

**TVET CURRICULUM DEVELOPMENT, ASSESSMENT AND CERTIFICATION COUNCIL**

**(TVET CDACC)**

**COMPETENCY BASED CURRICULUM**

**FOR**

**FABRIC FORMATION**

**LEVEL 5**



TVET CDACC

P.O BOX 15745-00100

NAIROBI

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# FOREWORD

The provision of quality education and training is fundamental to the Government’s overall strategy for social economic development. Quality education and training will contribute to achievement Kenya’s development blue print and sustainable development goals.

Reforms in the education sector are necessary for the achievement of Kenya Vision 2030 and meeting the provisions of the Constitution of Kenya 2010. The education sector had to be aligned to the Constitution and this resulted to the formulation of the Policy Framework for Reforming Education and Training. A key feature of this policy is the radical change in the design and delivery of the TVET training. This policy document requires that training in TVET be competency based, curriculum development be industry led, certification be based on demonstration of competence and mode of delivery allows for multiple entry and exit in TVET programmes.

These reforms demand that Industry takes a leading role in curriculum development to ensure the curriculum addresses its competence needs. It is against this background that this Curriculum has been developed.

It is my conviction that this curriculum will play a great role towards development of competent human resource for the Textile sector’s growth and sustainable development

**PRINCIPAL SECRETARY,**

**VOCATIONAL AND TECHNICAL TRAINING**

**MINISTRY OF EDUCATION**

# PREFACE

Kenya Vision 2030 aims to transform the country into a newly industrializing, “middle-income country providing a high-quality life to all its citizens by the year 2030”. Kenya intends to create a globally competitive and adaptive human resource base to meet the requirements of a rapidly industrializing economy through life-long education and training. TVET has a responsibility of facilitating the process of inculcating knowledge, skills and attitudes necessary for catapulting the nation to a globally competitive country, hence the paradigm shift to embrace Competency Based Education and Training (CBET).

The Technical and Vocational Education and Training Act No. 29 of 2013 on Reforming Education and Training in Kenya, emphasized the need toreform curriculum development, assessment and certification. This called for a shift to CBET to address the mismatch between skills acquired through training and skills needed by industry as well as increase the global competitiveness of Kenyan labour force.

TVET Curriculum Development, Assessment and Certification Council (TVET CDACC) in conjunction with Textile Sector Skills Advisory Committee (SSAC) and other stakeholders have developed this curriculum.

This curriculum has been developed following the CBET framework policy; the CBETA Standards and guidelines provided by the TVET Authority and the Kenya National Qualification framework designed by the Kenya National Qualification Authority.

The curriculum is designed and organized with an outline of learning outcomes; suggested delivery methods, training/learning resources and methods of assessing the trainee’s achievement. The curriculum is competency-based and allows multiple entry and exit to the course.

I am grateful to the Council Members, Council Secretariat, Textile SSAC, expert workers and all those who participated in the development of this curriculum.

**CHAIRPERSON,**

**TVET CDACC**

# ACKNOWLEDGMENT

This curriculum has been designed for competency-based training and has independent units of learning that allow the trainee flexibility in entry and exit. In developing the curriculum, significant involvement and support was received from various organizations.

I appreciate Textile Sector Skills Advisory Committee (SSAC) who enabled the development of this curriculum.

I recognize with appreciation the role of the SSAC in ensuring that competencies required by the industry are addressed in this curriculum. I also thank all stakeholders in the Textile sector for their valuable input and all those who participated in the process of developing this curriculum.

I am convinced that this curriculum will go a long way in ensuring that workers in Textile sector will acquire competencies that will enable them to perform their work more efficiently.

**COUNCIL SECRETARY/CEO**

**TVET CDACC**

# ABBREVIATION AND ACRONYMS

BC Basic Competency

CC Common Competency

CDACC Curriculum Development, Assessment and Certification Council

CR Core Competency

CU Curriculum

ENG Engineering

ICT Information and Communication Technology

IT Information Technology

KCSE Kenya Certificate of Secondary Education

OSHA Occupational Health and Safety Act

PPE Personal protective equipment

SOP Standard Operating Procedures

TEX Textile

TFF Textile Fabric Formation

TVET Technical and Vocational Education and Training

# **KEY TO UNIT CODE**

**ENG/CU/TFF/BC /01/ 5/ A**

Industry or sector

Occupational Standards

Occupational area

Type of competency

Competency number

Competency level

Version

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# COURSE DESCRIPTION

The Fabric Formation Craft Person Level 5 consists of competencies that a person must achieve to enable him/her to work in a Fabric Mananufacturing setup. It entails performing weaving operations, knitting operations, non-woven operations, maintaining machines and inspecting grey fabric.

|  |  |  |  |
| --- | --- | --- | --- |
| **BASIC UNITS OF COMPETENCY** | | | |
| **Unit of Learning Code** | **Units of Learning Title** | **Duration in Hours** | **Credits Factors** |
| **ENG/CU/TFF/BC/01/5/A** | Communication skills | 40 | 4.0 |
| **ENG/CU/TFF/BC/02/5/A** | Digital literacy | 60 | 6.0 |
| **ENG/CU/TFF/BC/03/5/A** | Entrepreneurial skills | 100 | 10.0 |
| **ENG/CU/TFF/BC/04/5/A** | Employability skills | 80 | 8.0 |
| **ENG/CU/TFF/BC/05/5/A** | Environmental literacy | 40 | 4.0 |
| **ENG/CU/TFF/BC/06/5/A** | Occupational health and safety | 40 | 4.0 |
| **TOTAL** | | **360** | **36.0** |
| **COMMON UNITS OF COMPETENCY** | | | |
| **ENG/CU/TFF/CC/01/5/A** | Technical drawing | 150 | 15 |
| **ENG/CU/TFF/CC/02/5/A** | Engineering mathematics | 150 | 15 |
| **ENG/CU/TFF/CC/03/5/A** | Mechanical science principles | 85 | 7.5 |
| **ENG/CU/TFF/CC/04/5/A** | Fluid mechanics principles | 90 | 4.0 |
| **ENG/CU/TFF/CC/05/5/A** | Material science principles | 85 | 7.5 |
| **TOTAL** | | **560** | **56.0** |
| **CORE UNITS OF COMPETENCY** | | | |
| **ENG/CU/TFF/CR/01/5/A** | Produce woven fabric |  |  |
| **ENG/CU/TFF/CR/02/5/A** | Produce knitted fabric |  |  |
| **ENG/CU/TFF/CR/03/5/A** | Produce non-woven fabric |  |  |
| **ENG/CU/TFF/CR/04/5/A** | Perform machine maintenance |  |  |
| **ENG/CU/TFF/CR/05/5/A** | Perform fabric testing & inspection |  |  |
|  | Industrial attachment | 480 | 48 |
| **TOTAL** | | **1480** | **148.0** |
| **GRAND TOTAL** | | **2400** | **240.0** |

1. **Entry Requirements**

An individual entering this course should have any of the following minimum requirements:

1. Kenya Certificate of Secondary Education (K.C.S.E.) with a minimum mean grade of D (plain)

**Or**

1. Level 4 certificate in a related course with **one** year of continuous work experience

**Or**

1. Equivalent qualifications as determined by Kenya National Qualifications Authority (KNQA)
2. **Trainer qualification**

A trainer for this course should have a higher qualification than the level of this course.

