

## Syllabus for Carding Tenter

<b>Course Name</b>	CARDING TENTER
<b>Sector</b>	TEXTILES & HANDLOOM
<b>Sub-sector</b>	SPINNING - TEXTILE
<b>Course Code</b>	TXT/2024/CATE/286
<b>Level</b>	3
<b>Occupation</b>	PRE-SPINNING OPERATION
<b>Job Description</b>	The Carding Tenter is responsible for conducting routine operations on carding machines which include understanding the shift change instructions, running the machine after material loading, minutely observing the running machine operation, mending the material to ensure continuous operation and optimal production efficiency of the carding machines.
<b>Course Duration</b>	<b>Total Duration 390 Hrs (T- 150, P- 240 including OJT-60 and ES-60)</b>
<b>Trainees' Entry Qualification</b>	Grade 10 OR Grade 8 pass and pursuing continuous schooling in regular school with vocational subject OR 8th grade pass with 2 yrs relevant experience OR Previous relevant Qualification of NSQF Level 2 with one year experience OR Previous relevant Qualification of NSQF Level 2.5 with 6 months experience
<b>Trainers Qualification</b>	B. Tech/B.E. in Textile Technology/Engineering from AICTE/UGC recognized Engineering College/ university with one-year experience in the relevant field. OR 03 years Diploma in Textile Technology/Engineering 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)	Total (Hrs) [Multiple of 30]
1.	<b>Identify the Prospective Sectors of a Carding Tenter and Roles &amp; Responsibility</b>	Identify the various textile spinning sectors for potential and mandatory need of a Carding Tenter along with general roles and responsibilities to perform the necessary tasks.	10	20	30
2.	<b>Machine components, knowhow of</b>	Demonstrate the material flow in carding machine from feed to delivery zone along with navigate the	40	80	120

Module No.	Module name	Outcome	Theory (Hrs)	Practical (Hrs)	Total (Hrs) [Multiple of 30]
	<b>processes and forms of materials to operate carding machines.</b>	sequence of starting a carding machine, and controlling the linear density of the feed material.			
3.	<b>Carding machine sliver quality optimization</b>	Deliver desired card sliver hank or card sliver linear density to maintain the desirable sliver quality with maximum machine running efficiency.	20	40	60
4.	<b>Maintain Cleanliness and occupational safety hazards at work place</b>	Perform regular cleaning activities on tools, machine and work area to avoid jamming and to achieve smooth running of the machine with safe working practices at work place	10	20	30
5.	<b>Workplace communication strategies and Team work</b>	Follow the instructions and communicate about the machine running and performance with the team.	10	20	30
6.	<b>OJT</b>	Work in a soft-floor environment of an industry with special emphasis on basic safety and hazards in this domain (OJT).	-	60	60
7	<b>Employability Skill</b>	As per guided curriculum	60	-	60
<b>TOTAL:</b>			150	240	390

**SYLLABUS:****Module 1: Identify the Prospective Sectors of a Carding Tenter and Roles & Responsibility.**

**Outcome:** Identify the various textile spinning sectors for potential and mandatory need of a Carding Tenter along with general roles and responsibilities to perform the necessary tasks.

**Theory Content:**

- Glimpse of the textile industry in relation to requirement of carding operation.
- Introduction to various spinning processes such as short staple, long staple, cotton system, worsted system, condenser-spun system etc. as well as non-woven processes on lieu of carding process need.
- Different types of Carding machines: Revolving flat card, Worsted card etc
- Identify the role and responsibility of the carding operation technician.
- Instruction related to shift handover and taken over procedures.
- Checking of carding machine status and related materials to be processed
- Review of work orders
- Communication with outgoing /incoming shift
- Maintain the safety protocols
- Procedure for documentation
- Review of work orders and pending tasks

**Practical Content:**

- Preparation of flow chart of various textile processes in which carding operation is mandatorily required.
- Identify the basic features of carding machines of different types such as Cotton card (revolving flat card), Worsted card (Circular card), Condenser card (waste fibre processing card) and their differences.
- Preparation of shift handover/takeover process
- Check the machine status
- Review the work orders
- Communicate with incoming/outgoing shift
- Check the safety hazards
- Inspect the tools and equipments
- Handing over/taking over documentation preparation

**Classroom Aids:**

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

**Tools, Equipment and Other Requirements:**

Carding machine, card clothing stripping tools (circular, flat, condenser), Grinding tools (Circular, flat, condenser), Air compressor.

**Module 2: Machine components, knowhow of processes and forms of materials to operate carding machines.**

**Outcome:** Demonstrate the material flow in carding machine from feed to delivery zone along with navigate the sequence of starting a carding machine, and controlling the linear density of the feed material.

