Textile processing technician • Weaving machine operator	• Handloom Weaving Unit • Power loom Unit • Textile Processing Unit • Wick manufacturing Unit. • Yarn sourcing • Fabric sourcing

ABOUT THE COURSE

Vocational Higher Secondary Education in Kerala is a unique scheme of education which combines both vocational and academic stream of education. Learning vocational skills along with conventional academic education gives the students double advantage of vertical mobility as well as employability. It helps to develop vocational aptitude, work culture, values and attitudes of the learner and enhances his productivity. The vision of Vocational Higher Secondary Education in Kerala is to equip the youth with multiple skills matching the technological advancements and to produce skilled work force for

meeting the demands of the emerging industries and service sectors with national and global orientation.

As India is emerging as a manufacturing hub to the world the demand for skilled manpower is on the rise. Kerala, traditionally known for its high quality man power all over the world can embark on this opportunity and equip our students with skills for the manufacturing sector and reduce the unemployment problems of the state.

The Textile technology course in VHSE is one such course from the manufacturing sector. Textile materials have wide spread applications in our daily life like the production of dress materials, house hold articles, automobile, aircraft, medical products, geo textiles, and various industrial applications etc. Hence acquiring skills in the manufacture of textile products will help the students to get early employment opportunities.

The course is designed for providing knowledge and skills to participants in Textile Fiber, yarn, and fabric manufacturing. This course is now offered in modular format consisting of four modules which focus on multi skills development. One month On The Job Training and Production cum training centers are also an integral part of the course which gives exposure to real time work environment.

On the successful completion of this course the candidate will be able to join Textile industries as junior level technicians / operators and are also eligible for attending advanced courses on Textile Technology or any other courses that can be pursued after plus two science stream

A few institutes offering higher learning courses Textile technology are listed below.

1. Three polytechnics colleges in Kerala offers Diploma in Textile technology
2. IEI offers Diploma and B.Tech level courses similar to AMIE schemes
3. Various universities offers B.Tech in Textile technology
4. ATDC in all over India provides various Diploma Courses in Garment manufacturing Merchandizing, Pattern making etc.
5. NIFT offers various Degree and Diploma courses related to Textile designing.

Thus finally you have a wonderful opportunity to learn in demand skills with higher learning opportunities. Come… let's explore the wonderful world of Textiles

SUBJECT APPROACH

Textile technology can be described in brief as the manufacture, processing and applications of various Textile materials. Materials that

are classified as Fibers, Yarn, Fabrics etc. We are living in an era in which human life is impossible without the use of Textile products. Since the per-capita consumption of Textile in India is far below the global average, this sector offers great scope for expansion. This will create millions of Job opportunities in this sector in the coming years.

The Textile industry in India including is facing acute shortage of skilled man power. This is because only very few institutes in India offer skill development program in this sector. Hence the VHSE course in Textile Technology offers very good employment opportunities for students in India and abroad.

The VHSE Textile Technology course curriculum is divided into four modules. In the first module the learner will learn about different types of Textile Fibers, their properties, and processing methods to make useful products from Textile fibers. At the end of the first module the learner will acquire basic skills in the production of various Textile fibers

The second module specifically deals with Yarn Manufacturing technology. The learner will learn in detail about different types of processing involved in Yarn manufacturing. At the end of the module the learner will acquire skills to operate different Yarn manufacturing machineries. He will be able to work as spinning technician / tender in various Spinning Mills.

The third module deals with Weaving Process. The learner will learn about the different stages of fabric manufacture by weaving. At the end of the module the learner will acquire skill in the operation of different weaving and preparatory machines. He will be able to work as Weaving technician / machine operator in Weaving mills.

The fourth module deals with Textile dyeing & printing process.The leaner will learn about dye various textile materials with different dyes and print the fabrics by various methods. At the end of the module the learner will acquire skill in Textile dyeing & printing. He may be able to work as dyeing & printing machine operator in processing mills.

Knowledge inputs are provided through participative lectures and other training methodologies like group discussion, role play and other activities to ensure effective learning. The methodology followed to impart the limited skill is by means of practical work.

Objectives

Upon successful completion, the Learners will be able to

- Understand basic Concepts in Textile technology
- List the domestic & industrial uses of fibres ,yarns and fabrics

- Elaborate on techniques involved in manufacturing of Textile products
- Know the working principles, features and components of machines used for Yarn manufacturing ,Fabric manufacturing and Textile Wet Processing
- Demonstrate skill in the mixing of fibers
- Understand the working principles, features and components of machines used in Yarn and Fabric manufacture.
- Demonstration skill in the working of spinning machineries.
- Know the different Winding techniques
- Demonstrate the skill in the manufacturing of Fabrics
- Know the standards & specifications of systems and products
- Know the safety guidelines