1. **Assessment**

The course will be assessed at two levels: internally and externally. Internal assessment is continuous and is conducted by the trainer who is monitored by an internal accredited verifier while external assessment is the responsibility of TVET CDACC.

1. **Certification**

A candidate will be issued with a record of Achievement on demonstration of competence in a unit of competency. To attain the qualification national certificate in Spinning Craft, the candidate must demonstrate competence in all the units of competency as given in qualification pack. TVET CDACC will issue these certificates in conjunction with training provider.

# BASIC UNITS OF LEARNING

## 

# COMMUNICATION SKILLS

**UNIT CODE:** ENG/CU/TFF/BC/01/5/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Communication Skills

**Duration of Unit:** 25hours

**Unit Description**

This unit covers the competencies required to demonstrate communication skills. It involves meeting communication needs of clients and colleagues, contributing to the development of communication strategies, conducting workplace interviews, facilitating group discussions and representing the organisation.

**Summary of Learning Outcomes**

1. Meet communication needs of clients and colleagues
2. Contribute to the development of communication strategies
3. Conduct interviews
4. Facilitate group discussions
5. Represent the organization

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Meet communication needs of clients and colleagues | * Communication process * Modes of communication * Medium of communication * Effective communication * Barriers to communication * Flow of communication * Sources of information * Organizational policies * Organization requirements for written and electronic communication methods * Report writing * Effective questioning techniques (clarifying and probing) * Workplace etiquette * Ethical work practices in handling communication * Active listening * Feedback * Interpretation * Flexibility in communication | * Interview * Third party reports * Written texts |
| 1. Contribute to the development of communication strategies | * Dynamics of groups * Styles of group leadership * Openness and flexibility in communication * Communication skills relevant to client groups | * Written * Observation |
| 1. Conduct interviews | * Types of interview * Establishing rapport * Facilitating resolution of issues * Developing action plans | * Written * Observation |
| 1. Facilitate group discussions | * Identification of communication needs * Dynamics of groups * Styles of group leadership * Presentation of information * Encouraging group members participation * Evaluating group communication strategies | * Written * Observation |
| 1. Represent the organization | * Presentation techniques * Development of a presentation * Multi-media utilization in presentation * Communication skills relevant to client groups | * Observation * Written |

**Suggested Methods of Instruction**

* Role playing
* Viewing of related videos

**Recommended Resources**

* Desktop computers/laptops
* Internet connection
* Projectors
* Telephone

# 

# DIGITAL LITERACY

**UNIT CODE:** ENG/CU/TFF/BC/02/5/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Digital Literacy

**Duration of Unit:** 45 hours

**Unit Description**

This unit covers the competencies required to demonstrate digital literacy. It involves identifying appropriate computer software and hardware, applying security measures to data, hardware, software in automated environment, applying computer software in solving tasks, applying internet and email in communication at workplace, applying desktop publishing in official assignment and preparing presentation packages.

**Summary of Learning Outcomes**

1. Identify computer software and hardware
2. Apply security measures to data, hardware, software in automated environment
3. Apply computer software in solving tasks
4. Apply internet and email in communication at workplace
5. Apply desktop publishing in official assignments
6. Prepare presentation packages

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify computer hardware and software | * Concepts of ICT * Functions of ICT * History of computers * Components of a computer * Classification of computers | * Written tests * Oral presentation * Observation |
| 1. Apply security measures to data, hardware and software | * Data security and control * Security threats and control measures * Types of computer crimes * Detection and protection against computer crimes * Laws governing protection of ICT | * Written tests * Oral presentation * Observation * Project |
| 1. Apply computer software in solving tasks | * Operating system * Word processing * Spread sheets * Data base design and manipulation * Data manipulation, storage and retrieval | * Oral questioning * Observation * Project |
| 1. Apply internet and email in communication at workplace | * Computer networks * Network configurations * Uses of internet * Electronic mail (e-mail) concept | * Oral questioning * Observation * Oral presentation * Written report |
| 1. Apply desktop publishing in official assignments | * Concept of desktop publishing * Opening publication window * Identifying different tools and tool bars * Determining page layout * Opening, saving and closing files * Drawing various shapes using DTP * Using colour pellets to enhance a document * Inserting text frames * Importing and exporting text * Object linking and embedding * Designing of various publications * Printing of various publications | * Oral questioning * Observation * Oral presentation * Written report * Project |
| 1. Prepare presentation packages | * Types of presentation packages * Procedure of creating slides * Formatting slides * Presentation of slides * Procedure for editing objects | * Oral questioning * Observation * Oral presentation * Written report * Project |

**Suggested Methods of Instruction**

* Demonstration
* Viewing of related videos
* Discussions
* Assignments
* Direct instructions

**Recommended Resources**

* Computers
* Other digital devices
* Printers
* Storage devices
* Internet access
* Computer software

# ENTREPRENEURIAL SKILLS

**UNIT CODE:** ENG/CU/TFF/BC/03/5/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Entrepreneurship

**Duration of unit:** 70 hours

**Unit Description**

This unit covers the competencies required to demonstrate understanding of entrepreneurship. It involves demonstrating understanding of an entrepreneur, entrepreneurship and self-employment. It also involves identifying entrepreneurship opportunities, creating entrepreneurial awareness, applying entrepreneurial motivation and developing business innovative strategies.

