Skills for Employment Investment Program (SEIP)

COMPETENCY-BASED LEARNING MATERIAL

(FACULTY GUIDE)

FOR

BASIC TECHNIQUES OF YARN MANUFACTURING

(TEXTILE SECTOR)

Finance Division, Ministry of Finance
Government of the People's Republic of Bangladesh

Table of Contents

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Approval Sheet

Identification and validation of modules and content for this occupation were made by experts within this sector. A series of consultations were held to accurately capture industry and employer needs and expectations and develop the learning material that would help to enhance the employability of the youth trained. This process started on November 2018 and concluded with a validation workshop with a sectoral working group on 28 March 2019.

Experts Involved

Industry and subject-matter experts who provided their valuable inputs to develop this competency-based learning material [November 2018 – March 2019]:

Name	Organisation	Designation
Abu Rayhan Al-Beeroonee	BTMA, SEIP	Chief Coordinator
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Md. Ikramul Islam	NITER	Lecturer
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Shilpi Akter	British Council - SD03	National Subject Matter Consultant - Textile Sector

Committee Workshop

The National competency-based learning material for National Skills Certificate in Basic Techniques of Yarn Manufacturing**, NTVQF Level [INSERT LEVEL]** qualification is a document developed by the Skill for Employment Investment Programme (SEIP), Finance Division, Ministry of Finance. This competency-based learning material has been developed by an industry expert group under guidance of SEIP. The competency-based learning material was approved by the SCDC [BTEB to insert date] at NTVQF Cell, BTEB.

Respectable members of the SCDC:

Basic Techniques of Yarn Manufacturing - Level [INSERT LEVEL]		

How to Use this Competency-based Learning Material

Welcome to the competency-based learning material for Basic Techniques of Yarn Manufacturing for use in textile works. These modules contain training materials and activities for learners to complete in order to become competent and qualified as an operator.

There are six (6) modules that make up this course which comprises the skills, knowledge and attitudes required to become a skilled worker including:

1. Interpret the basics of yarn manufacturing
2. Operate blow room machine
3. Prepare materials for spinning
4. Perform spinning operation
5. Perform spinning and finishing
6. Carry out quality control of material

As a trainer, you are required to guide the learners through a series of activities in order to complete each learning outcome of the module. These activities may be completed as part of structured classroom activities or they may be required to work at their own pace.

These activities will require the learners to complete associated learning and practice activities in order to gain knowledge and skills they need to achieve the learning outcomes. Refer to **Learning Activity Page of each module** to know the sequence of learning tasks and the appropriate resources to use for each task.

This page will serve as the road map towards the achievement of competence. If you read the **Information Sheets,** these will give you an understanding of the work, and why things are done the way they are. Once the learners have finished reading the Information Sheets, they are required to complete the questions in the **Self-Check Sheets**.

The self-check process follows the Information Sheets in the learning guide. Completing self-checks will help the learners know how they are progressing. To know how they fared with self-checks, they can review the **Answer Key**.

The learners are required to complete all activities as directed in the **Job Sheet**. This is where they will apply their newly acquired knowledge while developing new skills. When working, high emphasis should be laid on safety requirements. The learners should be encouraged to raise relevant queries or ask the facilitator for assistance as required.

When the learners have completed all the tasks required in the learning guide, an assessment event will be scheduled to evaluate if they have achieved competency of the specified learning outcomes and are ready for the next task.

Introduction to Teaching Adult Learners

Since you will be dealing with adult learners, it is important to understand the basic principles of adult learning and methodologies. Adults learn best through associations, experiences and application. A few facts to consider while teaching adult learners:

Discussion: Adult learning is best managed through mutual dialogue and discussion. Discussion needs to be encouraged and used in the classroom to maximise learning.

Associations: Adults have experiences which can be related to any learning objectives to create associations which enhance conceptual comprehension. Associations can be used to create user interest and gain attention. Adults learn new attitudes or skills best in relation to previous life experiences.

This strategy also ensures knowledge retention.

Create an environment conducive to learning and sharing: Make people feel comfortable talking to you and each other. They should feel at ease asking questions, sharing views even if they are not very sure of the efficacy of their suggestions or views.

Physical surroundings: Temperature, light, space and furniture should be optimal. There should be no distractions.

Inculcate respect: Encourage learners' contributions and experiences. People are more encouraged to learn and share when their experiences are acknowledged - new information builds easily on past knowledge and experience.

Reward and recognition: Acknowledging the efforts of people, even small attempts, can reap great benefits. Learners like to receive praise and positive encouragement, which motivates them to deliver their best.