SYLLABUS

MODULE - 1 Textile fiber

1.1 UNIT - 1 Introduction of textile fibers

1.1.1 Definition of Textile Fiber, staple fiber and filament.

1.1.2 Essential properties of Textile Fibers

1.1.3 Classification of Textile Fibers

1.2 UNIT - 2 Vegetable Fibers (Cotton)

1.2.1 Identify Cotton varieties and Explain the Cultivation of cotton fiber

1.2.2 Explain the Physical structure and composition of cotton fiber

1.2.3 Explain the physical properties of cotton fiber

1.2.4 Explain the Chemical properties of Cotton fiber

1.2.5 Explain the End uses of cotton Fiber

1.3 UNIT - 3 Vegetable fiber (Linen)

1.3.1 Identify Linen varieties and Explain the Cultivation of Linen fiber

1.3.2 Explain the Physical structure and composition of Linen fiber

1.3.3 Explain the physical properties of Linen fiber

1.3.4 Explain the Chemical properties of Linen fiber

1.3.5 Explain the End uses of Linen Fiber

1.4 UNIT - 4 Animal Fibers(Silk)

1.4.1 Identify the types of silk and Sericulture

1.4.2 Explain the Extraction of silk filament from cocoon

1.4.3 Describe the Physical structure of silk

1.4.4 List the Physical properties of Silk

1.4.5 Explain the Chemical properties of Silk

1.4.6 Describe the End uses of Silk

1.5 UNIT - 5 Animal Fibers (Wool)

1.5.1 Identify the types of wool

1.5.2 Explain the Extraction of wool filament from Sheep

1.5.3 Describe the structure and composition of wool

1.5.4 List the Physical properties of wool

1.5.5 Explain the Chemical properties of wool

1.5.6 Describe the End uses of wool

1.6 Unit -6 Manmade fibers(Viscose, Nylon and Polyester)

1.6.1 Manufacturing process of viscose rayon

1.6.2 Physical and chemical properties of viscose rayon

1.6.3 Manufacturing of Nylon

1.6.4 Physical and chemical properties of Nylon

1.6.5 Manufacturing of Nylon

1.6.6 Physical and chemical properties of Nylon

1.6.7 Explain the End uses of Viscose, Nylon and polyester

MODULE - 2 Yarn manufacture

4.1 UNIT - 1 Yarn numbering, mixing and blow room process

4.1.1 Explain the yarn numbering systems

4.1.2 Describe English Cotton yarn count Systems

4.1.3 Explain the Cotton quality characteristics and parameters

4.1.4 Describe the Stack mixing methods

4.1.5 Explain Blenders, Openers and cleaners for cotton fibers.

4.1.6 Determine the Hank of Lap

4.2 Unit 2 Carding & drawing process

4.2.1 Describe the Carding and stripping process

4.2.2 Explain the revolving flat Carding machines.

4.2.3 Mention the Combing Process.

4.2.4 Explain the Drawing Process

4.2.5 Explain the Drafting Systems in Drawing Frames

4.2.6 Determine the draft & hank of Sliver

4.3 Unit - 3 Roving process

4.3.1 Describe the simplex Processing.

4.3.2 Explain the Drafting Systems in Simplex Frames

4.3.3 Determine the hank of roving

4.3.4 Determine the TPI.

4.3.5 Differentiate roving winding

4.4 Unit - 4 Ring spinning

4.4.1 Explain the basic concepts of Ring Spinning.

4.4.2 Describe the Drafting Systems in Ring Frames

4.4.3 Explain the functions of Ring ,Travelers and Spindle

4.4.4 Determine the count of yarn

4.4.5 Calculate the TPI

4.4.6 Explain fundamentals of winding

SCHEME OF WORK

Unit	Month	Unit Name	Period
		Introduction of Textile Fibers	
1.1.1	June	Definition of Textile Fiber, staple fiber and filament	10
1.1.2	June	Essential properties of Textile Fibers	10
1.1.3	June	Classification of Textile Fibers	15
		Vegetable fibers Cotton	
1.2.1	June	Identify Cotton varieties and Explain the Cultivation of cotton fiber	10
1.2.2	June	Explain the Physical structure and composition of cotton fiber	10
1.2.3	June-July	Explain the physical properties of cotton fiber	15
1.2.4	July	Explain the Chemical properties of Cotton fiber	15
1.2.5	July	Explain the uses of cotton Fiber	10

		Vegetable Fiber Linen	
1.3.1	July	Identify Linen varieties and Explain the Cultivation of Linen fiber	5
1.3.2	July	Explain the Physical structure and composition of Linen fiber	5
1.3.3	July	Explain the physical properties of Linen fiber	10
1.3.4	July	Explain the Chemical properties of Linen fiber	10
		Animal Fiber Silk	
1.4.1	Aug	Identify the types of silk and Sericulture	5
1.4.2	Aug	Explain the Extraction of silk filament from cocoon	15
1.4.3	Aug	Describe the Physical structure of silk	5
1.4.4	Aug	List the Physical properties of Silk	15
1.4.5	Aug	Explain the Chemical properties of Silk	15
1.4.6	Aug	Describe the uses of Silk	5
		Animal Fiber Wool	
1.5.1	Aug	Identify the types of wool	5
1.5.2	Sep	Explain the Extraction of wool filament from Sheep	15
1.5.3	Sep	Describe the structure and composition of wool	5
1.5.4	Sep	List the Physical properties of wool	10
1.5.5	Sep	Explain the Chemical properties of wool	10
1.5.6	Sep	Describe the uses of wool	5
		Man made fiber Viscose Nylon Polyester	
1.6.1	Sep	Manufacturing process of viscose rayon	20
1.6.2	Oct	Physical and chemical properties of viscose rayon	15
1.6.3	Oct	Manufacturing of Nylon	10