**Summary of Learning Outcomes**

* 1. Demonstrate understanding of an entrepreneur
  2. Demonstrate knowledge of entrepreneurship and self-employment
  3. Identify entrepreneurship opportunities
  4. Create entrepreneurial awareness
  5. Apply entrepreneurial motivation
  6. Develop innovative business strategies
  7. Develop Business plan

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Demonstrate knowledge of entrepreneurship and self-employment | * Importance of self-employment * Requirements for entry into self-employment * Role of an Entrepreneur in business * Contributions of Entrepreneurs to National development * Entrepreneurship culture in Kenya * Born or made entrepreneurs | * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Identify entrepreneurship opportunities | * Business ideas and opportunities * Sources of business ideas * Business life cycle * Legal aspects of business * Assessment of product demand * Business environment * Factors to consider when evaluating business environment * Technology in business | * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Create entrepreneurial awareness | * Forms of businesses * Sources of business finance * Factors in selecting source of business finance * Governing policies on Small Scale Enterprises (SSEs) * Problems of starting and operating SSEs | * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Apply entrepreneurial motivation | * Internal and external motivation * Motivational theories * Self-assessment * Entrepreneurial orientation * Effective communications in entrepreneurship * Principles of communication * Entrepreneurial motivation | * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Develop business innovative strategies | * Innovation in business * Small business Strategic Plan * Creativity in business development * Linkages with other entrepreneurs * ICT in business growth and development | * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |
| 1. Develop Business Plan | * Business description * Marketing plan * Organizational/Management * plan * Production/operation plan * Financial plan * Executive summary * Presentation of Business Plan | * Case studies * Individual/group assignments * Projects * Written tests * Oral questions * Third party report * Interviews |

**Suggested Methods of instruction**

* Direct instruction
* Project
* Case studies
* Field trips
* Discussions
* Demonstration
* Question and answer
* Problem solving
* Experiential
* Team training

**Recommended Resources**

* Case studies
* Business plan templates
* Computers
* Overhead projectors
* Internet
* Mobile phone
* Video clips
* Films
* Newspapers and Handouts
* Business Journals
* Writing materials

# EMPLOYABILITY SKILLS

**UNIT CODE:** ENG/CU/TFF/BC/04/5/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Employability Skills

**Duration of Unit:** 50 hours

**Unit Description**

This unit covers competencies required to demonstrate employability skills. It involves conducting self-management, demonstrating interpersonal communication, critical safe work habits, leading a workplace team, planning and organizing work, maintaining professional growth and development, demonstrating workplace learning, problem solving skills and managing workplace ethics.

**Summary of Learning Outcomes**

1. Conduct self-management

2. Demonstrate interpersonal communication

3. Demonstrate critical safe work habits

4. Lead small teams

5. Plan and organize work

6. Maintain professional growth and development

7. Demonstrate workplace learning

8. Demonstrate problem solving skills

9. Demonstrate workplace ethics

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Conduct self-management | 1. Self-awareness 2. Formulating personal vision, mission and goals 3. Strategies for overcoming life challenges 4. Emotional intelligence 5. Assertiveness versus aggressiveness 6. Expressing personal thoughts, feelings and beliefs 7. Developing and maintaining high self-esteem 8. Developing and maintaining positive self-image 9. Articulating ideas and aspirations 10. Accountability and responsibility 11. Good work habits 12. Self-awareness 13. Self-development 14. Financial literacy 15. Healthy lifestyle practices | 1. Written tests 2. Oral questioning 3. Interviewing 4. Portfolio of evidence 5. Third party report |
| 1. Demonstrate interpersonal communication | 1. Meaning of interpersonal communication 2. Listening skills 3. Types of audience 4. Writing skills 5. Reading skills 6. Meaning of empathy 7. Understanding customers’ needs 8. Establishing communication networks 9. Sharing information | 1. Written tests 2. Oral questioning 3. Interviewing 4. Portfolio of evidence 5. Third party report |
| 1. Demonstrate critical safe work habits | 1. Stress and stress management 2. Punctuality and time consciousness 3. Leisure 4. Integratingpersonal objectives into organizational objectives 5. Resources utilization 6. Setting work priorities 7. HIV and AIDS 8. Drug and substance abuse 9. Handling emerging issues | 1. Written tests 2. Oral questioning 3. Interviewing 4. Portfolio of evidence 5. Third party report |
| 1. Lead a small team | 1. Leadership qualities 2. Team building 3. Determination of team roles and objectives 4. Team performance indicators 5. Responsibilities in a team 6. Forms of communication 7. Complementing team activities 8. Gender and gender mainstreaming 9. Human rights 10. Maintaining relationships 11. Conflicts and conflict resolution | 1. Written tests 2. Oral questioning 3. Interviewing 4. Portfolio of evidence 5. Third party report |
| 1. Plan and organize work | 1. Functions of management  * Planning * Organizing  1. Time management 2. Decision making process 3. Task allocation 4. Evaluating work activities 5. Resource utilization 6. Problem solving 7. Collecting and organising information | 1. Written tests 2. Oral questioning 3. Interviewing 4. Portfolio of evidence 5. Third party report |
| 1. Maintain professional growth and development | 1. Opportunities for professional growth 2. Assessing training needs 3. Licenses and certifications for professional growth and development 4. Pursuing personal and organizational goals 5. Identifying work priorities 6. Recognizing career advancement | 1. Written tests 2. Oral questioning 3. Interviewing 4. Portfolio of evidence 5. Third party report |
| 1. Demonstrate workplace learning | 1. Managing own learning 2. Contributing to the learning community at the workplace 3. Cultural aspects of work 4. Variety of learning context 5. Application of learning 6. Safe use of technology 7. Identifying opportunities 8. Generating new ideas 9. Workplace innovation 10. Performance improvement 11. Handling emerging issues 12. Future trends and concerns in learning | 1. Written tests 2. Oral questioning 3. Interviewing 4. Portfolio of evidence 5. Third party report |
| 1. Demonstrate problem solving skills | 1. Problem identification 2. Problem solving 3. Application of problem-solving strategies 4. Resolving customer concerns | 1. Written tests 2. Oral questioning 3. Interviewing 4. Portfolio of evidence 5. Third party report |
| 1. Demonstrate workplace ethics | 1. Meaning of ethics 2. Ethical perspectives 3. Principles of ethics 4. Values and beliefs 5. Ethical standards 6. Organization code of ethics 7. Common ethical dilemmas 8. Organization culture 9. Corruption, bribery and conflict of interest 10. Privacy and data protection 11. Diversity, harassment and mutual respect 12. Financial responsibility/accountability 13. Etiquette 14. Personal and professional integrity 15. Commitment to jurisdictional laws 16. Emerging issues in ethics | 1. Written tests 2. Oral questioning 3. Interviewing 4. Portfolio of evidence 5. Third party report |

**Suggested Methods of Instruction**

1. Demonstrations
2. Simulation/Role play
3. Discussion
4. Presentations
5. Case studies
6. Q&A

**Recommended Resources**

1. Computers
2. Stationery
3. Charts
4. Video clips
5. Audio tapes
6. Radio sets
7. TV sets
8. LCD projectors

# ENVIRONMENTAL LITERACY

**UNIT CODE:** ENG/CU/TFF/BC/05/5/A

**Relationship to Occupational Standards**

This unit addresses the Unit of Competency: Demonstrate Environmental Literacy

**Duration of Unit:** 25 hours

**Unit Description**

This unit describes the competencies required to demonstrate understanding of environmental literacy. It involves controlling environmental hazard, controlling control environmental pollution, complying with workplace sustainable resource use, evaluating current practices in relation to resource usage, identifying environmental legislations/conventions for environmental concerns, implementing specific environmental programs and monitoring activities on environmental protection/programs.