**Theory Content:**

- Explain the objectives of Carding process
- Overview of different types of carding machine used in various spinning sectors
- Describe different zones of a cotton carding machine (Revolving Flat card)
- Identify zone wise machine components of a Revolving Flat cotton card
- Study the function of the components of a card
- Depict material flow inside a cotton carding machine
- Differentiate between different feed system to card (Lap feed and chute feed etc.
- Study the driving system
- Explain the features of high production card
- Elaborate on control switch based operation for starting and stopping the machine
- Illustrate the function of inching switch
- Explain about function of light indicators.
- Learn about the function of different keys of display system in control panel.
- Procedure of troubleshooting techniques and diagnostic methods
- Monitoring machine performance and documentation procedures
- Identify various waste of carding such as licker-in droppings, flat strips etc.
- Know about waste collection techniques and its management procedures
- Learn about common faults occurred in carding machine and its possible remedies.
- Explain the settings of card components.

**Practical Content:**

- Identify various carding machine based in its application in different spinning sector
- Demonstrate the starting and stopping of carding machine and also its inching switch operation
- Draw the schematic diagram of material flow inside carding machine
- Identify various components of a carding machine of different zone

- Checking different settings between components and its change procedures
- Demonstrate the running in sequence to fulfill the condition of material collection
- Replace worn-out belt if any.
- Simulate common issues and use diagnostic tools
- Identify electrical and electronic malfunctions and use diagnostic tools to repair
- Practice to replace rapier head in step-by-step
- Demonstrate calibration and alignment procedure
- Identify and replace damaged wiring
- Inspect and maintain the sensors and actuators
- Replace the defective items and test it
- Demonstrate implementation procedure on emergency shutdown and evacuation
- Role play exercise for incoming and outgoing maintenance technicians
- Practice in maintaining shift log and preparation of report
- Environmental impact and implementation of eco-friendly practices and waste management procedures

**Classroom Aids:**

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

**Tools, Equipment and Other Requirements:**

Carding machine, calipers, Belt replacement kit, Diagnostic tools for carding machine, Spare rapier head, Calibration tools, Wiring kit. Tension meter, micrometer, tachometer, pressure gauge.

**Module 3: Carding machine sliver quality optimization**

**Outcome:** Deliver desired card sliver hank or card sliver linear density to maintain the desirable sliver quality with maximum machine running efficiency.

**Theory Content:**

- Significance of card sliver hank and linear density in the spinning process
- Relationship between sliver quality and subsequent yarn quality
- Factors influencing card sliver characteristics
- Key quality parameters in carding
- Impact of sliver quality on downstream processes and final product quality
- Settings of carding machine
- Role of cylinder speed, doffer speed and various settings in achieving desired sliver characteristics
- Introduction to auto leveller systems and their role in maintaining consistent sliver quality
- Methods for monitoring and controlling card sliver hank and linear density during machine operation
- Balancing sliver quality objectives with the need for maximum machine running efficiency

**Practical Content:**

- Operate the carding machine under supervision to understand the practical aspects of sliver production
- Adjust machine setting to achieve specific card sliver hank and linear density requirements
- Collect card sliver samples and performing visual and tactile evaluations
- Measure and verify sliver characteristics using testing instruments.
- Configure and optimize autoleveller systems
- Troubleshoot autoleveller related issues

**Classroom Aids:**

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

**Tools, Equipment and Other Requirements:**

Carding machine, screwdrivers, wrenches, container for collecting card sliver samples, magnifying glass, Gloves, Micrometer, electronic balance, Fibre length analyzer, Diagnostic tools for autoleveller issues, Multimeter, Safety gears.

**Module 4: Maintain Cleanliness and occupational safety hazards at work place**

**Outcome:** Perform regular cleaning activities on tools, machine and work area to avoid jamming and to achieve smooth running of the machine with safe working practices at work place

**Theory Content:**

- Significance of routine cleaning activities of machine maintenance
- Recognizing the impact of cleanliness on preventing jams and ensuring the smooth operation of machinery
- 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 equipments

**Practical Content:**

- Demonstration of cleaning techniques
- Machine specific cleaning procedures
- 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 5: Workplace communication strategies and team work**

**Outcome:** Follow the instructions and communicate about the machine running and performance with the team.

**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
- Group exercise to solve communication and idea sharing within the team
- Outlining enterprise ethical standards and requirements for interacting with other employees and staff.
- Explain good communication environmental practices in workplace.
- Discuss supervision policy as a leader who can bring the group together and build an environment in which the team can work together effectively.
- Compliance with industry regulations: Understanding industry regulations, organizational policies and procedures. Ethical considerations. Health and safety compliance