1.6.4	Oct	Physical and chemical properties of Nylon	10
1.6.5	Oct	Manufacturing of Polyester	10
1.6.6	Oct	Physical and chemical properties of Polyester	10
1.6.7	Oct-Nov	Explain the uses of Viscose, Nylon and polyester	15

MODULE - II Yarn Manufacturing

Yarn Numbering ,Cotton Mixing, and Blow room Process

2.1.1	Nov	Explain the yarn numbering systems	20
2.1.2	Nov	Describe English Cotton yarn count Systems	20
2.1.3	Nov	Explain the Cotton quality characteristics and parameters	15
2.1.4	Nov-Dec	Describe the Stack mixing methods	15
2.1.5	Dec	Explain Blenders, Openers and cleaners for cotton fibers. Determine the Hank of Lap	20

Carding, Drawing and Combing Process

2.2.1	Dec	Describe the Carding and stripping process	10
2.2.2	Dec	Explain the revolving flat Carding machines	10
2.2.3	Dec	Mention the Combing Process	15
2.2.4	Jan	Explain the Drawing Process	15
2.2.5	Jan	Explain the Drafting Systems in Drawing Frames	15
2.2.6	Jan	Determine the draft used in drawing & hank of Sliver	15

Roving Process

2.3.1	Jan	Describe the simplex Processing	15
2.3.2	Jan-Feb	Explain the Drafting Systems in Simplex Frames	15
2.3.3	Feb	Determine the hank of roving	15
2.3.4	Feb	Determine the TPI.	15

2.3.5	Feb	Differentiate roving winding	20
		Ring Spinning and Winding	
2.4.1	Mar	Explain the basic concepts of Ring Spinning	15
2.4.2	Mar	Describe the Drafting Systems in Ring Frames	15
2.4.3	Mar	Explain the functions of Ring, Travelers and Spindle	15
2.4.4	Mar	Determine the count of yarn	15
2.4.5	Mar	Calculate the TPI	15
2.4.6	Mar	Explain fundamentals of winding	15

COURSE STRUCTURE

This course consists of Four Modules

Module I	Textile Fibers	340
Module Ii	Yarn Manufacture	340
Module Iii	Weaving Technology	340
Module Iv	Textile Dyeing & Printing Technology	340

CERTIFICATION

Skill certificates will be issued to students after the completion of each module

1. Certificate in Basic Textile fiber Selector.
2. Certificate in Spinning technician/tender
3. Certificate in Weaving technician/tender
4. Certificate in Dyeing technician/tender

Module -I

Skill: Textile fiber selector

1.1 Familiar with textile fibers ,properties of textile fibers, identification of textile fibers, classification of textile fibers 35

1.2 Identification of cotton fibers, Familiar with cultivation of cotton, Structure and composition of cotton. 60

1.3 Identification of Linen fibers, Familiar with cultivation of Linen, Structure and composition of Linen. 35

1.4	Familiar with silk, sericulture ,structure and composition of silk, extraction of silk filament from cocoons etc.	60
1.5	Familiar with wool, Shearing ,structure and composition of wool, extraction of wool from sheep etc	60
1.6	Identification of Manmade fibers, Fully synthetic fibers and semi -synthetic fibers. Structure and composition of Viscose rayon, nylon, and polyester process lay out of fiber production.	90
	TOTAL PERIODS	340

Module -II

Skill: Spinning Technician

2.1	Blow room Tender/Technician	90
2.2	Carding ,Drawing and Combing Tender/Technician	80
2.3	Simplex Tender/Technician	80
2.4	Ring Spinning Tender/Technician	90
	TOTAL PERIODS	340

OVERVIEW OF MODULE - 1

Textile Fibers

This module is designed to equip the learner with knowledge and skills required to work in a textile industry. The module consists of basic properties, different types of textile fibers, classification and identification of textile fibers.

After completing the module he /she will be able to identify various types of textile fibres & know the properties and classifications. He/she will be able to work as cotton selector, managing mixing in a spinning mill /trading cotton market.

On the completion of this module the learner will be able to :-

1. Understand the basic concepts of textile fibers.
2. Identify different fibers.
3. Know the essential properties of textile fibers
4. Select suitable cottons for different applications
5. Develop working skills in cotton selection.
6. Understand properties & uses of silk.
7. Know the manufacture ,properties & uses of viscose rayon & polyester.

MODULE 1

TEXTILE FIBER

Periods: 340

Unit No.	Name of units	Periods
1.1	Introduction Of Textile Fibers	35
1.2	Cotton	60
1.3	Linen	35
1.4	Silk	60
1.5	Wool	60
1.6	Man Made Fibers	90
	TOTAL PERIODS	**340**

Module 1 : TEXTILE FIBER — **Unit : Introduction of Textile fibers (35 periods)**

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Define textile fibers, Identification of textile fibers, Staple and filament fibers Skills Observing,	• Explain Textile fibers, their properties, Classify and compare different types of Textile fibers, Staple fibres, Filament fibers Describe the properties	• Interactive discussion (with PPT), Sample analysis,	• Participation in discussion Quiz
• Communicating, Classifying Fiber length, strength, fineness Skills Observing, Communicating Classifying	• Fiber length and its impotence Fiber fineness and its importance Fiber strength and its importance	• Interactive discussion (with PPT), Collection of textile fiber samples ,Sample analysis Charting	• Participation in discussion Sample collection Quiz
• Classification of textile fibers by its origin Skills Observing, Communicating, Inferring	• Classify the textile fibers by its origin and its properties Prepare fiber classification chart	• Interactive lecture(with PPT), Sample Study with different varieties and Classification Chart preparations	• Participation in discussion Sample collection Quiz