Learners also like to be reassured that they are correctly recalling or using information they have absorbed in the classroom.

Structured teaching: Learners study faster when information or skills are presented in a structured way**:**

- Concepts to be taught in small, bite sized portions for easy assimilation
- Put forth the easiest ideas or skills first and then gradually build on them
- Bring in the important ideas first
- Reinforce key ideas at regular intervals
- Reinforce high order concepts at regular intervals

Move learner from generic to specific flow of information: Introduce the generic concepts first and then move to specific more complex information to ease understanding and comprehension.

Application of concepts/ideas taught: Help students put into practice the concepts taught in the class through exercises and work-based projects. Application ensures knowledge retention and skill building.

Relevance building: Build up relevance of the concepts being taught in class by relating them to day-to-day life and workplace experiences.

Learners should know to use and apply what they have learned in the classroom as they learn faster when they recognise that what they are learning will be useful in the future.

Sharing: Encourage learners to learn from each other and solve problems collectively. This makes learning easier and improves team spirit and the interpersonal skills of the learners.

Participation: Involve learners in the class - adults favour to be *active participants* in learning rather than passive receivers of knowledge. People learn faster when they actively process information, solve problems and practice skills.

Motivate: Inspire the class so that teaching does not become a one-way process of knowledge download. Learners will learn faster when they feel an inner urge to learn and be an active participant in the class.

Create a learning environment in which the learners feel free and able to shed their inhibitions and develop receptivity towards new ideas and concepts.

Students will have different motivation levels - some will be more eager to learn than others as each leaner is different from the other and therefore need to be treated differently.

And remember - adapt your communication style to suit the needs of the audience.

Communicate effectively: Communicate in a manner that is understood by the class. The language and sentence structuring should be clear and succinct.

Technical concepts should be explained in a manner that de-mystifies the concept - make things simple and easy to understand.

Avoid using *too much* technical jargon - if it is part of the curriculum, ensure the class is first made familiar with the words or jargon used.

Assessments: Conduct skill and knowledge checks regularly:

- Reinforce high order concepts at regular intervals.
- Conduct formative and summative assessments.
- Strengthen areas which appear to be weak.

Regular feedback:

- Provide regular feedback to learners
- Help them identify their strengths and areas of improvement
- Feedback should always be constructive
- Timely and specific feedback is easier to accept and act on

List of Icons

Icon Name	Icon
Module content	
Learning outcomes	
Performance criteria	
Contents	
Assessment criteria	
Resources required	
Information sheet	
Self-check Quiz	
Answer key	
Activity	
Video reference	
Learner job sheet	
Assessment plan	
Review of competency	

Module 1: Interpret the basics of yarn manufacturing

Module Descriptor:	This module covers the skills, knowledge and attitudes to interpret the basics of yarn manufacturing. It specifically includes understanding the yarn manufacturing process, identifying raw materials, tools, equipment, and machines, and interpreting common technical terms in the workplace.	
Nominal Duration:	24 hours	
Learning Outcomes:	**1.1.**	Understand yarn manufacturing process
	1.2.	Identify raw materials
	1.3.	Identify tools, equipment and machines
	1.4.	Interpret technical terms
Performance Criteria:	**1.1.**	Yarn manufacturing processes is identified and explained.
	1.2.	Role of an operator in a textile mill is explained.
	1.3.	Types of yarn are identified.
	1.4.	Lay-out of spinning floor is identified and illustrated.
	1.5.	Types of fibres are identified.
	1.6.	Types of impurities are identified.
	1.7.	Fibre contamination is identified and described.
	1.8.	Tools and equipment required for spinning are identified.
	1.9.	Different machines required for spinning are identified.
	1.10.	Technical terms used in spinning process are identified.
	1.11.	Technical terms are interpreted.

Learning Outcome 1.1 – Understand Yarn Manufacturing Process

Contents:	▪ Yarn manufacturing process ▪ Types of yarns		
Resources Required:	▪ Materials: Yarns		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	1.1.1	Information Sheet 1.1.1 Self-Check Quiz 1.1.1 Answer Key 1.1.1	8 13 24
	1.1.2	Information Sheet 1.1.2 Self-Check Quiz 1.1.2 Answer Key 1.1.2	14 14 24
Assessment Criteria:	▪ Yarn manufacturing process is identified and explained. ▪ Types of yarns are identified.		

