



MCAST

Malta College of Arts, Science & Technology

MQF Level 2

GZ2-01-19G

Foundation Certificate in Engineering Skills

Course Specification

Course Description

This course exposes learners to a number of diverse engineering disciplines and trades. It comprises vocational study-units covering basic Electrical Installation and Electronics, Mechanical Engineering, Welding and Fabrication and Woodwork.

The programme includes elements of vocational theory and practice that will help learners acquire the knowledge, skills and competences in these vocational areas and form a clear idea of the nature of diverse vocational options that they can pursue at higher levels. Learners will gain experience in the use of tools, materials and engineering processes. This programme also enables learners to improve their key skills which will be embedded in the vocational content.

Programme Learning Outcomes

At the end of the programme the learner will be able to:

- 1. Understand the basic principles of electrical engineering and installation, mechanical engineering, woodwork, welding and fabrication.*
- 2. Apply basic marking and measuring techniques and use hand tools effectively and safely to carry out specific practical tasks in a workshop environment.*
- 3. Read, understand and produce basic engineering drawings.*
- 4. Apply key competences (mathematics, language communication, science and information technology) within a contextualised environment in engineering*

Entry Requirements

- Finished Compulsory Education; or
- MCAST Introductory Certificate

Other Entry Requirements

- Initial Assessment Tests
- Applicants with SEC/OLevel passes at Grades 6 or 7 in at least two subjects from Maltese, English Language and Mathematics or “Secondary School Certificate and Profile” (SSC&P) at Level 1 or 2 will be exempted from the Initial Assessment Tests and will start directly at Level 2.

Current Approved Programme Structure

Unit Code	Unit Title	ECVET/ECTS
ETELE-206-1407	Electrical & Electronics Theory and Practice	6
ETWWK-206-1401	Woodwork	6
ETMEC-206-1404	Basic Milling, Bench Fitting and Turning Techniques	6
ETW&F-206-1401	Welding and Fabrication	6
CDKSK-206-2006	Mathematics	6
CDKSK-206-2004	English	6
CDKSK-206-2005	Malti	6
CDKSK-206-2007	Information Technology	6
CDLSK-206-1912	Individual and Social Responsibility	6
CDKSK-206-2008	Science	6
Total ECVET/ECTS		60

Unit: ETELE-206-1407 - Electrical & Electronics Theory and Practice

Unit level (MQF): 2
Credits : 6

Unit Description

This unit covers the basics of electrical and electronics theoretical principles and practice, and the rehearsal of previously acquired knowledge required for the continuation of learning at Level 2. The assumption is that learners have no previous related knowledge background.

The content of this unit fills in the gaps and makes the acquisition of functional skills in Mathematics, Science and Technology, English, and IT easier. The unit transfers trade-specific skills and knowledge, so that learners can explain how electricity is applied in practice, in electrical tools, and also the installation of equipment and electronic devices.

Theory and practice encompassed by the unit cover the basic electrical theory and the application of the subject's content is outcome-based. Learners will become aware of the origins and effects of electricity. They will be able to solve basic electrical-related problems and apply plain scientific facts in understanding the technology and practice of electrical and electronic components and devices.

Learners are requested to have a basic understanding of technology (electro-mechanical) principles and be able to systematically carry out basic mathematical calculations and conversions, manual and practical skills, and use common-sense logic and awareness.

Learning Outcomes

On completion of this unit the learner will be able to

- 1. Recognise the principles and effects of electricity;*
- 2. Solve electrical-related problems with practical implications;*
- 3. Identify electrical and electronic components, devices, equipment, tools, drawings and parts.*

Unit: ETWWK-206-1401 - Woodwork

Unit level (MQF): 2
Credits : 6

Unit Description

This unit introduces students to basic woodworking practices. The unit will approach the subject from both the practical and the technological aspects, with more emphasis placed on the practical side of the trade. The technological lessons will deal with, different types of materials used currently, the difference between soft and hard woods, the identification and safe use of basic hand tools, Personal protective equipment, power tools and main fasteners. Work drawings will be used to extract information to manufacture basic joints and finally to draw a workshop rod complete with a cutting list.

During the practical lessons the students will be taught how to execute basic joints (housing and halving joints), using hand tools effectively and safely. As a final exercise the students will produce a task, made up of different components, comprising the basic joints, which will finally be sanded down and varnished.

Learning Outcomes

On completion of this unit the learner will be able to

1. *Describe and discuss materials for carpentry and joinery, and the use of hand tools.*
2. *Demonstrate skills of making/reading a drawing and completing a range of well-defined tasks.*
3. *Understand facts and procedures of job risks and eliminate them using PPE.*
4. *Make simple joints for a door/window, etc. according to proposed task in safe working conditions with responsibility for the quality of made items.*

Unit: ETMEC-206-1404 - Basic Milling, Bench Fitting and Turning Techniques

Unit level (MQF): 2
Credits : 6

Unit Description

This unit will provide the basic knowledge about manufacturing methods for engineering materials including the principles of the manufacturing processes, machinery, tools, instrumentation and product quality. It covers the basic skills and knowledge needed to produce mechanical parts complying with the required accuracy and surface standards. Learners will acquire the basic of engineering knowledge, be able to apply this knowledge and carry out limited range of simple manufacturing projects. This unit will comprise the following: knowing the basic milling techniques and bench-fitting techniques; classifying and applying basic turning operations, tools and tool materials; knowing and applying turning techniques; becoming familiar with the measurement methods and measurement equipment.

Learning Outcomes

On completion of this unit the learner will be able to

1. *Know and apply the basic milling techniques;*
2. *Know and apply bench fitting techniques;*
3. *Classify and apply basic turning operations, tools and tool materials;*
4. *Know and apply turning techniques;*
5. *Know and apply measurement methods, marking out and related equipment.*

Unit: ETW&F-206-1401 - Welding and Fabrication

Unit level (MQF): 2
Credits : 6

Unit Description

Welding and fabricating are basic activities with metals in construction, in the workshop and on site. There are different welding techniques for joining metal parts and they depend on the nature of the material as well as its thickness. Basic welding techniques covered in this unit are electric arc and gas welding.

This unit explores the materials, tools, equipment and working techniques used to perform welding tasks in a safe manner. The unit focuses on hand tools, basic portable power tools, access equipment, personal protective equipment (PPE) and safe work techniques.

The aim of this unit is to provide learners with knowledge of different types of materials commonly used in metal constructions, their properties and with the knowledge on how to select metals for given practical applications throughout the unit delivery.

The unit covers the technology that underpins welding processes, and the basic principles of welding will be covered as well. Learners will have the opportunity to apply their knowledge producing simple joints using welding technology in the workshop.

Learning Outcomes

On completion of this unit the learner will be able to

1. *Identify and select appropriate tools, materials and consumables, and joints preparations to perform MMA and Gas welding tasks in a safe manner;*
2. *Produce MMA and Gas welding tasks in a safe manner;*
3. *Identify and select appropriate tools and materials for sheet metal fabrication tasks, and fabricate simple components from sheet metal in a safe manner.*