Module 1 : TEXTILE FIBER — **Unit : COTTON (60 periods)**

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Botanical classification of cotton Cultivation Varieties of cotton Skills Observing Understanding Comparing	• Compare the characteristic properties of different Varieties of Cotton	• General discussion on the properties of Cotton Group discussion with the help of charts	• Participation in discussion, Presentation/ write up

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Structure and composition of cotton Cross sectional and longitudinal view of Raw Cotton and Mercerized Cotton Skills Observing Understanding Inferring Length Maturity Fineness Strength Elasticity Elongation Moisture Absorption Skills Observing Understanding Comparing	• Describe the molecular structure of cellulose. List of composition of cotton fiber Draw the LV and CSV of Raw cotton Mercerized Cotton Describe the Fiber length fineness ,Strength, Elasticity, Elongation and Moisture absorption of cotton	• Interactive discussion (with PPT) Comparative study of Composition of Cotton General discussion on the Physical Properties of Cotton.	• Participation in discussion, Oral test Write up Participation in discussion Chart Oral test
• Action with Mineral Alkalis and Acids and Organic Acids Oxidizing Agent Dyeing Properties Sunlight Bleaching Agents Skills Observing Understanding Comparing	• Explain the Action of Conc. and Dil.Mineral and Organic Acids. Describe the Action of Conc. and Dil.Mineral Alkalis, Explain the Action of Bleaching Agents and Describe the Action of Sun Light Describe the affinity towards Dyes	• General discussion on the Chemical properties of Cotton.	• Participation in the discussion Write ups
• Uses of cotton Apparels Home furnishing Industrial Skills Observing Understanding Comparing	• Explain different uses of cotton fiber Apparels Home Furnishing Industrial fabrics.	• Collection of different types of Cotton Fabric/Yarn used in different area	• Collection Participation in discussion

Module 1 : TEXTILE FIBER — **Unit : Linen (35 periods)**

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Cultivation of linen Extraction of Linen fibers from the Baste Skills Observing Understanding Comparing	• Explain the cultivation of Linen and the retting process	• General discussion on the properties of linen Cultivation and retting Group discussion with the help of charts	• Participation in discussion, Presentation/ write up
• Structure and composition of Linen Cross sectional and longitudinal view of Linen Physical properties of Linen. Length, Strength fineness etc Skills Observing Understanding Comparing	• List of composition of and LV and CSV of linen fiber Describe the Fiber length fineness ,Strength, Elasticity, Elongation and Moisture absorption of cotton	• General discussion on the composition of Linen Physical Properties of Linen.	• Participation in discussion Chart Oral test
• Action with Mineral Alkalies and Acids and Organic Acids Oxidising Agent Dyeing Properties Sunlight Bleaching Agents Skills Observing Understanding Comparing	• Explain the Action of Conc. and Dil.Mineral and Organic Acids. Describe the Action of Conc. and Dil.Mineral Alkalis, Explain the Action of Bleaching Agents and Describe the Action of Sun Light Describe the affinity towards Dyes	• General discussion on the Chemical properties of linen.	• Participation in the discussion Write ups
• Uses of cotton Apparels Home furnishing Skills Observing Understanding Comparing	• Explain different uses of cotton fiber Apparels Home Furnishing .	• Collection of different types of linen Fabric/Yarn used in different area	• Collection Participation in discussion

Module 1 : TEXTILE FIBER	Unit : Silk (60 periods)		
Ideas/Concepts/Skill	**Learning Outcomes**	**Suggested Activities**	**Assessment**
• Varieties of Silk fibers Sericulture Life cycle of Silk worm Skills Observing Understanding Comparing	• Compare the characteristic properties of different Varieties of Silk Life cycle of Silk worm	• General discussion on the properties of Silk Group discussion with the help of charts	• Participation in discussion, Presentation/ write up
• Extraction of silk filament from cocoon Skills Observing Understanding Inferring	• Reeling of silk	• Interactive discussion (with PPT) Comparative study of Silk	• Participation in discussion, Oral test Write up
• Structure and composition of Silk Cross sectional and longitudinal view of Raw silk and Degummed silk Skills Observing Understanding Inferring	• List of composition of Silk fiber Draw the LV and CSV of Raw silk and Degummed silk	• Interactive discussion (with PPT) Comparative study of Composition of Silk	• Participation in discussion, Oral test Write up
• Length Maturity Fineness Strength Elasticity Elongation Moisture Absorption Skills Observing Understanding Comparing	• Describe the Fiber length fineness , Strength, Elasticity, Elongation and Moisture absorption of Silk	• General discussion on the Physical Properties of Silk	• Participation in discussion Chart Oral test