Learning Outcome 1.2 – Identify Raw Materials

Contents:	▪ Types of fibres ▪ Types of impurities ▪ Fibre contamination		
Resources Required:	▪ Personal protective equipment (PPE): Cloth/apron, hand gloves, dust mask, safety glasses, ear plug ▪ Materials: Fibres		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	1.2.1	Information Sheet 1.2.1 Self-Check Quiz 1.2.1 Answer Key 1.2.1	16 17 24
Assessment Criteria:	▪ Types of fibres are identified as per job requirement. ▪ Types of impurities are identified. ▪ Fibre contamination is identified and described.		

Learning Outcome 1.3 – Identify Tools, Equipment and Machines

<table>
<tr><td>Contents:</td><td colspan="3">▪ Tools and equipment required for spinning
▪ Different machines required for spinning</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth/apron, hand gloves, dust mask, safety glasses, ear plugs/ear muffs
▪ Tools and equipment: Pocket tape, adjustable wrench, files, hacksaw, hammer, pliers, screw drivers and hand pullers, bobbin, bobbin holder, can and trolley</td></tr>
<tr><td rowspan="3">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td>1.3.1</td><td>Information Sheet 1.3.1
Self-Check Quiz 1.3.1
Answer Key 1.3.1</td><td>18
20
24</td></tr>
<tr><td>1.3.2</td><td>Information Sheet 1.3.2
Self-Check Quiz 1.3.2
Answer Key 1.3.2</td><td>20
21
24</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Tools and equipment required for spinning are identified.
▪ Different machines required for spinning are identified.</td></tr>
</table>

Learning Outcome 1.4 – Interpret Technical Terms

Contents:	▪ Technical terms used in spinning process		
Resources Required:	N/A		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	1.4.1	Information Sheet 1.4.1 Self-Check Quiz 1.4.1 Answer Key 1.4.1	22 23 24
Assessment Criteria:	▪ Technical terms used in spinning process are identified as per job requirement.		

Module 2: Operate blow room machine

Module Descriptor:	This module covers the knowledge, skills and attitudes to operate blow room machine which includes carrying out bale opening, performing cleaning operation, operating the blow room machine, carrying out blending of different fibres and disposing of waste material.	
Nominal Duration:	56 hours	
Learning Outcomes:	**2.1.**	Carry out bale opening operation
	2.2.	Perform cleaning operation
	2.3.	Operate blow room line machine
	2.4.	Carry out blending of different fibres
	2.5.	Dispose of waste material
Performance Criteria:	**2.1.**	Materials are identified according to job requirements.
	2.2.	Tools are identified and selected according to job requirements.
	2.3.	The fibres are brushed to remove dust during loading and unloading.
	2.4.	Fibres are laid down according to bale management.
	2.5.	Natural impurities are removed.
	2.6.	Foreign materials are removed.
	2.7.	Fibres are opened.
	2.8.	Machine is operated as per standard operating procedure.
	2.9.	Machine is stopped in case of any emergency.
	2.10.	Control points of blow room line machine are identified.
	2.11.	Fibres from different bales are blended.
	2.12.	Different types of fibres are blended.
	2.13.	Waste material from machine is identified.
	2.14.	Waste material is separated and disposed of as per standard operating procedure.

Learning Outcome 2.1 – Carry Out Bale Opening Operation

<table>
<tr><td>Contents:</td><td colspan="3">▪ Materials used in bale opening
▪ Tools used during opening</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth, hand gloves, dust mask, safety glasses
▪ Tools and equipment: Blow room machine, pocket tape, wire stripper, adjustable wrench, hammers, pliers, screw drivers and scissors
▪ Materials: Fibres</td></tr>
<tr><td rowspan="4">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td>2.1.1</td><td>Information Sheet 2.1.1
Self-Check Quiz 2.1.1
Answer Key 2.1.1</td><td>27
29
47</td></tr>
<tr><td>2.1.2</td><td>Information Sheet 2.1.2
Self-Check Quiz 2.1.2
Answer Key 2.1.2</td><td>29
32
47</td></tr>
<tr><td>2.1.3</td><td>Information Sheet 2.1.3
Self-Check Quiz 2.1.3
Answer Key 2.1.3</td><td>32
33
47</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Materials are identified according to job requirements.
▪ Tools and equipment are gathered and checked in accordance with job requirements.
▪ Appropriate personal protective equipment (PPE) is used and demonstrated according to job requirements.
▪ Fibres are laid down according to bale management.</td></tr>
</table>

