Syllabus For Stenter Finishing Machine Operator

Course Name	Stenter finishing machine Operator
Course Code	TXT/2024/SFMO/370
Sector	Textiles & Handlooms
Level	2.5
Occupation	Stenter finishing machine Operator
Job Description	The operator is responsible to carry out the process of drying, heat setting and finishing of fabric using a Stenter / Tenter Machine, as per specified instructions. The operator is also responsible for the process flow and material flow in a fabric processing mill. He should also know the important functions and operations of a Stenter machine**.**
Course Duration	**Total Duration 270 Hrs (T- 60, P- 120, OJT-60 and ES-30)**
Trainees' Entry Qualification	• No formal education • May require ability to read and write for some qualifications • Previous relevant Qualification of NSQF Level 1
Trainers Qualification	B. Tech/B.E. in Textile Technology/ Textile Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. OR 03 years Diploma in Textile Technology/ Textile Engineering/ Knitting Technology from AICTE recognized board of technical education with two years' experience in the relevant field.

Structure of Course:

Module No.	Module name	Outcome	Theory (Hrs)	Practical (Hrs)	OJT (Hrs.)	Total (Hrs) [Multiple of 30]
1	**Introduction: Roles & Responsibility of Operator**	Demonstrate the Stentering finishing process along with the roles & responsibilities of Stenter operator	10	20		30
2	**Stenter machine components**	Identify different machine components along with their functions	10	20		30
3	**Finishing opration**	Perform stentering with Stenter finishing machine after preparing chemicals with ensuring good machine maintenance with safe working environment.	20	40		60
4	**Occupational safety**	Apply safe working practices at work place	10	20		30
5	**Workplace communication**	Demonstrate a comprehensive effective workplace communication strategy	10	20		30
6	**OJT**	Work in real job situation with special emphasis on basic safety and	-	-	60	60

Module No.	Module name	Outcome	Theory (Hrs)	Practical (Hrs)	OJT (Hrs.)	Total (Hrs) [Multiple of 30]
		hazards in this domain (OJT).				
7	**Employability Skills**	As per guided curriculum	30	-		30
		TOTAL	**90**	**120**	**60**	**270**

SYLLABUS:

Module No. 1: Introduction: Roles & Responsibility of Operator

Outcome : Demonstrate the Stentering finishing process along with the roles & responsibilities of Stenter operator

Theory Content:

- Basic knowledge about textile finishing techniques.
- Requirement of finishing operation.
- Introduction to various fabric processing terms such as FINISHING , HEAT SETTING, ABSORBENCY , DIMENSIONAL STABILITY , LUSTER, SOFTENER , YARN , FABRIC STRUCTURE etc.
- Brief about Stentering process
- Principles of mechanical finish technique.
- Different processes involved in Tenter/stenter machine.
- Various Types of stentering machine.
- Identify the role and responsibility of the Stenter finishing machine operator.
- Step wise process flow of Stenter finishing machine.

Practical Content:

- Identify different type of Stenter machine based on its application.
- Demonstration of stentering operation of Tenter finishing machine.
- Drawing of the schematic diagram of material flow inside Tenter finishing machine.
- Demonstration of the Drying and stretching operation of Tenter finishing machine .
- Demonstration of different functions of panel board.
- Controlling and monitoring systems of the tenter machine.
- Practice in maintaining shift logbook and preparation of report.
- Preparation of shift handover/takeover process.
- Demonstration of fabric faults identification.

Classroom Aids:

Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook, Pen pencil.

Tools & Equipment needed: Stenter finishing machine, Apron, head cap, mask, shoe, Fabric rolls, Fabric trolley, Work method posters, pictures, videos. temperature sensor, width measuring device, pen, pencil, marker, weighing balance

Module No. 2: Stenter machine components

Outcome: Identify different machine components along with their functions

Theory Content:

- Objectives of stentering process.
- Describe different components of a Tenter finishing machine.
- Study the functions of the components of Tenter machine.
- Study about fabric drying process, fabric dimension stability.
- Study about Controlling and monitoring programmed electronic equipments of the machine.
- Study about process parameters such as Chamber temperatures, Moisture retention, Stretch/shrinkage (over feed), Fabric width, Fabric weight, Padder pressures, Exhaust humidity, etc.
- Study different fabric faults during finishing and method of trouble shooting them.

Practical Content:

- Identify different components of a Tenter finishing machine and demonstrate their functions.
- Demonstration on Padres, Cooling Drums, Burners , Circulator fan , Exhaust fan ,Heat recovery unit, Weft Stretcher, Pins or clips ,Winder, Rollers of Attraction of the machine.
- Demonstration of the different setting point of the Tenter finishing machine.
- Demonstration of the process sequence of Tenter finishing machine
- Demonstrate the operation of Tenter finishing machine.
- Demonstration of the operations of the machine & the panel board functions.
- Demonstration of checking the parameters of the machine during the stentering process.
- Demonstration of Adjusting the machine settings using panel board.
- Demonstration of Inspecting of fabric final stage , checking the width and other defects.
- Instructions during shift change.