Module 1 : TEXTILE FIBER — **Unit : Silk (60 periods)**

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Action with Mineral Alkalis and Acids and Organic Acids Oxidizing Agent Dyeing Properties Sunlight Bleaching Agents Skills Observing Understanding Comparing	• Explain the Action of Conc. and Dil.Mineral and Organic Acids. Describe the Action of Conc. and Dil.Mineral Alkalis, Explain the Action of Bleaching Agents and Describe the Action of Sun Light Describe the affinity towards Dyes	• General discussion on the Chemical properties of Silk	• Participation in the discussion Write ups
• Uses of cotton Apparels Home furnishing Skills Observing Understanding Comparing	• Explain different uses of cotton fiber Apparels Home Furnishing	• Collection of different types of Silk Fabric/Yarn used in different area	• Collection Participation in discussion

Module 1 : TEXTILE FIBER — **Unit : Wool (60 periods)**

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Varieties of wool fibers Extraction of wool fiber from sheep Skills Observing Understanding Comparing	• Compare the characteristic properties of different Varieties of Wool Extraction of wool fiber	• General discussion on the properties of wool Group discussion with the help of charts	• Participation in discussion, Presentation/ write up

Module 1 : TEXTILE FIBER		Unit : Wool (60 periods)	
Ideas/Concepts/Skill	**Learning Outcomes**	**Suggested Activities**	**Assessment**
• Structure and composition of wool Cross sectional and longitudinal view of wool Skills Observing Understanding Inferring	• List of composition of wool fiber Draw the LV and CSV of wool	• Interactive discussion (with PPT) Comparative study of Composition of wool	• Participation in discussion, Oral test Write up
• Length Maturity Fineness Strength Elasticity Elongation Moisture Absorption Skills Observing Understanding Comparing	• Describe the Fiber length fineness , Strength, Elasticity, Elongation and Moisture absorption of Wool	• General discussion on the Physical Properties of wool	• Participation in discussion Chart Oral test
• Action with Mineral Alkalies and Acids and Organic Acids Oxidising Agent Dyeing Properties Sunlight Bleaching Agents Skills Observing Understanding Comparing	• Explain the Action of Conc. and Dil.Mineral and Organic Acids. Describe the Action of Conc. and Dil.Mineral Alkalis, Explain the Action of Bleaching Agents and Describe the Action of Sun Light Describe the affinity towards Dyes	• General discussion on the Chemical properties of wool	• Participation in the discussion Write ups
• Uses of wool Apparels Home furnishing Skills Observing Understanding Comparing	• Explain different uses of cotton fiber Apparels Home Furnishing	• Collection of different types of wool Fabric/Yarn used in different area	• Collection Participation in discussion

Module 1 : TEXTILE FIBER — **Unit : MAN MADE FIBERS (90 periods)**

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Manufacturing process of viscose rayon with Flow chart Skills Observing Understanding Comparing	• Compare the characteristic properties of viscose Flow chart preparations	• General discussion on the properties of viscose rayon Group discussion with the help of charts	• Participation in discussion, Presentation/ write up
• Length Maturity Fineness Strength Elasticity Elongation Moisture Absorption Action with Mineral Alkalis and Acids and Organic Acids Oxidizing Agent Dyeing Properties Sunlight Bleaching Agents Skills Observing Understanding Inferring	• Draw the LV and CSV of viscose rayon Describe the Fiber length fineness ,Strength, Elasticity, Elongation and Moisture absorption of viscose Explain the Action of Conc. and Dil.Mineral and Organic Acids. Describe the Action of Conc. and Dil.Mineral Alkalis, Explain the Action of Bleaching Agents and Describe the Action of Sun Light Describe the affinity towards Dyes	• Interactive discussion (with PPT) Comparative study of viscose	• Participation in discussion, Oral test Write up
• Manufacturing process of Nylon with Flow chart Skills Observing Understanding Comparing	• Compare the characteristic properties of Nylon Flow chart preparations	• General discussion on the properties of Nylon Group discussion with the help of charts	• Participation in discussion, Presentation/ write up
• Length Maturity Fineness Strength Elasticity Elongation	• Draw the LV and CSV of Nylon Describe the Fiber length fineness ,Strength, Elasticity, Elongation and Moisture absorption of Nylon Explain the Action of Conc. and Dil.Mineral and Organic Acids.	• Interactive discussion (with PPT) Comparative study of Nylon	• Participation in discussion, Oral test Write up

Module 1 : TEXTILE FIBER		Unit : MAN MADE FIBERS (90 periods)	
Ideas/Concepts/Skill	**Learning Outcomes**	**Suggested Activities**	**Assessment**
Moisture Absorption Action with Mineral Alkalis and Acids and Organic Acids Oxidizing Agent Dyeing Properties Sunlight Bleaching Agents Skills Observing Understanding Inferring	Describe the Action of Conc. and Dil.Mineral Alkalis, Explain the Action of Bleaching Agents and Describe the Action of Sun Light Describe the affinity towards Dyes		
• Manufacturing process of Polyester with Flow chart Skills Observing Understanding Comparing	• Compare the characteristic properties of Polyester Flow chart preparations	• General discussion on the properties of viscose Group discussion with the help of charts	• Participation in discussion, Presentation/ write up
• Length Maturity Fineness Strength Elasticity Elongation Moisture Absorption Action with Mineral Alkalis and Acids and Organic Acids Oxidizing Agent Dyeing Properties Sunlight Bleaching Agents Skills Observing Understanding Inferring	• Draw the LV and CSV of Polyester Describe the Fiber length fineness ,Strength, Elasticity, Elongation and Moisture absorption of Polyester Explain the Action of Conc. and Dil.Mineral and Organic Acids. Describe the Action of Conc. and Dil.Mineral Alkalis, Explain the Action of Bleaching Agents and Describe the Action of Sun Light Describe the affinity towards Dyes	• Interactive discussion (with PPT) Comparative study of polyester	• Participation in discussion, Oral test Write up

