



# MCAST

Malta College of Arts, Science & Technology

MQF Level 3

AG3-02-19

Diploma in Fish Husbandry

Course Specification

## **Course Description**

This course introduces the student to the basics of fish husbandry. It provides the knowledge and skills required by the student for eventual entry into related work places such as the fish farming and the aquatics industry.

Being the only course in Malta solely dedicated to fish husbandry, this programme offers an excellent opportunity for employment in this industry, which is an important economic sector in the Maltese islands.

The student will develop the knowledge and practical skills needed, provided one attends all practical sessions which will be vital to back up the theoretical knowledge gained during lectures.

## **Programme Learning Outcomes**

At the end of the programme the students are able to:

- 1. Perform simple techniques in fish handling and feeding.*
- 2. Perform simple techniques in pet fish care.*
- 3. Perform monitoring and simple analysis of water for fish farming and pet fish breeding.*
- 4. Make use of standard tools and equipment in line with safety procedures.*

## **Entry Requirements**

- MCAST Foundation Certificate; or
- 2 SEC/O-Level/SSC&P (level3) passes. Preferred L Biology and English Language
- A full “Secondary School Certificate and Profile” (SSC&P) at Level 2 will be accepted in lieu of one (1) O-Level pass

## Current Approved Programme Structure

| Unit Title  | ECVET     |
|---|-----------|
| The Marine Environment and Commercial Fishing Ecology | 6         |
| Fish Farming  | 6         |
| Water Quality in Fish Farming                         | 6         |
| Fish Biology  | 6         |
| Fish Health   | 6         |
| Pet Water Fish Care                                   | 6         |
| Mathematics   | 4         |
| English   | 4         |
| Malti   | 4         |
| Information Technology                                | 4         |
| Individual and Social Responsibility                  | 4         |
| Science and Technology                                | 4         |
| <b>Total ECVET</b>                                    | <b>60</b> |

## Unit: The Marine Environment and Commercial Fishing Ecology

Unit level (MQF): 3

Credits : 6

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### Unit description

The marine environment of the Mediterranean is a key factor for the development of two fishery sectors: (1) commercial fishing and (2) fish farming. Understanding of the environment and its basic features is a prerequisite for an efficient fishery business. Hence, at the start of this unit learners will be introduced to ecosystems of the Mediterranean, including their habitats and communities.

In addition, learners will learn about surveying techniques in fishery and basic related equipment. They will acquire the knowledge about the main physical, chemical and biological parameters of sea water. They will be able to perform water sampling and analysis as well as interpret the achieved results. Since fishery and aquaculture are important and developing sectors of the Maltese economy, with opportunities for further development in the future, learners will get informed about the economic importance of commercial fishing.

Moreover, learners will acquire knowledge about the economic and production features of this sector. In addition, the fish species targeted by fishermen in Malta will be examined within the unit.

### Learning Outcomes

On completion of this unit learners should be able to:

1. *Know a wide range of floral and faunal species of different marine ecosystems.*
2. *Understand the relationships between the different components of a range of marine ecosystems.*
3. *Know how to survey a water body.*
4. *Understand the importance of fishing for the Maltese Islands.*
5. *Know a wide range of fish species targeted by fishermen.*

## Unit: Fish Farming

**Unit level (MQF):** 3

**Credits :** 6

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### Unit description

The goal of this unit is to familiarise learners with fish farming in seawater. Commercial seawater fish farming has been developing since the 1960s in the Mediterranean countries and in many of them it became an important export-oriented business.

In the introduction part of this unit, learners will be introduced to the most common fish species for fish farming and their economic significance for the fish farming business.

Learners will be acquainted with key features of different fish farming systems such as intensive, extensive and recycle aquaculture systems (RAS). Special emphasis will be given to intensive fish farming of sea bass, sea bream, and tuna fish.

In relation to intensive fish farming techniques, learners will learn about the processes of propagation and spawn production, the methods of fish rearing including the kinds of fish feed, feeding procedures of farming fish, and food conversion. This unit will introduce learners with elementary requirements of fish for space and water quality. Moreover, the topics related to the harvesting of market-ready fish and slaughter methods will be presented. Learners will be informed about the equipment, vessels and jobs specific for fish farming. In addition; the unit content includes information about important legal requirements in fish farming.

Since the stocking in tuna fish farming is based on wild catch of small tuna, learners will also be introduced to the process of catching and towing of young tuna to the fish farm.

### Learning Outcomes

**On completion of this unit learners should be able to:**

1. *Understand the main phases of fish farming for different species.*
2. *Describe common types of feed and fish's requirements for food.*
3. *Understand the principles of production of closed-cycle production species.*
4. *Describe the types of vessels and jobs in fish farming.*
5. *Interpret important legal requirements in fish farming.*

## Unit: Water Quality in Fish Farming

Unit level (MQF): 3

Credits : 6

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### Unit description

Fish farming and commercial landing of fish is influenced by many natural factors - especially by the quality of water. The water quality is particularly crucial for intensive fish farming.