Learning Outcome 2.2 – Perform Cleaning Operation

<table>
<tr><td>Contents:</td><td colspan="3">▪ Natural impurities
▪ Foreign materials
▪ Fibres opening</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth, hand gloves, dust mask, safety glasses
▪ Tools and equipment: Blow room machine, pocket tape, wire stripper, adjustable wrench, hammers, pliers, screw drivers and scissors
▪ Materials: Fibres</td></tr>
<tr><td rowspan="4">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td rowspan="3">2.2.1</td><td>Information Sheet 2.2.1</td><td>34</td></tr>
<tr><td>Self-Check Quiz 2.2.1</td><td>35</td></tr>
<tr><td>Answer Key 2.2.1</td><td>47</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Tools and equipment are gathered and checked in accordance with job requirements.
▪ Appropriate personal protective equipment (PPE) is used and demonstrated according to job requirements.
▪ Natural impurities and foreign materials are removed as per job requirements.
▪ Fibres are opened as required.</td></tr>
</table>

Learning Outcome 2.3 – Operate Blow Room Line Machine

<table>
<tr><td>Contents:</td><td colspan="3">▪ Machine operation (i.e. starting and stopping) as per standard operating procedure
▪ Control points of blow room line machine</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth, hand gloves, dust mask, safety glasses
▪ Tools and equipment: Blow room machine, pocket tape, wire stripper, adjustable wrench, hammers, pliers, screw drivers and scissors
▪ Materials: Fibres</td></tr>
<tr><td rowspan="4">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td rowspan="3">2.3.1</td><td>Information Sheet 2.3.1</td><td>37</td></tr>
<tr><td>Self-Check Quiz 2.3.1</td><td>41</td></tr>
<tr><td>Answer Key 2.3.1</td><td>47</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Tools and equipment are gathered and checked in accordance with job requirements.
▪ Appropriate personal protective equipment (PPE) is used and demonstrated according to job requirements.
▪ Machine is operated as per standard operating procedure.
▪ Machine is stopped in case of any emergency.
▪ Control points of blow room line machine are identified.</td></tr>
</table>

Learning Outcome 2.4 – Carry Out Blending of Different Fibres

<table>
<tr><td>Contents:</td><td colspan="3">▪ Fibres blending from different bales</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): helmet, safety cloth, hand gloves, dust mask, safety glasses and ear plugs
▪ Tools and equipment: Blow room machine, pocket tape, wire stripper, adjustable wrench, hammers, pliers, screw drivers and scissors
▪ Materials: Fibres</td></tr>
<tr><td rowspan="4">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td rowspan="3">2.4.1</td><td>Information Sheet 2.4.1</td><td>42</td></tr>
<tr><td>Self-Check Quiz 2.4.1</td><td>43</td></tr>
<tr><td>Answer Key 2.4.1</td><td>48</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Fibres from different bales are blended.
▪ Different types of fibres are blended.</td></tr>
</table>

Learning Outcome 2.5 – Dispose of Waste Material

<table>
<tr><td>Contents:</td><td colspan="3">▪ Identify and collect waste materials of the machine
▪ Dispose of waste material</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth/apron, hand gloves, dust mask, safety goggles
▪ Cleaning tools and equipment: Blow room machine, pocket tape, wire stripper, adjustable wrench, hammers, pliers, screw drivers and scissors
▪ Materials: Fibres</td></tr>
<tr><td rowspan="5">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td rowspan="4">2.5.1</td><td>Information Sheet 2.5.1</td><td>44</td></tr>
<tr><td>Self-Check Quiz 2.5.1</td><td>45</td></tr>
<tr><td>Job Sheet 1</td><td>46</td></tr>
<tr><td>Answer Key 2.5.1</td><td>48</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Waste materials of the machine are identified.
▪ Collected waste materials are disposed of.</td></tr>
</table>

Module 3: Prepare materials for spinning

Module Descriptor:	This module covers the knowledge, skills and attitudes to prepare materials for spinning. It specifically includes operating the machines, performing production of sliver and lap, cleaning the machine and disposing of waste material.	
Nominal Duration:	56 hours	
Learning Outcomes:	**3.1.**	Operate the machines
	3.2.	Perform production of sliver and lap
	3.3.	Clean the machine
	3.4.	Dispose of waste material
Performance Criteria:	**3.1.**	Appropriate personal protective equipment (PPE) is identified and selected.
	3.2.	Hand tools are identified and selected as per job requirement.
	3.3.	Control points are identified.
	3.4.	The machines are operated as per standard operating procedure.
	3.5.	Materials are fed into the machines as per standard operating procedure.
	3.6.	Broken materials are pieced as per standard operating procedure.
	3.7.	Carded and drawn sliver, and mini laps are collected.
	3.8.	Carded and drawn sliver, and mini laps are doffed.
	3.9.	Machine parts are cleaned as per manufacturer instructions.
	3.10.	Cans and spools are cleaned as per standard operating procedure.
	3.11.	Waste material from machine is identified.