**Summary of Learning Outcomes**

1. Control environmental hazards
2. Control environmental Pollution
3. Demonstrate sustainable use of resource
4. Evaluate current practices in relation to resource usage
5. Identify Environmental legislations/conventions for environmental concerns
6. Implement specific environmental programs
7. Monitor activities on Environmental protection/Programs

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Control environmental hazards | * Purposes and content of Environmental Management and Coordination Act 1999 * Purposes and content of Solid Waste Act * Storage methods for environmentally hazardous materials * Disposal methods of hazardous wastes * Types and uses of PPE in line with environmental regulations * Occupational Safety and Health Standards (OSHS) | * Written test * Oral questions * Observation |
| 1. Control environmental Pollution control | * Types of pollution * Environmental pollution control measures * Types of solid wastes * Procedures for solid waste management * Different types of noise pollution * Methods for minimizing noise pollution | * Written test * Oral questions * Observation |
| 1. Demonstrate sustainable resource use | * Types of resources * Techniques in measuring current usage of resources * Calculating current usage of resources * Methods for minimizing wastage * Waste management procedures * Principles of 3Rs (Reduce, Reuse, Recycle) * Methods for economizing or reducing resource consumption | * Written test * Oral questions * Observation |
| 1. Evaluate current practices in relation to resource usage | * Collection of information on environmental and resource efficiency systems and procedures, * Measurement and recording of current resource usage * Analysis and recording of current purchasing strategies. * Analysis of current work processes to access information and data * Identification of areas for improvement | * Written test * Oral questions * Observation |
| 1. Identify Environmental legislations/conventions for environmental concerns | * Environmental issues/concerns * Environmental legislations /conventions and local ordinances * Industrial standard /environmental practices * International Environmental Protocols (Montreal, Kyoto) * Features of an environmental strategy | * Written questions * Oral questions * Observation |
| 1. Implement specific environmental programs | * Community needs and expectations * Resource availability * 5 s of good housekeeping * Identification of programs/Activities * Setting of individual roles /responsibilities * Resolving problems /constraints encountered * Consultation with stakeholders | * Written questions * Oral questions * Observation |
| 1. Monitor activities on Environmental protection/Programs | * Periodic monitoring and Evaluation of activities * Gathering feedback from stakeholders * Analysing data gathered * Documentation of recommendations and submission * Setting of management support systems to sustain and enhance the program * Monitoring and reporting of environmental incidents to concerned /proper authorities | * Oral questions * Written tests * Practical test * Observation |

**Suggested Methods of Instruction**

* Instructor led facilitation of theory
* Demonstration by trainer
* Viewing of related videos
* Project
* Assignements
* Role play

**Recommended Resources**

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Environmental Management and Coordination Act 1999
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE)
* ISO standards
* Ccompany environmental management systems (EMS)
* Montreal Protocol
* Kyoto Protocol

# OCCUPATIONAL SAFETY AND HEALTH PRACTICES

**UNIT CODE:** ENG/CU/TFF/BC/06/5/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: Demonstrate occupational safety and health practices

**Duration of Unit:** 25 hours

**Unit Description**

This unit specifies the competencies required to identify workplace hazards and risk, identify and implement appropriate control measures and implement OSH programs, procedures and policies/ guidelines

**Summary of Learning Outcomes**

1. Identify workplace hazards and risk
2. Control OSH hazards
3. Implement OSH programs

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify workplace hazards and risks | * Identification of hazards in the workplace and/or the indicators of their presence * Evaluation and/or work environment measurements of OSH hazards/risk existing in the workplace is conducted by * Authorized personnel or agency * Gathering of OHS issues and/or concerns raised | * Oral questions * Written tests * Portfolio of evidence * Third party report |
| 1. Control OSH hazards | * Prevention and control measures, including use of PPE (personal protective equipment) for specific hazards are identified and implemented * Appropriate risk controls based on result of OSH hazard evaluation is recommended * Contingency measures, including emergency procedures during workplace incidents and emergencies are recognized and established in accordance with organization procedures | * Oral questions * Written tests * Portfolio of evidence * Third party report |
| 1. Implement OSH programs | * Providing information to work team about company OHS program, procedures and policies/guidelines * Participating in implementation of OSH procedures and policies/ guidelines * Training of team members and advice on OSH standards and procedures * Implementation of procedures for maintaining OSH-related records | * Oral questions * Written tests * Portfolio of evidence * Third party report |

**Suggested Methods of Instruction**

* Assigments
* Discussion
* Q&A
* Role play
* Viewing of related videos

**Recommended Resources**

* Standard operating and/or other workplace procedures manuals
* Specific job procedures manuals
* Machine/equipment manufacturer’s specifications and instructions
* Personal Protective Equipment (PPE) e.g.
* Mask
* Face mask/shield
* Safety boots
* Safety harness
* Arm/Hand guard, gloves
* Eye protection (goggles, shield)
* Hearing protection (ear muffs, ear plugs)
* Hair Net/cap/bonnet
* Hard hat
* Face protection (mask, shield)
* Apron/Gown/coverall/jump suit
* Anti-static suits
* High-visibility reflective vest

# COMMON UNITS OF LEARNING

## TECHNICAL DRAWING

**UNIT CODE:** ENG/CU/TFF/CC/01/5/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Prepare and interpret technical drawings**

**Duration of Unit:** 75 Hours

**Unit Description**

This unit covers the competencies required to prepare and interpret technical drawings by a Spinning craft person. It involves competencies to select, use and maintain drawing equipment and materials. It also involves producing plain geometry drawings, solid geometry drawings, pictorial and orthographic drawings of components and application of CAD software.

