



MCAST

Malta College of Arts, Science & Technology

MQF Level 2

AS2-01-19

**Foundation Certificate in Applied Science
Course Specification**

Course Description

The programme gives students who are in possession of the Secondary School leaving certificate, the opportunity to progress to a number of science related areas including health sciences industrial sciences and environmental sciences. Besides the key skills subjects, namely English, Maltese, Mathematics, IT and Personal Development, the student will learn the basics of physics, chemistry and biology. The course will focus on the applied use of these subjects in areas such as in the study of living systems and energy applications. This programme is particularly suitable for students who have a scientific or technical aptitude, even if they have not fully decided upon their ultimate choice of career

Programme Learning Outcomes

At the end of the programme the students is able to

1. *Understand what skills and qualities are required for jobs in the science sector.*
2. *Make accurate scientific observations and measurements in given situations.*
3. *Describe the main factors that affect the health of individuals.*
4. *Understand some of the factors that influence scientific progress.*

Entry Requirements

- Finished Compulsory Education; or
- MCAST Introductory Certificate

Other Entry Requirements

- Initial Assessment Tests
- Applicants with SEC/O-Level 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 Title	ECVET
Energy, Waves and Radiation	6
The study of Living Systems	6
Causes of Diseases and Maintaining an Healthy Living	6
Fundamentals of Chemistry Investigations	6
Mathematics	6
English	6
Malti	6
Information Technology	6
Individual and Social Responsibility	6
Science	6
Total ECVET	60

Unit: Energy, Waves and Radiation

Unit level (MQF): 2

Credits : 6

Unit description

In this unit students will be introduced to fundamental principles of physics in the areas of energy, waves, radiation and exploration of outer space. Electrical power is used in many industrial devices as well as domestic appliances.

Students should gain hands-on experience of using practical devices and test instruments in a safe manner, become familiar with the different types of energy and their ways of transformation. Students get knowledge about different sources of energy, beneficial applications of waves and radiation, as well as ways of protection from the latter.

Students should also learn about the technology of space exploration, such as telescopes, satellites and robotics. Ultimately, students will be given an overview of the importance of different instruments (telescopes, satellites, space shuttles) that enable a better insight into the world around us.

No previous scientific knowledge is required.

Students will acquire the knowledge of energy stores and transfers. They will be introduced to the procedures for setting up electric circuits and measuring different parameters (e.g. current). The learning will be performed through the practical experience that encompasses constructing a simple circuit and learning how to use electrical devices in a safe manner (e.g. ammeter and voltmeter).

Types of ionizing radiation and their applications will be illustrated with examples (e.g. ionizing, X-ray) as well as accompanied with safety notices on protection from negative effects.

Learning Outcomes

On completion of this unit learners should be able to:

1. *Explain the procedures of energy stores and energy transfers.*
2. *Describe the applications of waves and radiation.*
3. *Perform measurements by using electrical devices and test instruments in a safe manner.*
4. *Describe different methods and technology used to explore space.*

Unit: The Study of Living Systems

Unit level (MQF): 2

Credits : 6

Unit description

The focus of this unit is on the cell as the primary building block of life. Students will become familiar with the basic cellular structure, different types of specialised cells and tissues. Additionally, ways of communication between cells (proximal - nervous system, distal - endocrine system) and concept of homeostasis are introduced. Students should develop an understanding of adaptations of organisms to their environment, as well as the human influence on ecosystems. They will learn about genes, inheritance and variations. Also, basic terminology related to the study of living systems is considered.

This unit introduces the fundamentals for biology related disciplines, including applied biosciences, healthcare, agriculture, horticulture, food science, ecology and other biology-related industries and services.

The unit follows the basics introduced in the Level 1, Unit 2: Introduction to Life Science. However, it is not a pre-requisite for this unit.

Students should learn about cells, tissues, organs and organ systems. Each level of structure will be studied in depth and students should be able to understand the meaning and the use of specific terminology related to eukaryotic organisms.

Furthermore, students will expand their knowledge on how organisms interact with their environment, as well as how the environment and genetics affect an organism

Learning Outcomes

On completion of this unit learners should be able to:

- 1. Understand the cells as the building blocks of life that carry out vital functions in living organisms.*
- 2. Describe the interactions between organisms and their environment.*
- 3. Understand the role of genes in inheritance and variations.*

Unit: Causes of Diseases and Maintaining a Healthy Living

Unit level (MQF): 2

Credits : 6

Unit description

This unit aims to provide students with an understanding of the most significant factors which can improve or harm human health, and increase their awareness of the causes of particular diseases. Students should recognise the symptoms of common diseases and life threatening states to be able to suggest appropriate professional care. The focus will be on the most common diseases in the Maltese Islands, including cardiovascular diseases, diabetes, and cancers, their causes as well as their prevention (e.g. infections and hygiene). This will increase students' awareness of their personal health and lifestyle, as well as their knowledge of communicable diseases in developing countries. No previous knowledge is required.

Students will become familiar with the term “health as an absence of disease” by studying the causes of different diseases, their diagnosis, prevention and treatment. Some of these objectives will be achieved by analysing students' personal experiences (e.g. hygiene).

Learning Outcomes

On completion of this unit learners should be able to:

1. *Recognize the terms concerned with health and disease.*
2. *Deal with the factors that influence the individual health.*
3. *Analyze the causes of diseases.*
4. *Advise appropriate professional care.*

Unit: Fundamentals of Chemistry Investigations

Unit level (MQF): 2

Credits : 6

Unit description

This unit will enable students to acquire knowledge of fundamental chemistry concepts and focus on safety in the laboratory. The unit covers fundamentals of chemistry, including classification of chemicals (e.g. elements and periodic table: metals and non-metals, bonding: covalent and ionic, etc.), properties of materials, simple chemical reactions, waste and pollution and their effect on the environment and society, with an emphasis on safe management of chemicals within the work environment.

The practical part of this unit should focus on familiarising students with basic laboratory equipment, apparatus, and other materials, improving their language skills and facilitating communication within the work environment. At this level, students should develop the necessary skills and techniques required to follow general laboratory procedures and processes, including the use of correct chemical terms (e.g. symbols, physical state).

No previous knowledge of chemistry is required.

Students will become familiar with the classification of chemical elements by studying the periodic table and atomic structure, including ionic and covalent bonding, and the main factors involved in chemical reactions. The knowledge of chemical reactions will be enhanced by laboratory sessions.

Furthermore, students will become aware of possible future use of different natural resources in the Maltese Islands (e.g. biodiesel, hydrogen and bio ethanol).

Learning Outcomes

On completion of this unit learners should be able to:

1. *Understand how chemical elements are classified.*
2. *Understand the main factors involved in chemical reactions.*
3. *Identify useful natural resources to be used as potential future fuels.*
4. *Synthesise useful chemical products from given starting materials by following good laboratory practices.*