In this unit learners will be introduced to the main aspects of seawater quality with an emphasis on its importance for fish farming.

Hence, learners will be provided with the elementary knowledge about the chemical characteristics of seawater that includes chemical composition, dissolved gasses and main chemical processes.

Additional topic that will be considered within this unit is related to the physics of seawater: salinity, density, temperature and optical characteristics. Learners will also learn about biological content of seawater, i.e. beneficial and harmful organisms and microorganisms in aquaculture. They will also be introduced to simple water observing and water analysis techniques by using common tools and equipment.

Moreover, the unit will offer the knowledge about the regular procedures and measures for maintaining the water quality in fish farming.

### Learning Outcomes

On completion of this unit learners should be able to:

1. Describe the chemical characteristics of water which are significant for fish farming and rearing.
2. Explain the main physical properties of water important in fish farming and rearing.
3. Describe beneficial and harmful biological agents living in water which are vital for fish farming and rearing.
4. Understand the water analysis process for the most important chemical, biological and physical factors.
5. Explain the regular measures for the sustaining of water quality.

## Unit: Fish Biology

**Unit level (MQF):** 3

**Credits :** 6

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### Unit description

This unit provides learners with the knowledge of fish-specific biology which is necessary for the understanding of concepts such as genetics, breeding, propagation and nutrition.

In this unit learners will also gain the basic knowledge about fish taxonomy in Maltese, English and Latin.

The unit includes the topics that examine anatomy and morphology of the most important fish farming species. Also, learners will learn about physiology and histology related to the fish species. The main principles of genetics, embryology and reproduction process, will also be considered in this unit. Moreover, the unit contains the topics that refer to the digestion system of fish, as well as information about nutrition and nutrients required in fish breeding.

Learners will obtain the necessary knowledge in regard to the listed topics in order to understand the reproduction, growth, and nutrition of the most common species in aquaculture.

### Learning Outcomes

On completion of this unit learners should be able to:

1. *Understand fish taxonomy and the division of fish species.*
2. *Describe the main fish organs and their function for the most important fish species.*
3. *Understand the principles of genetics and inheritance in fish.*
4. *Describe the reproduction cycles of a range of fish.*
5. *Explain the digestion process and the role of fish nutrients.*

## Unit: Fish Health

Unit level (MQF): 3

Credits : 6

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### Unit description

This unit will acquaint learners with fish health issues. Learners will become familiar with basics of fish haematology and pathology to be able to cope with fish health problems and disorders. This includes basic knowledge of causes of diseases and disorders, the unit will also introduce learners to preventive and healing treatments in case of common diseases, nutritional disorders and parasite attacks. Additionally, learners will be informed about the operational principles of main tools and utensils used in fish health procedures.

Learners will be able to observe and spot health problems. Also, they will be able to prevent uncontrolled expansion of the problem and to report the observations of fish condition to the experienced staff responsible for fish healing and recovery.

Learners will also be introduced to the ethical, sanitary and safety aspects regarding fish health.

### Learning Outcomes

On completion of this unit learners should be able to:

1. *Explain the vital health parameters for healthy fish.*
2. *Describe the most common fish diseases, disorders, and parasites.*
3. *Explain the basic routines for prevention and treatment in fish husbandry.*
4. *Understand the main ethical, sanitary and safety standards related to fish health.*
5. *Describe the main tools and utensils used in fish health routines.*



## Unit: Pet Water Fish Care

**Unit level (MQF):** 3

**Credits :** 6

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### Unit description

The aim of this unit is to familiarise learners with the basics of pet fish care. They will learn about the different aspects of the business to be able to perform simple routines in pet fish care.

Learners will be introduced to the main segments of pet fish business that includes breeding, maintenance and care. The unit will give an overview of the basic morphology of the most common species, emphasising differential traits of particular species, as well as fish requirements in regard to feed, main meals and feeding techniques.

Furthermore, the unit will consider keeping conditions, such as space, temperature and water characteristics. The learners will acquire the knowledge about pet fish care techniques which include cleaning of aquariums and equipment, as well as handling of fish. Learners will also upgrade their knowledge with the topics regarding typical flora and fauna used for water purification and cleaning or decoration in pet fish business.

Moreover, learners will learn about containers, tools and equipment used in keeping of pet fish.

### Learning Outcomes

On completion of this unit learners should be able to:

1. *Describe the different pet fish species.*
2. *Understand pet fish requirements for feed, housing and other abiotic factors.*
3. *Explain ordinary fish care routines.*
4. *Understand the requirements for the setting up of a freshwater aquarium.*