**Summary of Learning Outcomes**

1. Use and maintain drawing equipment and materials
2. Produce plain geometry drawings
3. Produce solid geometry drawings
4. Produce pictorial and orthographic drawings of components
5. Apply CAD software

**Learning Outcomes, Content and Suggested Assessment Methods:**

| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| --- | --- | --- |
| 1. Use and maintain drawing equipment and materials | * Identification and maintain of drawing equipment and materials * Identification and maintain of drawing materials | * Observation * Oral questioning * Written tests |
| 1. Produce plain geometry drawings | * Lettering in drawing * Types of lines in drawings * Construction of geometric forms * Construction of different angles * Measurement of different angles * Standard drawing conventions | * Oral questioning * Written tests * Observation |
| 1. Produce solid geometry drawings | * Interpretation of sketches and drawings of patterns   + Cylinders   + Prisms   + Pyramids * Development of surface of interpenetrating solids and truncated solids * Interpenetrations of solids   + Cylinder to cylinder,   + Cylinder to prism,   + Prism to prism of equal and unequal diameters | * Observation * Written tests * Oral questioning |
| 1. Produce pictorial and orthographic drawings of components | * Meaning of pictorial and orthographic drawings and sectioning * Meaning of symbols and abbreviations * Drawing of isometric, oblique, axonometric, auxiliary and perspective views * Drawing of first and third angle projections * Sectioning of components * Free hand sketching of tools, equipment, components, geometric forms and diagrams | * Observation * Written test * Oral test |
| 1. Produce assembly drawings | * Explosion of orthographic views * Explosion of pictorial views * Identification and listing of parts * Production of sectional views * Hatching of drawings | * Observation * Written test * Oral test |
| 1. Apply CAD software in drawing | * Meaning and types of CAD e.g. * Auto CAD * Archi CAD * Solid works * Inventor * Circuit maker * Electronic work bench * 2D and 3Ddrafting technique * Annotation of models | * Practicals * Observation * Written tests |

**Suggested Methods of Instruction**

* Projects
* Demonstration
* Practice by the trainee
* Field trips
* Group discussions
* Direct instructions

**Recommended Resources**

* + Drawing room
  + Computer lab
  + Drawing equipment and materials
  + Computers
  + CAD package
  + Overhead projector

## ENGINEERING MATHEMATICS

**UNIT CODE:** ENG/CU/TFF/CC/02/5/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Apply engineering mathematics**

Duration of Unit: 75 hours

**Unit Description**

This unit describes the competencies required by a Spinning craft person in order to apply algebra, apply trigonometry and hyperbolic functions, apply complex numbers, apply coordinate geometry, apply calculus, solve ordinary differential equations, carry out mensuration, apply power series, apply statistics, apply numerical methods, apply vector theory and apply matrix.

**Summary of Learning Outcomes**

1. Use concepts of arithmetic in solving work problems
2. Use common formula and algebraic expressions for work
3. Use trigonometry to solve practicals engineering problems
4. Perform estimations, measurements and calculations
5. Apply matrices in work
6. Apply vectors in work
7. Collect, organize and interpret statistical data
8. Apply concepts of probability for work
9. Perform commercial calculations

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| Learning Outcome | Content | Suggested Assessment Methods |
| 1. Use concepts of arithmetic in solving work problems | * Fundamental operations * Addition, * Subtraction, * Multiplication, * Division of positive and negative numbers * Fractions and decimals operations and conversions * Indices * Ratios and proportions * Meaning * Conversions into percentages * Direct and inverse proportions determination * Use of scientific calculator | * Written tests * Oral questioning * Assignments * Supervised exercises |
| 1. Use formulae and algebraic expressions for work | * Algebraic linear equations * Simultaneous * Quadratic * Linear graphs * Plotting * Interpretation * Applications of linear graphs * Curves of first and second degree * Plotting * Interpretation * Applications | * Written tests * Oral questioning * Assignments * Supervised exercises |
| 1. Use trigonometry to solve practicals work problems | * Meaning of trigonometry * Pythagoras theorem * Trigonometry ratios of angles * Trigonometric identities * Conversion of angles | * Assignments * Oral questioning * Supervised exercises * Written tests |
| 1. Perform estimations, measurements and calculations of quantities | * Units of measurements and their symbols * Conversion of units of measurement * Calculation of length, width, height, perimeter, area and angles of figures * Measuring tools and equipment * Performing measurements and estimations of quantities | * Assignments * Oral questioning * Practicals tests * Observation * Supervised exercises * Written tests |
| 1. Apply matrices in work | * Meaning of matrix * Types of matrices * Matrix operations * Compatibility * Addition * Subtraction * Multiplication * Determination of inverse of a matrix * Solution of simultaneous equations with two and three unknowns * Applications of matrices | * Assignments * Supervised exercises * Written tests |
| 1. Collect, organize and interpret statistical data | * Classification of data * Grouped data * Ungrouped data * Data collection * Importance of sampling * Errors in sampling * Types of sampling and their limitations * Tabulation of data * Class intervals * Class boundaries * Frequency tables * Cumulative frequency * Diagrammatic and graphical presentation of data e.g. * Histograms * Frequency polygons * Bar charts * Pie charts * Cumulative frequency curves * Meaning of measures of central tendency * Measures * Properties * Calculation and interpretation of mean, mode and median * Variance and standard deviation | * Assignments * Oral questioning * Supervised exercises * Written tests |
| 1. Apply vectors in work | * Meaning of vector * Representations of vectors * Operations of vectors * Addition * Subtraction * Scalar and vector products * Determination of angles | * Assignments * Supervised exercises * Written tests |
| 1. Apply concepts of probability in work | * Meaning of probability * Types of probability events * Dependent * Independent * Mutually exclusive * Laws of probability * Counting techniques * Permutation * Combination * Tree diagrams * Ven diagrams | * Written tests * Assignments * Supervised exercises |
| 1. Perform commercial calculations | * Product pricing * Average sales determination * Stock turnover * Calculation of incomes * Profit and loss calculations * Salaries * Gross * Net * Wages * Time rate * Flat rate * Overtime * Piece rate * Commission * Percentage * Bonus * Conversion of one currency to another * Exchange rates calculation * Devaluation * Revaluation | * Oral questioning * Written tests * Assignments * Supervised exercises |

**Suggested Methods of Instruction**

* Group discussions
* Demonstration by trainer
* Exercises by trainee

**Recommended Resources**

* Scientific Calculators
* Rulers, pencils, erasers
* Charts with presentations of data
* Graph books
* Dice
* Computers with internet connection

## MECHANICAL SCIENCE PRINCIPLES

**UNIT CODE:** ENG/CU/TFF/CC/03/5/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Apply Mechanical science principles**

**Duration of Unit:** 50 hours

**Unit Description**

This unit describes the competencies required by a spinning craft person in order to apply a wide range of Mechanical science principles in their work. It includes using concepts of mechanical science, determining effects of loading on static and dynamic engineering systems, analyse properties of materials, determine parameters of a fluid system and use of basic systems in power transfer.