**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.
- Exhibit enterprise ethical standards and requirements for interacting with other employees and staff.
- Apply good communication environmental practices in workplace.
- Simulate/role play of ethical dilemmas in the workplace
- Familiarize with relevant industry standards and regulations
- 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 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 7 : Employability Skills (60 Hrs)****Key Learning Outcomes****Introduction to Employability Skills**

Duration: 1.5 Hours

After completing this programme, participants will be able to:

1. Discuss the Employability Skills required for jobs in various industries
2. List different learning and employability related GOI and private portals and their usage

**Constitutional values - Citizenship**

Duration: 1.5 Hours

3. Explain the constitutional values, including civic rights and duties, citizenship, responsibility towards society and personal values and ethics such as honesty, integrity, caring and respecting others that are required to become a responsible citizen
4. Show how to practice different environmentally sustainable practices.

**Becoming a Professional in the 21st Century**

Duration: 2.5 Hours

5. Discuss importance of relevant 21st century skills.
6. Exhibit 21st century skills like Self-Awareness, Behavior Skills, time management, critical and adaptive thinking, problem-solving, creative thinking, social and cultural awareness, emotional awareness, learning to learn etc. in personal or professional life.
7. Describe the benefits of continuous learning.

**Basic English Skills**

Duration: 10 Hours

8. Show how to use basic English sentences for everyday conversation in different contexts, in person and over the telephone
9. Read and interpret text written in basic English
10. Write a short note/paragraph / letter/e -mail using basic English

**Career Development & Goal Setting**

Duration: 2 Hours

11. Create a career development plan with well-defined short- and long-term goals

**Communication Skills**

Duration: 5 Hours

12. Demonstrate how to communicate effectively using verbal and nonverbal communication etiquette.

13. Explain the importance of active listening for effective communication
14. Discuss the significance of working collaboratively with others in a team

**Diversity & Inclusion**

Duration: 2.5 Hours

15. Demonstrate how to behave, communicate, and conduct oneself appropriately with all genders and PwD
16. Discuss the significance of escalating sexual harassment issues as per POSH act.

**Financial and Legal Literacy**

Duration: 5 Hours

17. Outline the importance of selecting the right financial institution, product, and service
18. Demonstrate how to carry out offline and online financial transactions, safely and securely
19. List the common components of salary and compute income, expenditure, taxes, investments etc.
20. Discuss the legal rights, laws, and aids

**Essential Digital Skills**

Duration: 10 Hours

21. Describe the role of digital technology in today's life
22. Demonstrate how to operate digital devices and use the associated applications and features, safely and securely
23. Discuss the significance of displaying responsible online behavior while browsing, using various social media platforms, e-mails, etc., safely and securely
24. Create sample word documents, excel sheets and presentations using basic features
25. utilize virtual collaboration tools to work effectively

**Entrepreneurship**

Duration: 7 Hours

26. Explain the types of entrepreneurship and enterprises
27. Discuss how to identify opportunities for potential business, sources of funding and associated financial and legal risks with its mitigation plan
28. Describe the 4Ps of Marketing-Product, Price, Place and Promotion and apply them as per requirement
29. Create a sample business plan, for the selected business opportunity

**Customer Service**

Duration: 5 Hours

30. Describe the significance of analyzing different types and needs of customers
31. Explain the significance of identifying customer needs and responding to them in a professional manner.
32. Discuss the significance of maintaining hygiene and dressing appropriately

**Getting Ready for apprenticeship & Jobs**

Duration: 8 Hours

33. Create a professional Curriculum Vitae (CV)
34. Use various offline and online job search sources such as employment exchanges, recruitment agencies, and job portals respectively
35. Discuss the significance of maintaining hygiene and confidence during an interview
36. Perform a mock interview
37. List the steps for searching and registering for apprenticeship opportunities