Learning Outcome 3.1 – Operate the Machine

<table>
<tr><td>Contents:</td><td colspan="3">▪ Appropriate personal protective equipment is identified and selected
▪ Hand tools are identified and selected as per job requirement
▪ Control points are identified
▪ The machines are operated as per standard operating procedure</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth, hand gloves, dust mask, safety glasses, ear plug
▪ Tools and equipment: Carding machine, Breaker draw frame, lap former, sample cutter, machine brush
▪ Materials: Chute or card mat, carded sliver and drawn sliver</td></tr>
<tr><td rowspan="4">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td>3.1.1</td><td>Information Sheet 3.1.1
Self-Check Quiz 3.1.1
Answer Key 3.1.1
https://www.youtube.com/watch?v=nd6ExoC0LEY</td><td>51
54
66</td></tr>
<tr><td>3.1.1</td><td>Information Sheet 3.1.2
Self-Check Quiz 3.1.2
Answer Key 3.1.2
https://www.youtube.com/watch?v=CMEUG7QKHLM</td><td>55
56
66</td></tr>
<tr><td>3.1.1</td><td>Information Sheet 3.1.3
Self-Check Quiz 3.1.2
Answer Key 3.1.2
https://www.youtube.com/watch?v=RzzhBpx4x3w</td><td>56
58
66</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Appropriate personal protective equipment is identified and selected.
▪ Hand tools are identified and selected as per job requirement.
▪ Control points are identified.
▪ Drafting zone.
▪ The machines are operated as per standard operating procedure.</td></tr>
</table>

Learning Outcome 3.2 – Perform Production of Sliver and Lap

Contents:	▪ Process of materials feeding into the machines ▪ Piecing of broken materials ▪ Collection of carded and drawn sliver and mini laps ▪ Doffing of carded and drawn sliver and mini laps		
Resources Required:	▪ Personal protective equipment (PPE): Safety cloth, hand gloves, dust mask, safety glasses, ear plug ▪ Tools and equipment: Carding machine, Breaker draw frame, lap former, sample cutter, machine brush ▪ Materials: Chute or card mat, carded sliver and drawn sliver		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	3.2.1	Information Sheet 3.2.1 Self-Check Quiz 3.2.1 Answer Key 3.2.1	60 60 66
Assessment Criteria:	▪ Materials are fed into the machines as per standard operating procedure. ▪ Broken materials are pieced as per standard operating procedure. ▪ Carded and drawn sliver, and mini laps are collected. ▪ Carded and drawn sliver, and mini laps are doffed.		

Learning Outcome 3.3 – Clean the Machine

<table>
<tr><td>Contents:</td><td colspan="3">▪ Cleaning of machine marts
▪ Cleaning of cans and spools</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): safety cloth, hand gloves, dust mask, safety glasses, ear plugs
▪ Tools and equipment: Carding machine, Breaker draw frame, lap former, sample cutter, machine brush
▪ Materials: Chute or card mat, carded sliver and drawn sliver</td></tr>
<tr><td rowspan="2">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td>3.3.1</td><td>Information Sheet 3.3.1</td><td>61</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Machine parts are cleaned as per manufacturer instructions.
▪ Cans and spools are cleaned as per standard operating procedure.</td></tr>
</table>

Learning Outcome 3.4 – Dispose of Waste Materials

<table>
<tr><td>Contents:</td><td colspan="3">▪ Waste materials of carding machine, breaker draw frame and lap former machine
▪ Process of disposal of waste materials</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): safety cloth, hand gloves, dust mask, safety glasses, ear plug
▪ Tools and equipment: Carding machine, Breaker draw frame, lap former, sample cutter, machine brush
▪ Materials: Chute or card mat, carded sliver and drawn sliver</td></tr>
<tr><td rowspan="5">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td rowspan="4">3.4.1</td><td>Information Sheet 3.4.1</td><td>63</td></tr>
<tr><td>Self-Check Quiz 3.4.1</td><td>64</td></tr>
<tr><td>Job Sheet 2</td><td>65</td></tr>
<tr><td>Answer Key 3.4.1</td><td>66</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Waste materials from machine is identified, separated and disposed of as per standard operating procedure.</td></tr>
</table>