**Summary of Learning Outcomes**

1. Use the concept of mechanical science
2. Determine effects of loading in static and dynamic engineering systems
3. Analyse properties of materials
4. Determine parameters of a fluid system
5. Use of basic mechanical systems in power transfer

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Use the concept of mechanical science | * Define work, force, mechanical advantage and efficiency * State and explain newton’s laws of motion * Calculation velocity, distance, and acceleration * Conversion and SI units of energy, power and work | * Written tests * Oral questioning * Assignments * Supervised exercises |
| 1. Determine effects of loading in static and dynamic engineering systems | * Explain type of forces * Discussion and analysis of reaction of forces * Calculation of coefficient of friction and inclined plane * Resolve the forces * Calculate the resultant force and equilibrium * Discuss the application of different forces * Calculation of moments of a force, | * Written tests * Oral questioning * Assignments * Supervised exercises |
| 1. Analyse properties of materials | * Definition of mechanical properties of materials * Draw the stress strain graph * Discuss application of material depending on their properties * Discuss effect of environmental factors on material properties. | * Assignments * Oral questioning * Supervised exercises * Written tests |
| 1. Determine parameters of a fluid system | * Discussion of Pascal’s principles * Measuring fluid parameters * State the laws of gases * Discuss properties of water and steam | * Assignments * Oral questioning * Practicals tests * Observation * Supervised exercises * Written tests |
| 1. Use of basic mechanical systems in power transfer | * Uses and working principle of Gear trains * Uses and working principles of Pulley system, hoists and lifts * Uses and working principles of screws | * Assignments * Supervised exercises * Written tests * Practicals test |

**Suggested Methods of Instruction**

* Group discussions
* Demonstration by trainer
* Online video clips
* Power point presentation
* Exercises by trainee

**Recommended Resources**

* Scientific Calculators
* Relevant reference materials
* Stationeries
* Electrical workshop
* Relevant practical’s materials
* Dice
* Computers with internet connection

FLUID MECHANICS PRINCIPLES

**UNIT CODE: ENG/CU/TEX/CC/04/5/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Apply fluid mechanics principles**

**Duration of Unit:** 90 hours

**Unit Description**

This unit describes the competencies required by a Plant technician in order to apply a wide range of fluid mechanics principles in their work. It includes understanding flow of fluids, demonstrating knowledge in viscous flow, performing dimensional analysis and operating fluid pumps.

**Summary of Learning Outcomes**

1. Understand flow of fluids
2. Demonstrate knowledge in viscous flow
3. Perform dimensional analysis
4. Operate fluid pumps

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Understand flow of fluids | * Flow rate in pipes * Losses in pipes * Causes of losses in pipes * Application of flow loss equations | * Written tests * Oral questioning * Assignments * Supervised exercises |
| 1. Demonstrate knowledge in viscous flow | * Viscous flow between parallel surfaces * Viscous flow equations * Application of viscous flow equations | * Written tests * Oral questioning * Assignments * Supervised exercises |
| 1. Perform dimensional analysis | * Dimensional analysis definition * Principle of dimensional homogeneity * Fundamental dimensions and units * Physical quantities * Application of dimensional analysis | * Assignments * Oral questioning * Supervised exercises * Written tests |
| 1. Operate fluid pumps | * Principle of operation of pumps * Reciprocating pump equation * Centrifugal pump equation * Application of pump equations in problem solving | * Assignments * Oral questioning * Practical tests * Observation * Supervised exercises * Written tests |

**Suggested methods of instructions**

* Group discussions
* Demonstration by trainer
* Online video clips
* Power point presentation
* Exercises by trainee

**Recommended Resources**

* Scientific Calculators
* Relevant reference materials
* Stationeries
* Relevant practical materials
* Dice
* Computers with internet connection

## MATERIAL SCIENCE

**UNIT CODE: ENG/CU/TEX/CC/05/5/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Apply material science principles**

**Duration of Unit:** 90 hours

**Unit Description:**

The learner will be introduced to performing material testing. It involves analysing properties of engineering materials, performing extraction processes, producing iron materials, ceramics, composites and alloys, performing heat treatment, material testing and identifying corrosion and its prevention

**Summary of Learning Outcomes**

1. Analyse properties of engineering materials
2. Perform ore extraction processes
3. Produce iron materials
4. Produce alloy materials
5. Produce non-ferrous materials
6. Produce ceramics materials
7. Produce composite materials
8. Utilise other engineering materials
9. Perform heat treatment
10. Perform material testing
11. Prevent material corrosion

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| * 1. Analyse properties of engineering materials | * Engineering materials is identified as per the procedures * Physical properties of engineering material * Mechanical properties of engineering materials * Crystal structure of materials | * Written tests * Oral questioning * Assignments * Supervised exercises |
| * 1. Perform ore extraction processes | * Safety measures in metal extraction * Method of metal extraction * Procedure in metal extraction processes * Storing of metal Extraction by- products * Disposing extraction by- products | * Written tests * Oral questioning * Assignments * Supervised exercises |
| * 1. Produce iron materials | * Ore smelting processes. * Composition of iron * Method of producing iron material * Refinement processes | * Assignments * Oral questioning * Supervised exercises * Written tests |
| * 1. Produce alloy materials | * Tools and equipment for alloy production * Alloy formation process * Testing alloy products quality | * Assignments * Oral questioning * Practical tests * Observation * Supervised exercises * Written tests |
| * 1. Produce non-ferrous materials | * Extraction of Non-ferrous materials * Smelting and purifying of extracted non-ferrous material * Testing Non-ferrous material * Identifying Alloying elements for non-ferrous materials * Alloy formation process * Testing of Alloys for non-ferrous material | * Assignments * Supervised exercises * Written tests * Practical test |
| * 1. Produce ceramics materials | * Composition of ceramic materials * Manufacturing process for ceramics * Production of Ceramic materials * Finishing processes for ceramic materials | * Assignments * Supervised exercises * Written tests * Practical test |
| 1. Produce composite materials | * Types of composites * Elements involve in composite formation * Formation process of composites * Testing of composite materials | * Assignments * Supervised exercises * Written tests * Practical test |
| 1. Utilise other engineering materials | * Identifying and selecting engineering materials * Developing operation plan * Setting up production machine * Setting production parameters * Production process for engineering materials | * Assignments * Supervised exercises * Written tests * Practical test |
| 1. Perform heat treatment | * Safety practices procedures * Heat treatment processes * Procedure in heat treatment processes * Operations of heat treatment of metals | * Assignments * Supervised exercises * Written tests * Practical test |
| 1. Perform material testing | * Material testing methods * Procedure of material testing * Analysing material testing results * Material testing equipment are taken care of and maintained. | * Assignments * Supervised exercises * Written tests * Practical test |
| 1. Corrosion and its prevention | * Safety observation during corrosion prevention * Corrosion type is identified * Causes of corrosion * Methods of corrosion prevention * Corrosion prevention | * Assignments * Supervised exercises * Written tests * Practical test |

