Syllabus For Jute Mill Machinery Maintenance Technician

Course Name	Jute Mill Machinery Maintenance Technician
Sector	Textiles & Handlooms
Course Code	STC-TXT /2023/3701
Level	4
Occupation	Jute Mill Machinery Maintenance Technician
Job Description	Jute Mill Machinery Maintenance Technician plays a very important role in: -The operation of Jute mill machineries used in jute mill and its maintenance requirements. -Inspecting, repairing and maintaining the machinery and equipment used in the jute mill. -Identifying and diagnosing equipment malfunctions and technical issues. Elucidate various components of power transmission system present in Jute mill machinery -Identify the standard maintenance schedule -Carrying out repairs on damaged or faulty machinery components, such as motors, belts, bearings and other mechanical parts. Evaluate production balancing and allocate manpower as per requirements. Measure various statistical quality parameters in jute mill maintenance and store keeping record using spread sheet/App.
Course Duration	Total Duration 450 Hrs (T- 150, P- 90 , OJT-150 and ES-60)
Trainees' Entry Qualification	Grade 12 – Regular OR Vocational OR 10th grade pass plus 2-year NTC/NAC OR Completed 2nd year of 3-yeardiploma (after 10th) and pursuing regular diploma OR 10th grade pass and pursuing continuous schooling OR 10th grade pass with 2 years experience OR Previous relevant Qualification of NSQF Level 3.0 with minimum education as 8th Grade pass
Trainers Qualification	Diploma in Jute Technology / Post Graduate Diploma in Jute Technology and Management/ Diploma in Textile Technology/ Textile Engineering with 3 years experience in the relevant filed OR/ B.Tech in Jute Technology / B.Tech in Textile Technology/ Textile Engineering with 2 years experience in the relevant filed

Structure of Course:

Module No.	Module name	Outcome	Compulsory/ Optional	Theory (Hrs)	Practical (Hrs)	OJT (Hrs.)	Total (Hrs) [Multiple of 30]
1	**Fire and industrial safety management**	Maintain health, safety and security at work place	**Compulsory**	10	20		30
2	**Introduction of Maintenance and jute mill machine**	Explain operation of jute machineries used in jute mills and its maintenance requirements**.**	**Compulsory**	20	10		30
3	**Power Transmission and accessories**	Elucidate various components of power transmission system present in Jute mill machinery	**Compulsory**	20	10		30
4	**Brief about the Maintenance**	Plan for standard maintenance of machineries as recommended by machine manufacturer	**Compulsory**	20	10		30
5	**Lubrication and its schedule.**	Ensure proper quality of lubricants to be used in various jute mill machineries	**Compulsory**	20	10		30
6	**Jute Machinery Maintenance**	Execute maintenance of machineries as per planed schedule or for breakdown.	**Compulsory**	20	10		30
7	**Concept about the man machine ratio and hands complements.**	Evaluate production balancing and allocate manpower as per requirements.	**Compulsory**	20	10		30
8	**Basic Computer Skill**	Measure various statistical quality parameters in jute mill maintenance	**Compulsory**	20	10		30

		and store keeping record using spread sheet/App					
9	**OJT**	Work in real job situation with special emphasis on basic safety and hazards in this domain (OJT).	**Compulsory**	--	--	150	150
10	**Employability Skill**	As per guided curriculum	**Compulsory**	60	--		60
		TOTAL:		**210**	**90**	**150**	**450**

SYLLABUS:

Module No 1: Fire and industrial safety management

Outcome: Maintain health, safety and security at work place

Theory Content:

- Fire Extinguishers - Types of fire extinguishers, method of operation and care & maintenance.
- Anatomy of Fire - Definition of combustion, elements of combustion, production of combustion, heat of reaction an calorific value.
- Safety Management System, Objectives of Health, Safety and Environment Policy, Responsibility for Implementation of HSE Policy
- Role of Occupier and Factory Manager, Factory Safety Committee, Structure and Functions and Working Tenure Details etc.
- Accident Prevention: Definition, Incident, Accident, Injury, Dangerous occurrence, Unsafe Act, Unsafe, Conditions, Hazards,

Practical Content:

- Fire Extinguishers - Types of fire extinguishers, method of operation and care & maintenance
- Fire Hose and Hose Fittings, Hydrants and Water Supply

Tools & Equipment:

Fire Extinguishers, Hose pipe.