Module 1 : TEXTILE FIBER **Unit : MAN MADE FIBERS (90 periods)**

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Uses of Viscose, Nylon and Polyester Apparels Home furnishing Industrial Skills Observing Understanding Comparing	• Explain different uses of viscose ,Nylon and polyester in Apparels , Home Furnishing and industrial	• Collection of different types of viscose, Nylon and polyester materials used in different area	• Collection Participation in discussion

LIST OF PRACTICAL EXPERIMENTS IN MODULE I

1. Fiber Length Measurement By Hand stapling Method
2. Fiber Length Measurement By Bare sorter
3. Fiber Fineness Testing by ATIRA fineness Tester
4. Fiber Strength testing by Stellometer
5. Fiber maturity testing by Caustic Soda Swelling method and projection microscope
6. Cultivation of cotton Plant
7. Action of cotton with Conc. And Dil. Sulphuric acid
8. Action of cotton with Conc. And Dil. Caustic Soda
9. Cross sectional and Longitudinal View of cotton in microscope
10. Bleaching of cotton by bleaching agents
11. Action of Linen with Conc. And Dil. Sulphuric acid
12. Action of Linen with Conc. And Dil. Caustic Soda
13. Cross sectional and Longitudinal View of linen in microscope
14. Sericulture of Silk
15. Action of silk with Acid and Alkali
16. Light Bleaching of Silk
17. Degumming Process
18. Reeling of silk
19. Cross sectional and Longitudinal View of Silk in microscope
20. Action of wool with Acid and Alkali
21. Light Bleaching of wool
22. Cross sectional and Longitudinal View of wool in microscope
23. Action of viscose,nylon,polyeste with Acid and Alkali
24. Cross sectional and Longitudinal View of viscose,nylon,polyester in microscope
25. Identification of Textile fiber by Burning Test
26. Identification of Textile fiber by Solubility Test

List of Instruments Module - I

1. Microscope Projection Type
2. Bare Sorter
3. Stelo meter
4. ATIRA fineness meter
5. Silk Reeling

OVERVIEW OF MODULE - 2

MODULE 2

YARN MANUFACTURE

Periods: 340

Unit No.	Name of units	Periods
2.1	Yarn numbering,mixing and blowroom process	90
2.2	Carding, Drawing and Combing Process	80
2.3	Roving Process	80
2.4	Ring Spinning and Winding	90
	TOTAL PERIODS	**340**

Module 2 : YARN MANUFACTURE	Unit : Yarn numbering,mixing and blowroom process (90 periods)		
Ideas/Concepts/Skill	**Learning Outcomes**	**Suggested Activities**	**Assessment**
• Yarn numbering systems Types of yarn numbering Direct and indirect systems English systems Tex system	• Describe yarn count Find out yarn count in different systems of yarn numbering, the student will be able to comprehend the cotton yarn count system English Cotton yarn count system Skills Observing, communication, and calculation	• General discussion on yarn counting systems. Data collection calculations Assignment	• Oral Test/ Assignment
• Classification of cotton on the basis of staple, varieties, percentage of impurities and other fiber quality parameters	• Explain Cotton quality parameters in mixing Describe different types of cotton used in India for the manufacturing different types of yarn. . Skills Observing, communication, Experimenting, Inferring	• Interactive lecture with PPT, Video Show Field Visit to a Spinning mill Lab practical Lab lectures	• Participation in the discussion Oral test Field visit report Lab record
• Need of mixing in cotton spinning, Different types of mixing methods, conventional and modern technique	• Describe the mixing process and its need and different types of mixing process(Stack mixing Process). Find the fiber length by hand stapling methods Mixing chart preparation for different count osf yarn Skills Observing, communication, Experimenting, Inferring	• Interactive Discussion with PPT, Video Show Field Visit Lab practical	• Participation in the discussion Oral test Field visit report Lab record
• Functions of blow room process Opening methods Cleaning methods Blow room layouts	• Describe the function of blow room process (Openers and cleaners). Draw layout of a single scutcher blow room line. Functions of Opener and Cleaner and scutcher Lap formation and Find out the hank of lap Skills Observing, communication, Experimenting, Inferring	• Interactive Discussion, Video Show Field Visit Lab Practical	• Participation in the discussion Oral test Field visit report

Module 2 : YARN MANUFACTURE **Unit : Carding, Drawing and Combing Process (80 periods)**