**Suggested methods of instructions**

* Demonstration by trainer
* Discussions
* Practical work by trainee(s)
* Exercises
* Industrial visits
* YouTube for teaching/learning and inspiration
* Simulation
* Power point presentation

**Recommended Resources**

* Measuring tools and gauges
* Marking out tools
* Inspection tools and equipment
* Dressing tools
* Firefighting equipment
* PPEs –dust coat, dust masks, ear muffs, goggles
* First Aid kit
* Brooms and cleaning stuff
* Cleaning detergents
* Drawing papers

# CORE UNITS OF LEARNING

## WOVEN FABRICS

**UNIT CODE:** **ENG/CU/TFF/CR/01/5/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Produce woven fabric**

**Duration of Unit:** 150 hours

**Unit Description**

This unit describes the competencies required by a fabric formation craft person to perform weaving operations. It involves competencies required to identify weaving plan, develop weave design, prepare warp beam, prepare sized beam, perform drawing-in operation, set up weaving machine, prepare weft, produce woven fabric and document weaving production.

**Summary of Learning Outcomes**

1. Identify weaving plan
2. Develop weave design
3. Prepare warp beam
4. Prepare sized beam
5. Perform drawing-in operation
6. Set up weaving machine
7. Prepare weft
8. Produce woven fabric
9. Document weaving production

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Identify weaving plan | * Definition of weaving * Color scheme * Types of yarn packages * Uses of yarn packages * Loom motions * Classification of looms | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Develop weave design | * Weave and weave notation * Sett and count * Warp and weft crimp * Calculation of fabric weight | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Prepare warp beam | * Machinery safety * Purpose of warping * Methods of warping * Warping machines * Warping faults * Warping calculation | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Prepare sized beam | * Workplace safety * Purpose of sizing * Size liquor preparation * Sizing machinery * Sizing faults | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Perform drawing-in operation | * Machinery safety * Methods of drawing-in and denting * Faults in drawing-in and denting * Functions of the reed * Drawing and denting tools and equipment | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Set up weaving machine | * Machinery safety * Classification of looms * Parts of a loom * Primary and secondary motion | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Prepare weft | * Weft feelers * Working principles of weft feelers * Principles of bobbin change mechanism * Weft patterning | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Produce woven fabric | * Introduction to weaving processes * Safety procedures * Machine type * Setting points * Setting tools and equipment * Types of weaving machines * Weaving machine * Operation of weaving machines * Weaving faults and remedies * Weft patterning * Weft replenishment | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Document weaving production | * Weaving production calculation * Documentation tools and equipment * Technical report writing * Filing and data storage | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |

**Suggested methods of instructions**

* Instructor led facilitation of theory
* Illustrative diagrams
* Practical work by trainee(s)
* Group discussions
* Exercises by trainee(s)
* Industrial visits to textile mills, weaving department
* Power point presentation and videos

**Recommended Resources**

* Looms
* Warping machine
* Warp yarns
* Weft yarns
* Point paper
* Woven fabric samples
* Sizing machinery
* Splicer
* Knotting Machine
* Pirn winders
* Cheese winders
* Pick lenses
* Beams
* Size raw materials
* Weaving reference standards and journals
* Stationeries
* Overhead projector/ Black or white board
* Computer and its accessories
* Weighing balance

## KNITTED FABRICS

**UNIT CODE: ENG/CU/TFF/CR/02/5/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Produce knitted fabric**

**Duration of Unit:** 140 hours

**Unit description**

This unit describes the competencies required by a fabric formation craft person to perform knitting operations. It involves competencies required to prepare raw material for knitting, prepare weft for knitting, prepare warp beam for knitting, set up knitting machines, produce knitted fabric, repair yarn related-faults and document knitting production.

**Summary of Learning Outcomes**

1. Prepare raw material for knitting

2. Prepare weft for knitting

3. Prepare warp beam for knitting

4. Set up knitting machines

5. Produce knitted fabric

6. Repair yarn related-faults

7. Document knitting production

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Prepare raw material for knitting | * Introduction to knitting * Yarn properties * Methods of knitting | * Practical * Observation * Written tests * Oral * Individual assignments * Group assignments |
| 1. Prepare weft for knitting | * Weft knitting * Fabric design * Weft knitting machines | * Observation * Written tests * Oral * Practical * Individual assignments * Group assignments |
| 1. Prepare warp beam for knitting | * Safety precautions in warping * Warp knitting * Fabric design * Warp knitting machines * Procedure for warping * Types of warping * Warp knitting machines * Warping faults and there remedies | * Practical * Oral * Observation * Written tests * Individual assignments * Group assignments |
| 1. Set up knitting machines | * Safety precautions in knitting * Importance of knitting * Identification of knitting elements * Types of knitting machines * Knitting principles * knitting needles * Knitting machine setting points * Knitting machine parts | * Practical * Oral * Observation * Written tests * Individual assignments * Group assignments |
| 1. Produce knitted fabric | * Machinery safety * Knitting machines * Procedure operating knitting machine * Knitting machine maintenance | * Practical * Oral * Observation * Written tests * Individual assignments * Group assignments |
| 1. Repair yarn related-faults | * Knitting faults * Engineering materials, tools and equipment * Knotting and tying | * Practical * Oral * Observation * Written tests * Individual assignments * Group assignments |
| 1. Document knitting production | * Knitting production calculation * Documentation tools and equipment * Technical report writing * Filing and data storage | * Practical * Oral * Observation * Written tests * Individual assignments * Group assignments |

**Suggested methods of instructions**

* Demonstration by trainer
* Practical work by trainee(s)
* Knitting exercises by trainee
* Industrial visits to textile knitting plants
* Power point presentation

**Recommended Resources**

* Knitting machine
* Knitted fabric samples
* Yarns
* Needles
* Tapestry needles
* Lubricants
* Crochet hook
* Log book
* Measuring Tape
* PPEs
* Stitch Holders
* Swift and Winder
* Yarn Guide
* Yarn Bobbins
* Yarn Threader
* Beams
* Knitting reference standards and journals
* Stationeries
* Overhead projector/ Black or white board
* Computer and its accessories
* Weighing balance

## NON-WOVEN FABRICS

**UNIT CODE:** ENG/CU/TFF/CR/03/5/A

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Produce non-woven fabric**

**Duration of Unit:** 150 hours

**Unit Description**

This unit describes the competencies required by a fabric formation craft person to perform non-woven operations. It involves competencies required to produce fiber web, produce non-woven fabric, carry out nonwoven fabric finishing and document non-woven production.