Module 4: Perform spinning operation

Module Descriptor:	This module covers the knowledge, skills and attitudes to perform spinning operation. It specifically includes handling lap trolley, operating the machine (comber and finisher draw frame), perform feeding of materials and piecing, cleaning the machine and disposing of waste material.	
Nominal Duration:	56 hours	
Learning Outcomes:	**4.1.**	Handle lap trolley
	4.2.	Operate the machine
	4.3.	Perform feeding of materials and piecing
	4.4.	Clean the machine, cans and spools
	4.5.	Dispose of waste material
Performance Criteria:	**4.1.**	Lap trolley of full and empty packages is collected as per schedule.
	4.2.	Trolley wheels are cleaned as per schedule.
	4.3.	Appropriate personal protective equipment (PPE) is identified and selected.
	4.4.	Hand tools are identified and selected as per job requirement.
	4.5.	Control points are identified.
	4.6.	The machines are operated as per standard operating procedure.
	4.7.	Materials are fed into the machine as per standard operating procedure.
	4.8.	Broken materials are pieced as per standard operating procedure.
	4.9.	Machine parts are cleaned as per manufacturer instructions.
	4.10.	Cans and spools are cleaned as per standard operating procedure.
	4.11.	Waste material from machine is identified.
	4.12.	Waste material is separated and disposed of as per standard operating procedure.

Learning Outcome 4.1 – Handle Lap Trolley

<table>
<tr><td>Contents:</td><td colspan="3">▪ Lap trolley handling</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): helmet, safety cloth, hand gloves, dust mask, safety glasses, ear plug
▪ Tools and equipment: Comber machine, finisher draw frame, adjustable wrench, screw driver, hammer, pliers
▪ Materials: Mini lap and combed sliver</td></tr>
<tr><td rowspan="4">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td rowspan="3">4.1.1</td><td>Information Sheet 4.1.1</td><td>69</td></tr>
<tr><td>Self-Check Quiz 4.1.1</td><td>70</td></tr>
<tr><td>Answer Key 4.1.1</td><td>83</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Tools and equipment are gathered and checked in accordance with job requirements.
▪ Lap trolley of full and empty packages is collected as per schedule.
▪ Trolley wheels are cleaned as per schedule.</td></tr>
</table>

Learning Outcome 4.2 – Operate the Machine

<table>
<tr><td>Contents:</td><td colspan="3">▪ Personal protective equipment (PPE)
▪ Control points
▪ Machine operation</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): safety cloth, hand gloves, dust mask, safety glasses, ear plug
▪ Tools and equipment: Comber machine, finisher draw frame, adjustable wrench, screw driver, hammer, pliers
▪ Materials: Mini lap and combed sliver</td></tr>
<tr><td rowspan="2">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td>4.2.1</td><td>Information Sheet 4.2.1
Self-Check Quiz 4.2.1
Answer Key 4.2.1
https://www.youtube.com/watch?v=bZbiB0Vn1H4</td><td>72
74
83</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Appropriate personal protective equipment (PPE) is identified and selected as required.
▪ Hand tools are identified and selected as per job requirement.
▪ Control points are identified.
▪ The machines are operated as per standard operating procedure.</td></tr>
</table>

Learning Outcome 4.3 – Perform Feeding of Materials and Piecing

<table>
<tr><td>Contents:</td><td colspan="3">▪ Process of materials feeding into the machine
▪ Process of piecing of broken materials</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth/apron, hand gloves, dust mask, safety glasses, ear plugs/ear muffs
▪ Tools and equipment: Comber machine, finisher draw frame, adjustable wrench, screw driver, hammer, pliers
▪ Materials: Mini lap and combed sliver</td></tr>
<tr><td rowspan="2">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td>4.3.1</td><td>Information Sheet 4.3.1
Self-Check Quiz 4.3.1
Answer Key 4.3.1</td><td>75
76
83</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Materials are fed into the machine as per standard operating procedure.
▪ Broken materials are pieced as per standard operating procedure.</td></tr>
</table>

Learning Outcome 4.4 – Clean the Machine, Cans and Spools

Contents:	▪ Cleaning of machine parts as per manufacturer instructions ▪ Cleaning of cans and spools		
Resources Required:	▪ Personal protective equipment (PPE): safety cloth, hand gloves, dust mask, safety glasses ▪ Tools and equipment: Comber machine, finisher draw frame, adjustable wrench, screw driver, hammer, pliers ▪ Material: Mini lap and combed sliver		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	4.4.1	Information Sheet 4.4.1 Self-Check Quiz 4.4.1 Answer Key 4.4.1	77 78 83
Assessment Criteria:	▪ Machine parts are cleaned as per manufacturer instructions. ▪ Cans and spools are cleaned as per standard operating procedure.		