Classroom Aids:

Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook, Pen pencil.

Tools & Equipment needed: Tenter finishing machine, Apron, head cap, mask, shoe, Fabric rolls, Fabric trolley, Work method posters, pictures, videos. temperature sensor, width measuring device, pen, pencil, marker, weighing balance**,** Chemicals, Squeezing rollers

Module No. 3: Finishing opration

Outcome: Perform stentering with Stenter finishing machine after preparing chemicals with ensuring good machine maintenance with safe working environment.

Theory Content:

- Different terminologies related to textile Finishing,
- Function of different finishing chemicals and auxiliaries,
- Study about the finishing chemicals. Understanding mixing & dissolving techniques.
- Important factors of finishing, different process control parameters.
- Fabric faults after finishing and its remedies,

- Overview of different types of stentering machines – pin stenters and clip stenters
- For both **pin stenters and clip stenters**, – Types of materials processed, different important parts of the m/c and their function, material flow path and process sequence.
- Different control point setting of stentering process.
- Commonly occurred machine-problems, Procedure of troubleshooting techniques.
- Different check-points before stating of machine operation.
- Safety guidelines to be followed.
- Actions to be taken in emergency conditions.

Practical Content:

- Demonstration of the preparatory activities for operation of the Stenter machine
- Demonstration of feeding of fabric rolls onto the machine.
- Explain the preparatory activities for operations in the machine.
- Switching on the main on panel, Open the steam, water and air valve, during starting of machine.
- Operate the panel board.
- Place the batch in the machine.
- Perform proper feeding of fabric in chain track.
- Setting the maximum and minimum width once a day so as to keep even tension on fabric throughout the process.
- Keep optimum pressure of the squeezer rolls to get specified results.
- Set the required temperature and fan speeds in all chambers.
- Feed the fabric to the stenter chain.
- Demonstration of Adjusting the overfeed device as per the requirement of the fabric.
- Preparation of the finishing chemical required.
- Weighing of required chemicals and filtering the chemical.
- Assist the inspection process of fabric faults.
- Demonstrate the different stop motions of the Tenter machine.
- Practice in maintaining shift log and preparation of report.
- Cleaning the machine on a regular basis and carrying out preventive maintenance activities.

Classroom Aids:
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook, Pen pencil.

Tools & Equipment needed: Tenter finishing machine, Apron, head cap, mask, shoe, Fabric rolls, Fabric trolley, Work method posters, pictures, videos. temperature sensor, width measuring device, pen, pencil, marker, weighing balance, **Chemicals**, Squeezing rollers

Module No. 4: Maintain occupational safety hazards at work place

Outcome : Apply safe working practices at work place

Theory Content:

- Significance of routine cleaning activities of machine maintenance
- Identifying potential hazards associated with a lack of regular cleaning on tools, machines and work areas.
- Types of cleaning agents and tools
- Introduction of Occupational safety
- Overview of relevant occupational safety regulations and standards
- The responsibility of technician in compliance with safety guidelines
- Identification of Occupational safety hazards
- Identification of common hazards in in the machine

- Describe types of hazards
- Application of PPE (Personal protective equipment)
- Selection and use of PPE
- Safe work practices with electrical systems
- Applications of electrical tools
- Describe the importance of immediate response during emergencies
- Fire prevention measures and firefighting equipment's

Practical Content:

- Demonstration of cleaning techniques
- Create a check list for routine cleaning tasks and their frequency
- Demonstrate the use protective clothing/equipment for specific tasks and work conditions
- Identify PPE application and its maintenance procedure
- Demonstrate the correct use of safety glasses, gloves and hearing protection
- Simulate an emergency scenario require the use of PPE
- Identify electrical hazards (power supply and points, loose and naked cables and wires, equipment malfunctions, etc.)
- Apply electrical precautions like insulated clothing, adequate equipment insulation, use dry work area etc.
- Identify safety features and emergency stop locations
- Present proper method of rescue techniques applied during fire hazard and other accidental situation.

Classroom Aids:
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook

Tools, Equipment and Other Requirements:
Protective Gloves, Head Caps, Safety Goggles, Safety Boots, Mouth Masks, coats and aprons; ear plugs or muffs; eye and facial protection; head-wear; lifting assistance;

Module No. 5: Workplace communication strategies

Outcome : Demonstrate a comprehensive effective workplace communication strategies

Theory Content:

• Explain purpose or common goals of each member in a group of willing to work toward. Members feel that they played a role in determining these goals and the methods used to achieve them.
• Describe the task between each members in group, but also with its own processes and operating procedures.
• Maintain Communication is clear and direct manner.
• Interpret machine performance data and metrics
• Explain key indicators of machine health and efficiency
• Establish clear reporting procedures for machine running and performance
• Generate machine performance reports and sharing them with the team
• Discuss supervision policy as a leader who can bring the group together and build an environment in which the team can work together effectively.