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Fundamentals of Carding and Stripping action	• Explain general functions of carding and Stripping actions	• Interactive lecture (with PPT), Field visit Demonstrate the action of carding and stripping actions	• Participation in the discussion Oral test Field visit report Lab record
• Carding machine operation Machine main components, Its functions Diagrams Calculations Speed and Production Hank of sliver Sliver formation	• Explain the revolving flat carding machines Describe the functions of carding machines Gearing diagrams of carding machines Passage of cotton through a carding machines Sliver formation and coiler factions	• Interactive lecture (with PPT), Draw the carding machine diagram and mark the parts, Video Show Field Visit	• Participation in the discussion Oral test Field visit report Lab record
• Production of combed sliver Working principles of a comber	• Explain the working principles of a comber Difference between normal sliver and a combed sliver Use of comber Main components of a comber	• Interactive lecture (with PPT), Drawing, Video Show Field Visit	• Participation in the discussion Oral test Field visit report Lab record
• Fundamentals of drawing Process Types of Drafting Systems used in the Drawing What are the Tension systems used in drawing Machine Parts description Coilers	• Describe the functions of drawing machine. Passage of cotton through a drawing machines Working of a drawing machines Draft calculations Doublings	• Interactive discussion (with PPT), Assignment - Drawings Draft Calculation	• Participation in discussion, Field visit Oral Test Assignment

Module 2 : YARN MANUFACTURE	Unit : ROVING FORMATION (80 periods)		
Ideas/Concepts/Skill	**Learning Outcomes**	**Suggested Activities**	**Assessment**
• Roving formation	• Explain the working of simplex machine	• Interactive lecture(with PPT), Student learning Resource Book, Field Visit	• Participation in the discussion Oral test Field visit report Lab record
• Three over three or four over four drafting system; explain through schematic diagram	• Identify the simplex drafting system Explain salient features of drafting system	• Interactive lecture (with PPT), Student learning Resource Book, Video Show Field Visit	• Participation in the discussion Oral test Field visit report Lab record
• Determination of roving count gravimetrically.	• Identify and explain the roving count.	• Interactive lecture, Student learning Resource Book, lab work	• Participation in the discussion Oral test Field visit report Lab record
• Calculate the twist per inch, twist multiplier and roving hank	• Identify the roving twist and twist multiplier according to roving count	• Interactive lecture, Student learning Resource Book,	• Participation in the discussion Oral test Field visit report Lab record
• Functions of flyer, bobbin and roving package building.	• Identify the winding of roving in simplex frame and operating the machine	• Interactive lecture, Student learning Resource Book, Field visit	• Participation in the discussion Oral test Field visit report Lab record

Module 2 : YARN MANUFACTURE	Unit : Ring Spinning and Winding (90 periods)		
Ideas/Concepts/Skill	**Learning Outcomes**	**Suggested Activities**	**Assessment**
• Yarn formation	• Explain the working of ring spinning machine	• Interactive lecture (with PPT), Student learning Resource Book, Field Visit	• Participation in the discussion Oral test Field visit report Lab record
• Three over three roller drafting system; explain through schematic diagram	• Identify the drafting system Explain salient features of drafting system	• Interactive lecture (with PPT), Student learning Resource Book, Video Show Field Visit	• Participation in the discussion Oral test Field visit report Lab record
• Explain diagrammatically the yarn passage in ring frames	• Identify and explain the functions of ring, traveler and spindle	• Interactive lecture, Student learning Resource Book, Field isist	• Participation in the discussion Oral test Field visit report Lab record
• Wrapping test procedure	• Identify the yarn count and CSP	• Interactive lecture, Student learning lab work	• Participation in the discussion Oral test Field visit report Lab record
• Rig frame empty cops, ring, traveler, lift, chase, ring rail, etc.. End breaks and piecing Doffing and donning	• Identify the working of ring frame and operating the machine	• Interactive lecture, Student learning Resource Book, Field visit	• Participation in the discussion Oral test Field visit report Lab record
• Yarn winding process, objects of winding, wining machine parts and cone package details.	• Identify the conversion of yarn fro cops to cone through cone winding process. Operate winding machine attending to end breaks, doffing cone weight control	• Interactive lecture Filed visit	• Participation in the discussion Oral test Field visit report Lab record

LIST OF PRACTICAL EXPERIMENTS IN MODULE II

1. Belt drives- Plain belt, Cross belt, flat belt and V-belt
2. Rope drive
3. Speed calculations using belt drives
4. Gear drive - types of gears - spur wheels, helical wheels, Bevel Wheels, Worm and Worm Wheels, chain drive- application of each type
5. Speed calculations using gear wheels
6. Draw the line sketch of modern Blow room
7. Calculate the cleaning efficiency of openers
8. Find out the cleaning efficiency of blow room
9. Draw the gearing diagram of scutcher
10. Determine the draft and production of scutcher
11. Operate blow room machinery
12. Set the feed part of the card for different staple length of cotton
13. Set the flats for different staple length of cotton
14. Dismantle mote knives, taker - in under grid and re-set
15. Set the taker- in and doffer to cylinder for different staple of cotton
16. Set the back plate and front plate to the cylinder for different staples of cotton
17. Draw gearing diagram of card, identify draft change wheel, tension draft change wheel, production change wheel
18. Calculate the speeds and draft between various organs.
19. Determine the draft constant, find out draft change wheel for different hanks of sliver
20. Change draft wheels for different hank of sliver
21. Change production change wheel, tension draft wheel
22. Draw the gearing plan of draw frame and calculate break draft constant and main draft constant
23. Calculate the Break Draft Wheel and Main Draft Wheel for different feed hank and delivery Hanks
24. and change the wheels
25. Set the drafting rollers for different staple of fiber
26. Draw the gearing diagram of speed frame and calculate break draft constant, main draft constant
27. and twist constant