Learning Outcome 4.5 – Dispose of Waste Materials

Contents:	▪ Waste material of comber machine ▪ Separation and disposal of waste material		
Resources Required:	▪ Personal protective equipment (PPE): safety cloth, hand gloves, dust mask, safety glasses ▪ Tools and equipment: Comber machine, finisher draw frame, adjustable wrench, screw driver, hammer, pliers ▪ Materials: Mini lap and combed sliver		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	4.5.1	Information Sheet 4.5.1 Self-Check Quiz 4.5.1 Job Sheet 4 Answer Key 4.5.1	79 80 81 83
Assessment Criteria:	▪ Waste material from machine is identified, separated and disposed of as per standard operating procedure.		

Module 5: Perform spinning and finishing

Module Descriptor:	This module covers the knowledge, skills and attitudes to perform spinning and finishing. It specifically includes operating machines, performing feeding, creeling and piecing of materials, carrying out doffing operation, cleaning the machines and packages and disposing of waste material.	
Nominal Duration:	64 hours	
Learning Outcomes:	**5.1.**	Operate the machine
	5.2.	Perform feeding, creeling and piecing
	5.3.	Perform doffing operation
	5.4.	Clean the machines and packages
	5.5.	Dispose of waste material
Performance Criteria:	**5.1.**	Appropriate personal protective equipment (PPE) is identified and selected.
	5.2.	Hand tools are identified and selected as per job requirement.
	5.3.	Control points are identified.
	5.4.	The machines are operated as per standard operating procedure.
	5.5.	Block of materials are identified and separated.
	5.6.	Materials are identified and arranged.
	5.7.	Materials are fed into the machines as per standard operating procedure.
	5.8.	Broken materials are pieced to continue production.
	5.9.	Roving and yarns are collected.
	5.10.	Full and empty packages are arranged as required.
	5.11.	Machine parts are cleaned as per manufacturer instructions.
	5.12.	Packages are cleaned as per standard operating procedure.
	5.13.	Waste material from machine is identified.
	5.14.	Waste material is separated and disposed of as per standard operating procedure.

Learning Outcome 5.1- Operate the Machine

<table>
<tr><td>Contents:</td><td colspan="3">▪ Control points
▪ Machines
▪ Block of materials
▪ Materials
▪ Packages
▪ Machine parts</td></tr>
<tr><td>Resources Required:</td><td colspan="3">▪ Personal protective equipment (PPE): safety shoes, safety cloth, hand gloves, dust mask, safety glasses and ear plug
▪ Tools and equipment: Simplex/speed frame, ring frame, rotor spinning, auto coner machine
▪ Materials: Sliver, roving and yarn</td></tr>
<tr><td rowspan="5">Learning Activities:</td><td>Activity</td><td>Resource</td><td>Student Guide Page</td></tr>
<tr><td>5.1.1</td><td>Information Sheet 5.1.1
Self-Check Quiz 5.1.1
Answer Key 5.1.1
https://www.youtube.com/watch?v=Y0uUOAFoQgg</td><td>86
88
104</td></tr>
<tr><td>5.1.1</td><td>Information Sheet 5.1.2
Self-Check Quiz 5.1.2
Answer Key 5.1.2</td><td>88
90
104</td></tr>
<tr><td>5.1.1</td><td>Information Sheet 5.1.3
Self-Check Quiz 5.1.3
Answer Key 5.1.3</td><td>91
92
104</td></tr>
<tr><td>5.1.1</td><td>Information Sheet 5.1.4
Self-Check Quiz 5.1.4
Answer Key 5.1.4</td><td>92
94
104</td></tr>
<tr><td>Assessment Criteria:</td><td colspan="3">▪ Appropriate personal protective equipment (PPE) are used according to job requirements.
▪ Necessary tools and equipment are checked for their usability.
▪ Control points are identified.
▪ The machines are operated as per standard operating procedure.
▪ Block of materials are identified and separated.
▪ Materials and packages are identified and arranged as required.
▪ Machine parts are cleaned are as required.</td></tr>
</table>

Learning Outcome 5.2 - Perform Feeding, Creeling and Piecing

Contents:	▪ Materials		
Resources Required:	▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth, hand gloves, dust mask, safety glasses ▪ Tools and equipment: Simplex/speed frame, ring frame, rotor spinning, auto coner machine ▪ Materials: Sliver, roving and yarn		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	5.2.1	Information Sheet: 5.2.1 Self-Check Quiz: 5.2.1 Answer Key: 5.2.1	95 96 105
Assessment Criteria:	▪ Materials are identified and arranged. ▪ Materials are fed into the machines as per standard operating procedure. ▪ Broken materials are pieced to continue production.		