Learning Outcome – Assessment Criteria

Module No.	Outcome	Assessment Criteria
1	Identify the various textile spinning sectors for potential and mandatory need of a Carding Tenter along with general roles and responsibilities to perform the necessary tasks.	<p><b>After completion of this module students will be able to:</b></p> <p>1.1 Describe the historical and current context of the textile industry</p> <p>1.2 Articulate the relevance of carding operations in textile manufacturing</p> <p>1.3 Explain and identify various spinning processes</p> <p>1.4 Identify different types of carding machine</p> <p>1.5 Explain the roles and responsibilities of carding tenter</p> <p>1.6 Explain shift handover and takeover processes</p> <p>1.7 Conduct a systematic check of carding machine status and related materials</p> <p>1.8 Identify, analyze and address issues related to carding operation effectively</p>
2	Demonstrate the material flow in carding machine from feed to delivery zone along with navigate the sequence of starting a carding machine, and controlling the linear density of the feed material.	<p><b>After completion of this module students will be able to:</b></p> <p>2.1 Explain the objectives of the carding process</p> <p>2.2 Identify different types of carding machines and principle of working</p> <p>2.3 Describe different types of cotton carding machine as per purpose</p> <p>2.4 Identify machine components different zones of a revolving flat cotton card</p> <p>2.5 Explain the function of individual components of a carding machine</p> <p>2.6 Explain the material flow inside a cotton carding machine</p> <p>2.7 Describe different feed systems such as lap feed and chute feed</p> <p>2.8 Explain drive system in a carding machine</p> <p>2.9 Demonstrate the operation involving control switches for stating and stopping the machine</p> <p>2.10 Explain the function of light indicators in a carding machine</p> <p>2.11 Demonstrate troubleshoot techniques and diagnostic methods for carding machine</p> <p>2.12 Demonstrate the method of replacing rapier head</p> <p>2.13 Demonstrate the procedure of replacing defective items and testing.</p>
3	Deliver desired card sliver hank or card sliver linear density to maintain the desirable sliver quality with maximum machine running efficiency.	<p><b>After completion of this module students will be able to:</b></p> <p>3.1 Demonstrate the operation of carding machine</p> <p>3.2 Adjust the machine setting to achieve specific card sliver hank and linear density requirements</p>

Module No.	Outcome	Assessment Criteria
		3.3 Collect card sliver samples for evaluation 3.4 Verify sliver characteristics using testing instruments 3.5 Configure and optimize auto leveler systems 3.6 Describe the role of auto levelers in maintaining consistent sliver quality
4	Perform regular cleaning activities on tools, machine and work area to avoid jamming and to achieve smooth running of the machine with safe working practices at work place	<b>After completion of this module students will be able to:</b> 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 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	Follow the instructions and communicate about the machine running and performance with the team.	<b>After completion of this module students will be able to:</b> 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

Module No.	Outcome	Assessment Criteria
		standards and regulations.  5.8 Explain the organizational policies and procedures  5.9 Consider ethical considerations and health, safety compliance.
6	OJT	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.)
7	Employability Skill	As per guided curriculum

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

SI No	Items Name	Specification	Qty
1	Carding machine (Revolving flat card, Worsted Card, Condenser Card)		1 each
2	Air blowers		1
3	Brushes		6
4	Calipers		4
5	Micrometer		2
6	Wrenches	Standard	4
7	Screwdrivers		4
8	Pliers		4
9	Multimeter		2
10	Air compressor		1
11	Tachometer		1
12	Vibration analyzer		1
13	Stroboscope		1
14	Tension gauge		2
15	Electronic sensors		As required
16	Oscilloscope		1
17	Pressure gauge		1
18	Belt tension gauge		1
19	High speed camera	Standard	1
20	Computer	Latest configuration	1
21	White board	Standard 6'x4'	1
22	Marker		As required
23	Chart papers		As required
24	Projector		1
25	Aprons	Standard	30
26	Ear plugs		30
27	Eye and facial protection		30
28	Muffs		30
29	Head-wear		30

SI No	Items Name	Specification	Qty
30	Hand gloves		30
31	Mesh aprons		30
32	Fire extinguishers		2
33	Fire Alarm		2
34	First aid equipment		3

### Marks Distribution

Outcome	Outcome Code	Total Th marks	Total Pr marks	Total OJT marks
Identify the various textile spinning sectors for potential and mandatory need of a Carding Tenter along with general roles and responsibilities to perform the necessary tasks.	TXT/3705/OC1	20	110	0
Demonstrate the material flow in carding machine from feed to delivery zone along with navigate the sequence of starting a carding machine, and controlling the linear density of the feed material.	TXT/3705/OC2	50	180	0
Deliver desired card sliver hank or card sliver linear density to maintain the desirable sliver quality with maximum machine running efficiency.	TXT/3705/OC3	40	140	0
Perform regular cleaning activities on tools, machine and work area to avoid jamming and to achieve smooth running of the machine with safe working practices at work place	TXT/3705/OC4	20	110	0
Follow the instructions and communicate about the machine running and performance with the team.	TXT/3705/OC5	20	110	0
Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	TXT/3705/OC6	0	0	150
Employability Skills – 60 Hrs	DGT/VSQ/N0102	50	0	0