

**The Further Education and Training Awards Council (FETAC)  
was set up as a statutory body on 11 June 2001  
by the Minister for Education and Science.  
Under the Qualifications (Education & Training) Act, 1999,  
FETAC now has responsibility for making awards  
previously made by NCVA.**



**Module Descriptor**

# **Marine Engineering Processes**

**Level 5 C20226**

**[www.fetac.ie](http://www.fetac.ie)**

## Level 5 Module Descriptor

### Summary of Contents

|  |   |
|--|---|
| <b>Introduction</b>                        | Describes how the module functions as part of the national vocational certificate framework.  |
| <b>Module Title</b>                        | Indicates the module content. This title appears on the learner's certificate. It can be used to download the module from the website <a href="http://www.fetac.ie">www.fetac.ie</a> .  |
| <b>Module Code</b>                         | An individual code is assigned to each module; a letter at the beginning denotes a vocational or general studies area under which the module is grouped and the first digit denotes its level within the national vocational certificate framework.               |
| <b>Level</b>                               | Indicates where the module is placed in the national vocational certificate framework, from Level 3 to Level 6.   |
| <b>Credit Value</b>                        | Denotes the amount of credit that a learner accumulates on achievement of the module.   |
| <b>Purpose</b>                             | Describes in summary what the learner will achieve on successfully completing the module and in what learning and vocational contexts the module has been developed. Where relevant, it lists what certification will be awarded by other certification agencies. |
| <b>Preferred Entry Level</b>               | Recommends the level of previous achievement or experience of the learner.  |
| <b>Special Requirements</b>                | Usually 'none' but in some cases detail is provided here of specific learner or course provider requirements. There may also be reference to the minimum safety or skill requirements that learners must achieve prior to assessment.                             |
| <b>General Aims</b>                        | Describe in 3-5 statements the broad skills and knowledge learners will have achieved on successful completion of the module.   |
| <b>Units</b>                               | Structure the learning outcomes; there may be no units.   |
| <b>Specific Learning Outcomes</b>          | Describe in specific terms the knowledge and skills that learners will have achieved on successful completion of the module.  |
| <b>Portfolio of Assessment</b>             | Provides details on how the learning outcomes are to be assessed.   |
| <b>Grading</b>                             | Provides details of the grading system used.  |
| <b>Individual Candidate Marking Sheets</b> | List the assessment criteria for each assessment technique and the marking system.  |
| <b>Module Results Summary Sheet</b>        | Records the marks for each candidate in each assessment technique and in total. It is an important record for centres of their candidate's achievements.  |
| <b>Appendices</b>                          | Can include approval forms for national governing bodies.   |
| <b>Glossary of Assessment Techniques</b>   | Explains the types of assessment techniques used to assess standards.   |
| <b>Assessment Principles</b>               | Describes the assessment principles that underpin FETAC approach to assessment.   |

## Introduction

A module is a statement of the standards to be achieved to gain a FETAC award. Candidates are assessed to establish whether they have achieved the required standards. Credit is awarded for each module successfully completed.

The standards in a module are expressed principally in terms of specific learning outcomes, i.e. what the learner will be able to do on successful completion of the module. The other elements of the module - the purpose, general aims, assessment details and assessment criteria - combine with the learning outcomes to state the standards in a holistic way.

While FETAC is responsible for setting the standards for certification in partnership with course providers and industry, it is the course providers who are responsible for the design of the learning programmes. The duration, content and delivery of learning programmes should be appropriate to the learners' needs and interests, and should enable the learners to reach the standard as described in the modules. Modules may be delivered alone or integrated with other modules.

The development of learners' **core skills** is a key objective of vocational education and training. The opportunity to develop these skills may arise through a single module or a range of modules. The core skills include:

- taking initiative
- taking responsibility for one's own learning and progress
- problem solving
- applying theoretical knowledge in practical contexts
- being numerate and literate
- having information and communication technology skills
- sourcing and organising information effectively
- listening effectively
- communicating orally and in writing
- working effectively in group situations
- understanding health and safety issues
- reflecting on and evaluating quality of own learning and achievement.