Learning Outcome 5.3 - Perform Doffing Operation

Contents:	▪ Packages		
Resources Required:	▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth, hand gloves, dust mask, safety glasses ▪ Tools and equipment: Simplex/speed frame, ring frame, rotor spinning, auto coner machine ▪ Materials: Sliver, roving and yarn		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	5.3.1	Information Sheet 5.3.1 Self-Check Quiz 5.3.1 Answer Key 5.3.1	97 98 105
Assessment Criteria:	▪ Roving and yarns are collected. ▪ Full and empty packages are arranged as required.		

Learning Outcome 5.4 - Clean the Machines and Packages

Contents:	▪ Machine parts		
Resources Required:	▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth/apron, hand gloves, dust mask, safety goggles ▪ Cleaning tools and equipment: Simplex/speed frame, ring frame, rotor spinning, auto coner machine, sliver can, roving bobbin, ring cup and cone ▪ Materials: Sliver, roving and yarn		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	5.4.1	Information Sheet 5.4.1 Self-Check Quiz 5.4.1 Answer Key 5.4.1	99 100 105
Assessment Criteria:	▪ Machine parts are cleaned as per manufacturer instructions. ▪ Packages are cleaned as per standard operating procedure.		

Learning Outcome 5.5 - Dispose of Waste Material

Contents:	▪ Waste materials separation and disposal of		
Resources Required:	▪ Personal protective equipment (PPE): helmet, safety shoes, safety cloth/apron, hand gloves, dust mask, safety goggles ▪ Cleaning tools and equipment: Simplex/speed frame, ring frame, rotor spinning, auto coner machine, sliver can, roving bobbin, ring cup and cone ▪ Materials: Sliver, roving and yarn		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	5.5.1	Information Sheet 5.5.1 Self-Check Quiz 5.5.1 Job Sheet 4 Answer Key 5.5.1	101 102 103 105
Assessment Criteria:	▪ Waste materials from machine is identified. ▪ Waste material is separated and disposed of as per standard operating procedure.		

Module 6: Carry out quality control of material

Module Descriptor:	This module covers the skills, knowledge, and attitudes required to carry out quality control of materials. It specifically includes identifying spinning accessories to be implemented, identifying fibre and yarn faults, and testing the quality of the materials.	
Nominal Duration:	24 hours	
Learning Outcomes:	**6.1.**	Identify spinning accessories
	6.2.	Identify fibre and yarn faults
	6.3.	Test the quality of the materials
Performance Criteria:	**6.1.**	Spinning accessories are identified and selected as per the product specifications.
	6.2.	Selected spinning accessories are implemented.
	6.3.	Fibre and yarn faults are identified.
	6.4.	Identified faults are reported to appropriate authority.
	6.5.	Material quality is identified and established.
	6.6.	Fibre and yarn properties are tested.
	6.7.	Test results are reported to appropriate authority.

Learning Outcome 6.1- Identify Spinning Accessories

Contents:	▪ Spinning accessories		
Resources Required:	▪ Personal protective equipment (PPE): Helmet, safety shoes, safety cloth, hand gloves, dust mask, safety glasses ▪ Tools and equipment: Ring frame, auto coner ▪ Materials: Yarns		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	6.1.1	Information Sheet 6.1.1 Self-Check Quiz 6.1.1 Answer Key 6.1.1	107 108 116
Assessment Criteria:	▪ Spinning accessories are identified and selected as per the product specifications. ▪ Selected spinning accessories are implemented.		

Learning Outcome 6.2 - Identify Fibre and Yarn Faults

Contents:	▪ Fibre faults ▪ Yarn faults		
Resources Required:	▪ Personal protective equipment (PPE): Safety cloth, hand gloves, dust mask, safety glasses ▪ Tools and equipment: AFIS, USTER Tester ▪ Materials: Fibres and yarns		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	6.2.1	Information Sheet 6.2.1 Self-Check Quiz 6.2.1 Answer Key 6.2.1	109 110 116
Assessment Criteria:	▪ Fibre and yarn faults are identified. ▪ Identified faults are reported to appropriate authority.		

Learning Outcome 6.3 – Test the Quality of the Material

Contents:	▪ Material quality identification ▪ Fibre and yarn properties		
Resources Required:	▪ Personal protective equipment (PPE): Safety cloth, hand gloves, dust mask, safety glasses ▪ Tools and equipment: AFIS, USTER Tester ▪ Materials: Fibres, yarns		
Learning Activities:	**Activity**	**Resource**	**Student Guide Page**
	6.3.1	Information Sheet 6.3.1 Self-Check Quiz 6.3.1 Job Sheet 5 Answer Key 6.3.1	111 114 115 116
Assessment Criteria:	▪ Material quality is identified. ▪ Fibre and yarn properties are tested. ▪ Test results are reported to appropriate authority.		