Module No 2: Introduction of Maintenance and jute mill machine

Outcome: Explain operation of jute machineries used in jute mills and its maintenance requirements**.**

Theory Content:

- Explain the maintenance objectives, outcomes, etc.
- Explain about various types of standard maintenance management systems and their proper execution in the shop floor
- Explain following Jute Mill machinery and its operation

Spreader, Softener, Carding, Drawing, Spinning, Winding, Beaming, Loom, Damping, Calendaring, Lapping, Cutting, Sack sewing machine, Hemming, Herackle sewing machine etc.

Practical Content:

- Demonstrate and operate
- Jute Spreader, Softener, Carding, Drawing, Spinning, Winding, Beaming, Loom, Damping, Calendaring, Lapping, Cutting, Sack sewing machine, Hemming, Herackle sewing machine

machine safety - Identification of each machine parts, Machine setting, Identifications of machine faults at different and its rectification, Speed checking at different stages, Machine lubrication system

Tools & Equipment:

Jute Spreader, Softener, Carding, Drawing, Spinning, Winding, Beaming, Loom, Damping, Calendaring, Lapping, Cutting, Sack sewing machine, Hemming, Herackle sewing machine

Module No 3: Power Transmission and accessories

Outcome: Elucidate various components of power transmission system present in Jute mill machinery

Theory Content:

- Power transmission through Belt and gear drive –
  Types of gears- spur gear, bevel gear, helical gear, worm and worm wheel, rack and pinion and calculation
  Belts – Flat, v-belt and hexagonal belt and calculation
- Explain basic principle of motor, Types of motor, Idea about HP/ KWh
- Bushes and Bearings
  Various kinds of bearings bush bearing, ball and roller bearing, thrust bearing and their application in jute machinery.
- Explain different measuring tools and operating tools, Key preparation, types and applications
- Explain basic principle of workshop machinery – lathe, shaping, drilling, milling and grinding.

Practical Content:

- Calculation of speed ratio through different types of gears- spur gear, bevel gear, helical gear, worm and worm wheel, rack and pinion and
- Different measuring tools and operating tools
- Preparation of various tools/spares for using Workshop machinery – lathe, shaping, drilling, milling and grinding.

Tools & Equipment:

Vernier, Measuring Tape, gauge, lathe, shaping, drilling, milling and grinding

Module No. 4: Brief about the Maintenance

Outcome: Plan for standard maintenance of machineries as recommended by machine manufacturer

Theory Content:

- Maintenance Audit - Preparation of Audit Format, Important check points
- Maintenance type and frequency
- Schedule for normal cleaning and dust removal
- Schedule for picking, staving and general preventive maintenance & overhauling maintenance

- Type of breakdowns - Causes and remedies
- Maintaining records and ensuring availability of spares
- Adopt proper inventory control and classify them as V(Vital), E(Essential), D(Desirable)

Practical Content:

- Maintenance Audit of Jute Spreader, Softener, Carding, Drawing, Spinning, Winding, Beaming, Loom, Damping, Calendaring, Lapping, Cutting, Sack sewing machine, Hemming, Herackle sewing machinery,
- Maintenance schedule of Jute Spreader, Softener, Carding, Drawing, Spinning, Winding, Beaming, Loom, Damping, Calendaring, Lapping, Cutting, Sack sewing machine, Hemming, Herackle sewing machine.
- Maintain Electrical equipment like motor / straters

Tools & Equipment:

Jute Spreader, Softener, Carding, Drawing, Spinning, Winding, Beaming, Loom, Damping, Calendaring, Lapping, Cutting, Sack sewing machine, Hemming, Herackle sewing machine

Module No 5: Lubrication and its schedule.

Outcome: Ensure proper quality of lubricants to be used in various jute mill machineries

Theory Content:

Lubrication and its schedule

- Principle of lubrication.
- Objective of Lubrication
- Lubricants and their properties
- Various application of lubricants
- Selection of lubricants for various Jute machineries
- Lubrication Schedule

Practical Content:

- Various application of lubricants
- Determine amount and frequency of application of Lubricant.

Tools & Equipment:

Grease gun, Lubrication Injectors, Lubrication Pumps, Hydraulic Pumps, Oil Injectors.