**Summary of Learning Outcomes**

1. Produce fiber web
2. Produce non-woven fabric
3. Carry out nonwoven fabric finishing
4. Document non-woven production

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Produce fiber web | * Introduction to non-woven * Methods of fibre laying * Fibre properties * Filament fibres * Web formation * Operation and setting of fibre laying machines * Fibre laying procedures * Fibre laying techniques * Web laying methods | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Produce non-woven fabric | * Machinery Safety * Non-woven manufacturing methods * Areas of application * Non-woven machines * Bonding techniques * Non-woven fabric defects | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Carry out nonwoven fabric finishing | * Ways of finishing nonwovens * Types of finishes * Purposes of finishing * Finishing of non-woven fabric * Non-woven finishing machines * Operation and setting procedures of nonwoven finishing machines * Finished nonwoven fabric process monitoring and control | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Document non-woven production | * Non-woven production calculation * Documentation tools and equipment * Technical report writing * Filing and data storage | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |

**Suggested methods of instructions**

* Theory facilitated by trainer
* Demonstration by trainer
* Practical work by trainee(s)
* Group discussions
* Exercises by trainee(s)
* Field trips to textile mills

**Recommended Resources**

* Bonding machine
* Non-woven machine
* Laying machines
* Extruders
* Filament yarns
* Fibres
* Resins
* Non-woven samples
* Stationeries
* Overhead projector/ Black or white board
* Computer and its accessories
* Weighing balance

## MACHINE MAINTENANCE

**UNIT CODE:** **ENG/CU/TFF/CR/04/5/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **Perform machine maintenance**

**Duration of Unit:** 150 hours

**Unit Description**

This unit describes the competencies required by a fabric formation craft person to perform machine maintenance. It involves competencies required to maintain fabric formation machine, adjust fabric formation machine parts, and repair fabric formation machine and document maintenance operation.

**Summary of Learning Outcomes**

1. Maintain fabric formation machine
2. Adjust fabric formation machine parts
3. Repair fabric formation machine
4. Document maintenance operation

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Maintain fabric formation machine | * Machinery safety * Electrical safety * Introduction to maintenance * Types of maintenance * Knitting machines * Weaving machine * Non-woven machines * Workshop tools * Fasteners, sealant and cleaning liquid | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Adjust fabric formation machine parts | * Machinery safety * Electrical safety * Mechanical systems * Electrical systems * Lubrication systems | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Repair fabric formation machine | * Safety * Knitting machines * Weaving machine * Non-woven machines * Machine installation * Machine parts * Maintenance inventory management | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |
| 1. Document maintenance operation | * Documentation tools and equipment * Technical report writing for maintenance * Filing and data storage | * Oral questions * Written tests * Observation * Practical * Individual assignments * Group assignments |

**Suggested methods of instructions**

* Assignments to trainee(s)
* Demonstration by trainer
* Industrial visits to textile mills
* PowerPoint presentation and videos
* Practical demonstration by trainee(s)
* Illustrative diagrams and flow charts
* Discussion and focus groups

**Recommended Resources**

* Oil
* Grease
* Lubricants
* Cutter
* Dropper
* Knotter
* Nipper
* Comb
* Pick counting glass
* Trolley
* Rewinding machine
* Weaving machine
* Warping machines
* Knitting machines
* Drawing-in machines
* Sizing machine
* Bobbin winding
* Non-woven machines
* Stationeries
* Overhead projector/ Black or white board
* Computer and its accessories
* Weighing balance

## FABRIC TESTING AND INSPECTION

**UNIT CODE:** **ENG/CU/TFF/CR/05/5/A**

**Relationship to Occupational Standards**

This unit addresses the unit of competency: **perform fabric testing & inspection**

**Duration of Unit:** 150 hours

**Unit Description**

This unit describes the competencies required by a fabric formation craft person to perform fabric testing & inspection. It involves competencies required to select grey fabric, set up machine, inspect grey fabric, grade grey fabric, test processed fabric, and inspect finished fabric and document fabric inspection.

**Summary of Learning Outcomes**

1. Select Grey fabric
2. Set up machine
3. Inspect grey fabric
4. Grade grey fabric
5. Test processed fabric
6. Inspect finished fabric
7. Document fabric inspection

**Learning Outcomes, Content and Suggested Assessment Methods**

|  |  |  |
| --- | --- | --- |
| **Learning Outcome** | **Content** | **Suggested Assessment Methods** |
| 1. Select Grey fabric | * Introduction to grey fabric inspection * Types of fabrics * Characteristics of fabric * Sampling methods * Fabric reference standards | * Individual assignments * Group assignments * Oral questions * Written tests * Observation * Practical |
| 1. Set up machine | * Machinery safety * Inspection table * Inspection tools and equipment | * Individual assignments * Group assignments * Oral questions * Written tests * Observation * Practical |
| 1. Inspect grey fabric | * Safety * Grey fabric faults * Purpose of grey fabric inspection * Fault remedies techniques | * Individual assignments * Group assignments * Oral questions * Written tests * Observation * Practical |
| 1. Grade grey fabric | * Grey fabric properties * Grey fabric faults and causes * Grading criteria and methods | * Individual assignments * Group assignments * Oral questions * Written tests * Observation * Practical |
| 1. Test processed fabric | * Safety operations * Processed fabric testing equipment * Equipment operation * Processed fabric properties * Processed fabric defects * Processed fabric test * Processed fabric reference standards * Sampling methods | * Individual assignments * Group assignments * Oral questions * Written tests * Observation * Practical |
| 1. Inspect finished fabric | * Safety operations * Finished fabric testing equipment * Equipment operation * Finished fabric properties * Finished fabric defects * Finished Fabric defect mending * Finished fabric grading * Finished fabric reference standards * Sampling methods | * Individual assignments * Group assignments * Oral questions * Written tests * Observation * Practical |
| 1. Document fabric inspection | * Documentation tools and equipment * Technical report writing * Fabric inspection reference standards * Documentation of testing results * Filing and data storage | * Individual assignments * Group assignments * Oral questions * Written tests * Observation * Practical |

**Suggested methods of instructions**

* Demonstration by trainer
* Practical work by trainee(s)
* Grey fabric inspection exercises by trainee
* Processed fabric test exercises by trainee
* Finished fabric inspection exercises by trainee
* Industrial visits to fabric testing & inspection laboratories
* Industrial visits to textile mills

**Recommended Resources**

* Grey fabric sample
* Processed fabric
* Finished fabric
* Nipper
* Pointer
* Comb
* Fault marker
* GSM cutter
* Magnifying glass
* Ends, picks per inch counter
* Needle
* Inspection table
* Inspection machine
* Inspection laboratory
* Stationeries
* Overhead projector/ Black or white board
* Computer and its accessories
* Weighing balance