Practical Content:

- Demonstrate the purpose or common goals of each member in a group of willing to work toward. Members feel that they played a role in determining these goals and the methods used to achieve them.
- Identify the task between each members in group, but also with its own processes and operating procedures. The group periodically evaluates its performance.
- Exhibit the accurately receive information and instructions from the supervisor and fellow workers, getting clarification where required.
- Apply Communication is clear and direct manner.
- Apply good communication environmental practices in workplace.
- Simulate/role play of ethical dilemmas in the workplace
- Illustrate organizational policies and procedures

Classroom Aids:
Computer, Projection Equipment, PowerPoint Presentation and software, Facilitator's Guide, Participant's Handbook
Tools, Equipment and Other Requirements:

Protective Gloves, Head Caps, Aprons, Safety Goggles, Safety Boots, Mouth Masks, Sanitizer, Food Safety Manual, communication tools, communication manual, On-task Communication, Instant Chats , Video Conferencing, Voice Calls, Audio Recording, Discussion Forums, Instant File Sharing, External Communication

Module No. 6: OJT
Outcome: Work in real job situation with special emphasis on basic safety and hazards in this domain

Practical Content:

Assessor will check report prepared for this component of Practical training of the course and assess whether competency has been developed to work in the real job situation with special emphasis on basic safety and hazards in this domain. (The trainee is expected to undertake work in actual workplace under any supervisor / contractor for **60 Hours.**)

Module No. 7: : Employability Skills (30 Hrs)

Key Learning Outcomes

Introduction to Employability Skills Duration: 1 Hour
After completing this programme, participants will be able to:
1. Discuss the importance of Employability Skills in meeting the job requirements

Constitutional values - Citizenship Duration: 1 Hour
2. Explain constitutional values, civic rights, duties, citizenship, responsibility towards society etc. that are required to be followed to become a responsible citizen.
3. Show how to practice different environmentally sustainable practices

Becoming a Professional in the 21st Century Duration: 1 Hours
4. Discuss 21st century skills.
5. Display positive attitude, self -motivation, problem solving, time management skills and continuous learning mindset in different situations.

Basic English Skills Duration: 2 Hours

6. Use appropriate basic English sentences/phrases while speaking

Communication Skills Duration: 4 Hour

7. Demonstrate how to communicate in a well -mannered way with others.
8. Demonstrate working with others in a team

Diversity & Inclusion Duration: 1 Hour

9. Show how to conduct oneself appropriately with all genders and PwD
10. Discuss the significance of reporting sexual harassment issues in time

Financial and Legal Literacy Duration: 4 Hours

11. Discuss the significance of using financial products and services safely and securely.
12. Explain the importance of managing expenses, income, and savings.
13. Explain the significance of approaching the concerned authorities in time for any exploitation as per legal rights and laws

Essential Digital Skills Duration: 3 Hours

14. Show how to operate digital devices and use the associated applications and features, safely and securely
15. Discuss the significance of using internet for browsing, accessing social media platforms, safely and securely

Entrepreneurship Duration: 7 Hours

16. Discuss the need for identifying opportunities for potential business, sources for arranging money and potential legal and financial challenges

Learning Outcome – Assessment Criteria

Module No.	Outcome	Assessment Criteria

Module No.	Outcome	Assessment Criteria
1	Demonstrate the Stentering finishing process along with the roles & responsibilities of Stenter operator	**After completion of this module students will be able to:** 1.1. Demonstrate the Principles of textile finishing and stentering. 1.2. Explain different processes involved Stenter machine. 1.3. Identify the role and responsibility of the Stenter machine operator. 1.4. Explain Step wise process flow of Stenter finishing machine. 1.5. Demonstrate the finishing operation of Stenter machine. 1.6. Demonstrate different functions of panel board. 1.7. Demonstrate maintaining shift logbook. 1.8. Explain the shift handover/takeover process.
2	Identify different machine components along with their functions	**After completion of this module students will be able to:** 2.1 Describe different components of a Stenter finishing machine. 2.2 Explain the objectives of finishing process. 2.3 Demonstrate the Drying and stretching operation of Stenter finishing machine . 2.4 Explain Chamber temperatures, Moisture retention, Stretch/shrinkage, Fabric width, Fabric weight, Padder pressures, Exhaust humidity. 2.5 Explain different fabric finishing faults and method of trouble shooting them. 2.6 Identify different components of a Stenter finishing machine and demonstrate their functions. 2.7 Demonstrate working of Padres, Cooling Drums, Burners , Circulator fan , Exhaust fan ,Heat recovery unit ,Weft Stretcher ,Pins or clips ,Winder, Rollers of Attraction of the machine. 2.8 Demonstrate the different setting points of the Stenter finishing machine. 2.9 Demonstrate how to check the parameters of the machine during the Stentering process. 2.10 Demonstrate how to Adjust the machine settings using panel board. 2.11 Demonstrate how to Inspect fabric in final stage. 2.12 Demonstrate how to check the width of fabric and other fabric defects.