28. Find out the break draft wheel, main draft wheel and twist wheel for different sliver hanks and
29. roving hanks and identify changing points
30. Set the drafting rollers for different fiber length
31. Perform threading of roving through the flyer
32. Perform doffing and restarting
33. Operate the draw frame, comber and speed frame. Verify the effectiveness of single
34. preventer motions in draw frame and lap formers
35. Draw the gearing diagram of the ring frame
36. Ring frame Spindle gauging and arranging the tapes for Z & S twist
37. Setting of drafting rollers the staple in process
38. Draw the gearing diagram of the ring frame
39. Calculate the draft wheel required for the count in process
40. Calculate the twist wheel required
41. Change draft and twist wheel
42. Practice threading of roving
43. Practice Piecing of yarn
44. Practice Changing of traveller
45. Calculate production and efficiency of the ring frame
46. Practice doffing operations and restart the machine after doffing
47. Calculate the production and efficiency of rotor spinning frame

List of Instruments Module - II

1. Count balance
2. Yarn Warp reel (motorized)
3. Sliver,Roving,Wrapping Block
4. Lea tester
5. Twist Tester

Unit Detailing

Module 1 : TEXTILE FIBER — **Unit : Introduction of Textile fibers (35 periods)**

Ideas/Concepts/Skill	Learning Outcomes	Suggested Activities	Assessment
• Define textile fibers, Identification of textile fibers, Staple and filament fibers Skills Observing,	• Explain Textile fibers, their properties, Classify and compare different types of Textile fibers, Staple fibres, Filament fibers Describe the properties	• Interactive discussion (with PPT), Sample analysis,	• Participation in discussion Quiz
• Communicating, Classifying Fiber length, strength, fineness Skills Observing, Communicating Classifying	• Fiber length and its impotence Fiber fineness and its importance Fiber strength and its importance	• Interactive discussion (with PPT), Collection of textile fiber samples ,Sample analysis Charting	• Participation in discussion Sample collection Quiz
• Classification of textile fibers by its origin Skills Observing, Communicating, Inferring	• Classify the textile fibers by its origin and its properties Prepare fiber classification chart	• Interactive lecture(with PPT), Sample Study with different varieties and Classification Chart preparations	• Participation in discussion Sample collection Quiz

Content

1.1 General properties of Textile fibers

Suggested Activity

Discussion & Demonstration

Demonstration by the Teacher

Discussion on concept of General properties of textile fiber. Demonstration with available fiber samples

Discussion and Demonstration with instruments used and their functions

Discussion Points

Need of desirable properties of a textile fiber (Length, Fineness, Crimp, Etc)

Practical work by the students

Measurement of fiber length by hand stapling method

Content

1.2 Classify and compare different types, Textile fibers as Staple and Filaments

Suggested Activity

Demonstration & discussion with instruments

Demonstration by the Teacher

Demonstrate the method of classification in the classroom

Discussion Points

Staple fiber and filament fiber

Practical work by the students

Students practice the method of classification by the fiber lengths

Content

1.3 Fiber properties

Suggested Activity

Interactive lecture with PPT about the desirable properties of a textile fiber and its importance in Yarn manufacturing

Demonstration by the Teacher

Preparation of sketches and exercises based on sample measurements.

Discussion Points

Fiber length, maturity, fineness, Crimp, etc

Practical work by the students

Preparation of chart

Content

1.4 Classification of textile fiber

Suggested Activity

Interactive lecture with PPT about the classification of a textile fiber by its origin

Demonstration by the Teacher

Preparation of sketches and exercises based on sample

Discussion Points

Classification of Vegetable fiber, Animal fiber, Man Made fiber

Practical work by the students

Preparation of chart

Content

1.5 Prepare Classification chart of Textile fiber

Suggested Activity

Interactive lecture with PPT about the Preparation of a textile fiber by its origin

Demonstration by the Teacher

Preparation of fiber classification chart

Discussion Points

Classification of Vegetable fiber, Animal fiber, Man Made fiber

Practical work by the students

Preparation of chart

LIST OF TOOLS AND EQUIPMENTS

1. Lab Model Blow Room
2. Carding Machine
3. Multiple leaf gauges
4. Spanner set
5. Draw Frame
6. Simplex
7. Screw drivers
8. Hammers
9. Vernier calliper
10. Ring frame

11. Spindle gauges
12. Wheel puller

REFERENCE BOOKS

Module - I

1.	Gohl & Valensky	Textile Science Mahajan Publishers Ahmadabad
2.	J T Marsh	Textile Science
3.	V.a Shenai	Textile Fibres
4.	S.p.mishra	Fibre Science And Technology
5.	Morton & Hearle	Physical Properties of Textile Fibre
6.	Burno Luniah	Identification of Textile Fibres

Module - II

1.	W.S.Taggart	Cotton Spinning - Mahajan Publishers
2.	G.R.Merill	Cotton opening and picking
3.	G.R.Merill	Cotton carding
4.	G.R.Merill	Cotton Drafting, Roving, Combing Cotton spinning
5.	G.R.Merill	Cotton Ring spinning
6.	Butter Worth	Manual of cotton spinning Volume I and II
7.	Venkita Subramani	Spun Yarn Technology Volume I and II
8.	Textile Association	Cotton Spinning
9.	Pattabiraman	Essential elements of Cotton Spinning
10.	W.S Taggart	Cotton Spinning Calculations