Module No. 6: Jute Machinery Maintenance

Outcome: Execute maintenance of machineries as per planed schedule or for breakdown

Theory Content:

- Identification of machine parts
- Function of machine parts
- Gearing diagram and calculations of jute machiner

Practical Content:

- Spreader Maintenance – assembly of gill bars, causes of bar jam
- Carding Maintenance – repining and gauging and pin diameter checking, roll former diameter setting
- Drawing Maintenance – repining, carriage setting and pressure adjustment of pressing roller.
- Spinning Maintenance – Dial gauge, height gauge.
- Loom maintenance – Cam Setting, Catcher pin setting (S4), Spear/ Rapier setting, Take up motion setting, etc.
- To make a Dead Spindle for 4¼" Slip Draft Spinning Frame
- Study maintenance of crank type shapes machine.

Tools & Equipment:

Spreader, Softener, Carding, Drawing, Spinning, Winding, Beaming, Loom, Damping, Calendaring, Lapping, Cutting, Sack sewing machine, Hemming, Herackle sewing machine etc

Module No. 7: Concept about the man machine ratio and hands complements.

Outcome: Evaluate production balancing and allocate manpower as per requirements.

Theory Content:

- Calculation of production and efficiency of Spreader, Softener, Carding, Drawing, Spinning, Winding, Beaming, Loom, Damping, Calendaring, Lapping, Cutting, Sack sewing machine, Hemming, Herackle sewing machine etc.
- Machine Balancing.

Practical Content:

- Calculation of production and efficiency of Jute Spreader, Softener, Carding, Drawing, Spinning, Winding, Beaming, Loom, Damping, Calendaring, Lapping, Cutting, Sack sewing machine, Hemming, Herackle sewing machine etc..

Tools & Equipment:

NA

Module No. 8: Basic Computer Skill

Outcome: Measure various statistical quality parameters in jute mill maintenance and store keeping record using spread sheet/App

Theory Content:

- Basic concept of computer application and its necessity in jute mill
- Introduction of MS Office
    - Use of MS Word
    - Use of MS Excel
    - Use of MS PowerPoint
- Internet and E-mail, procedures, use of apps etc.

Practical Content:

- Production data entry, Input ofJute beaming, sizing, weaving, damping, calendering, Lapping, Cutting machine, hemming, herackle sewing machine parameters, quality distribution, no of bag, bale weight and analysis by using Spread sheet / App

Tools & Equipment:

Computer

Module No. 9 : 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 **150 Hours.**)

Module No. 10 : 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	Maintain health, safety and security at work place	**After completion of this module students will be able to:** (1.1) Comply with health and safety related instructions applicable to the workplace (1.2) Use personal protective equipment such as "ear plug", " nose mask", "head cap" etc., as per protocol (1.3) Carry out own activities in line with approved guidelines and procedures (1.4) Follow environment management system related procedures **(1.5)** Communicate safety plan to everyone and attach disciplinary rules with the implementation
2	Explain operation of jute machineries used in jute mills and its maintenance requirements**.**	**After completion of this module students will be able to:** (2.1) Familiarize with work flow of the manufacturing process/ machine operation (2.2) Explain working of jute machinery is used in jute mills and its maintenance requirements (2.3) Evaluate machinery performance through fault identification and timely rectification. (2.4) Apply strict safety protocols during machine operation. (2.5) Execute effective lubrication routines for machine reliability.
3	Elucidate various components of power transmission system present in Jute mill machinery	**After completion of this module students will be able to:** (3.1) Identify power transmission through Belt and gear drive, motors, Bushes and Bearings & safety devices. (3.2) Use various maintenance tools and equipment safely (3.3) Identify various bearings to uses them in appropriate places. (3.4) Repair / replacements of machine parts by using workshop machinery and reduce the downtime