Module No.	Outcome	Assessment Criteria
3	Perform sing with Stenter finishing machine after preparing chemicals with ensuring good machine maintenance with safe working environment.	**After completion of this module students will be able to:** 3.1. Explain Different terminologies related to textile Finishing. 3.2 Demonstrate the Function of different finishing chemicals and auxiliaries in stentering process. 3.3 State Types of materials processed, different important parts of the m/c and their function, material flow path and process sequence for **pin stenters and clip stenters**. 3.4 State Different control point settings of stentering process 3.5 Perform feeding of fabric rolls onto the machine , 3.6 Switch ON the main on panel, Open the steam, water and air valve and start the machine. 3.7 Demonstrate how to operate the panel board. 3.8 Remove dust and dirt from machine using cleaning tools. 3.9 Demonstrate the Setting the maximum and minimum width. 3.10 Demonstrate how to keep optimum pressure of the squeezer rolls to get specified results. 3.11. Demonstrate the Setting the required temperature and fan speeds in all chambers. 3.12. Demonstrate Feeding the fabric to the stenter chain 3.13. Prepare the finishing chemical required. 3.14. Demonstrate how to do Weighing of required chemicals and filtering the chemical. 3.15. Demonstrate the Cleaning the Stenter machine on a regular basis and what are the preventive maintenance activities.
4	Apply safe working practices at work place	**After completion of this module students will be able to:** 4.1 Demonstrate of effective cleaning techniques 4.2 Execute machine specific cleaning procedures 4.3 Create a checklist for routine cleaning tasks 4.4 Demonstrate the use of protective clothing/equipment for the specific tasks and work conditions 4.5 Describe the importance of PPE kit 4.6 Demonstrate the correct use of safety gear. 4.7 Identify electrical hazards, including power supply issues, loose cables and equipment malfunctioning 4.8 Detect health hazards (such as untreated injuries and contagious illness/ zoonotic diseases). 4.9 Maintain Fire safety and prevention of fire hazards

Module No.	Outcome	Assessment Criteria
		in workplace [fire extinguishers, fire Alarm, fire exits] 4.10 Ensure use of general health and safety equipment and materials in the workplace first aid equipment
5	Demonstrate a comprehensive effective workplace communication strategy	**After completion of this module students will be able to:** 5.1 Demonstrate the purpose of each team member and their involvement in determining goals 5.2 Identify tasks between team members and their own processes 5.3 Apply effective communication strategies in a practical context 5.4 Exhibit enterprise ethical standards in workplace interactions 5.5 Apply good communication environmental practices in practical workplace 5.6 Simulate/Role play ethical dilemmas in the work place 5.7 Illustrate familiarity with relevant industry standards and regulations. 5.8 Explain the organizational policies and procedures
6	**OJT**	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).
7	**Employability Skill**	As per guided curriculum

List of Tools, Equipment & materials needed for 30 Trainees (Practical)

Sl No	Items Name	Specification	Qty
1	Stenter finishing machine		1
2	Overlock Sewing machine		1
3	Sewing thread		As required
4	Head cap		30
5	Shoe		30
6	Hand gloves		30
7	Fabric rolls		As required
8	Fabric trolley		As required
9	Scissors		5
10	Meterage devices		30
11	Measuring scales, Inch Tape		30
12	Glass reagent jars		5
13	Softeners		As required
14	Stiffeners		As required
15	Plastic beaker		5
16	Stirrer		5
17	Thermometer		2
18	Fabric markers		10
19	Auxiliary chemicals		As required
20	Pressure gauge		2
21	Fire extinguishers		2
22	Fire Alarm		2
23	First aid equipment		5

Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr marks	Total OJT marks
Demonstrate the Stentering finishing process along with the roles & responsibilities of Stenter operator	TXT/3715/OC1	30	120	0
Identify different machine components along with their functions	TXT/3715/OC2	30	120	0
Perform stentering with Stenter finishing machine after preparing chemicals with ensuring good machine maintenance with safe working environment.	TXT/3715/OC3	40	170	0
Apply safe working practices at work place	TXT/3715/OC4	20	120	0
Demonstrate a comprehensive effective workplace communication strategy	TXT/3715/OC5	30	120	0
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	TXT/3715/OC6	0	0	150
Employability Skills – 30 Hrs	DGT/VSQ/N0101	50	0	0