Module No.	Outcome	Assessment Criteria
		of machinery / cost.
4	Plan for standard maintenance of machineries as recommended by machine manufacturer	**After completion of this module students will be able to:** (4.1) Perform basic inspection visually and use tools & instruments (4.2) Identify with various types of standard maintenance schedule recommended by machine manufacturer and their proper execution on the shop floor. (4.3) Identify maintenance spare parts for the Equipment and clarity as the critical, replacement and breakdown spare parts (4.4) Maintain electrical equipment
5	Ensure proper quality of lubricants to be used in various jute mill machineries	**After completion of this module students will be able to:** (5.1) Identify / select Lubrication type (5.2) Apply lubricants in various machine based on utility and quality (5.3) Store lubricant properly
6	Execute maintenance of machineries as per planed schedule or for breakdown.	**After completion of this module students will be able to:** (6.1) Identify machine parts accurately during practical demonstrations. (6.2) Execute scheduled maintenance tasks for different machinery types. (6.3) Perform general maintenance activities (machine wise) (6.4) Analyze gearing diagrams to perform calculations for jute machinery. (6.5) Perform various machine setting like card gauging, carriage setting, spindle gauging, cam setting etc. (6.6) Demonstrate correct assembly techniques for spreader gill bars. (6.7) Identify, troubleshoot and rectify fault in case of breakdown of machines or accessories
7	Evaluate production balancing and allocate manpower as per requirements.	**After completion of this module students will be able to:** (7.1) Calculate production balancing (7.2) Allocate Manpower as per requirements (Man-Machine Ratio) (7.3) Assess machine productivity across all stages

Module No.	Outcome	Assessment Criteria
		from Spreader to Herackle sewing. (7.4) Implement strategies for improving machine balancing and output (7.5) Adjust staffing levels to match production requirements accurately.
8	Measure various statistical quality parameters in jute mill maintenance and store keeping record using spread sheet/App	**After completion of this module students will be able to:** (8.1) Evaluate the use of MS Word for jute mill document creation. (8.2) Calculate statistical parameters using MS Excel. (8.3) Verify data entry and analysis skills using spreadsheets. (8.4) Examine the use of apps to improve jute mill productivity. (8.5) Create presentations using MS PowerPoint. (8.6) Measures various Statistical quality parameters, Production calculation using Spread sheet / App
9	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 150 Hours.)
10	Employability Skill	As per guided curriculum

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

Sl. No.	Name	Specification	Quantity
1.	Jute Spreader Machine		1
2.	Jute Softener Machine		1
3.	Jute Carding Machine		1
4.	Jute Drawing Machine		1
5.	Jute Spinning Machine		1
6.	Jute Winding Machine		1
7.	Jute Beaming/ Sizing machine		1
8.	Shuttle loom machine		1
9.	Shuttleless loom		1

10.	Damping machine		1
11.	Calendering machine		1
12.	Lapping machine		1
13.	Cutting machine		1
14.	Hemming sewing machine		1
15.	Herackle sewing machine		1
16.	Moisture Meter		1
17.	Measuring Tape		1
18.	Gauge		1
19.	Vernier		1
20.	Gauge plate set		1
21.	Lathe machine		1
22.	Shaping machine		1
23.	Drilling machine		1
24.	Milling and grinding machine		1
25.	Grease gun		1
26.	Lubrication Injectors		1
27.	Lubrication Pumps		1
28.	Hydraulic Pumps		1
29.	Oil Injectors		1
30.	Computer	Latest Configuration	7

Marks distribution as per outcome

Course Name	Sr No	Outcome No.	Outcome Name	Th Hrs	Pr Hrs	Total marks Th	Total marks Pr
Jute Mill Machinery Maintenance Technician	1	TXT/3701/OC1	Maintain health, safety and security at work place	10	20	10	80
	2	TXT/3701/OC2	Explain operation of jute machineries used in jute mills and its maintenance requirements.	20	10	20	60
	3	TXT/3701/OC3	Elucidate various components of power transmission system present in Jute mill machinery	20	10	20	60
	4	TXT/3701/OC4	Plan for standard maintenance of machineries as recommended by machine manufacturer	20	10	20	60
	5	TXT/3701/OC5	Ensure proper quality of lubricants to be used in various jute mill machineries	20	10	20	60
	6	TXT/3701/OC6	Execute maintenance of machineries as per planed schedule or for breakdown.	20	10	20	60
	7	TXT/3701/OC7	Evaluate production balancing and allocate manpower as per requirements.	20	10	20	60
	8	TXT/3701/OC8	Measure various statistical quality parameters in jute mill maintenance and store keeping record using spread sheet/App	20	10	20	60
	9	TXT/3701/OC9	OJT	0	150	0	300
	10	DGT/VSQ/N0102	Employability Skills (60 Hrs)	60	0	50	0
	TOTAL Theory 150Hrs, Practical 90 Hrs, OJT 150 Hrs (Including Employability Skill 60 Hrs)					200	800