Course providers are encouraged to design programmes which enable learners to develop core skills.

|          |                              |  |
|----------|------------------------------|--|
| <b>1</b> | <b>Module Title</b>          | <b>Marine Engineering Processes</b>  |
| <b>2</b> | <b>Module Code</b>           | <b>C20226</b>  |
| <b>3</b> | <b>Level</b>                 | <b>5</b>   |
| <b>4</b> | <b>Credit Value</b>          | <b>1 credit</b>  |
| <b>5</b> | <b>Purpose</b>               | <p>This module is a statement of the standards to be achieved to gain a FETAC credit in Marine Engineering Processes at Level 5.</p> <p>The module has been designed to equip learners with an knowledge of the construction of small vessels and of the engineering operations carried out on them. The learner will also acquire a range of practical skills that will promote safe working practices on small vessels.</p> <p>Course providers are responsible for designing learning programmes that are consistent with the learning outcomes and appropriate to the learner’s interests and needs.</p> |
| <b>6</b> | <b>Preferred Entry Level</b> | Level 4 Certificate, Leaving Certificate or equivalent qualifications and / or relevant life and work experiences.   |
| <b>7</b> | <b>Special Requirements</b>  | None   |
| <b>8</b> | <b>General Aims</b>          | <p><i>Learners who successfully complete this module will:</i></p> <p><b>8.1</b> be familiar with the principles used in the construction of small vessels</p> <p><b>8.2</b> be familiar with the functioning of machinery fitted onboard small vessels</p> <p><b>8.3</b> be capable of performing a range of routine maintenance tasks on machinery fitted onboard small vessels</p> <p><b>8.4</b> develop safe work practices</p>  |

**9 Units**                      **The specific learning outcomes are grouped into 6 units.**

|        |  |
|--------|--|
| Unit 1 | <b>Vessel Construction</b>             |
| Unit 2 | <b>Main Propulsion Systems</b>         |
| Unit 3 | <b>Auxiliary Machinery</b>             |
| Unit 4 | <b>Electrical Systems</b>              |
| Unit 5 | <b>Hydraulic and Pneumatic Systems</b> |
| Unit 6 | <b>Health, Safety and Environment</b>  |

**10 Specific Learning Outcomes**

**Unit 1**                      **Vessel Construction**

*Learners should be able to:*

- 10.1.1**                      describe the problems associated with the selection of materials used in the construction of small vessels
- 10.1.2**                      describe the construction details and function of various hull and shell fittings on small vessels
- 10.1.3**                      explain the effects on the operational stability of a small vessel due to:
- pumping / transferring weight
  - adding additional machinery and structural items
  - free surface effect

**Unit 2**                      **Main Propulsion Systems**

*Learners should be able to:*

- 10.2.1**                      describe the function and safe operation of a main propulsion unit to include:
- engine
  - gearbox
  - shafting
  - propeller
- 10.2.2**                      explain the two and four stroke cycles of an internal combustion engine
- 10.2.3**                      describe the function and operation of the following systems:
- fuel oil
  - lubricating oil
  - water cooling

- 10.2.4** explain the principles of:
- aspiration
  - combustion
  - scavenging
  - fuel economy
- 10.2.5** carry out routine maintenance on a propulsion system e.g. changing fuel, air and lube oil filters, vee belt tensioning, lubricating a morse cable, shaft gland packing

**Unit 3**                      **Auxiliary Machinery**

*Learners should be able to:*

- 10.3.1** describe the function and operation of range of hand and mechanically operated pumps used on small vessels to include:
- diaphragm
  - flexible impeller
  - centrifugal
  - gear
- 10.3.2** identify the problems associated with pumping operations aboard small vessels
- 10.3.3** describe the function and operation of range of steering gear types aboard small vessels
- 10.3.4** detail the procedures required to carry out an emergency steering operation
- 10.3.5** describe the function and operation of the main components of a marine refrigeration system
- 10.3.6** identify the problems associated with the operation of a marine refrigeration system
- 10.3.7** carry out routine maintenance on a range of auxiliary machinery e.g. pumping systems, steering gear, refrigeration

**Unit 4**                      **Electrical Systems**

*Learners should be able to:*

- 10.4.1** describe the function and operation of the main components of a marine electrical system
- 10.4.2** interpret a simple marine electrical circuit drawing
- 10.4.2** explain a range of electrical terms to include the following: volts, amperes, ohms, watts, AC and DC
- 10.4.3** carry out basic fault finding on marine electrical systems using test equipment
- 10.4.5** identify the problems of marine corrosion due to electrical interactions
- 10.4.6** carry out routine maintenance on marine batteries

**Unit 5                    Hydraulic and Pneumatic Systems**

*Learners should be able to:*

- 10.5.1**                    describe the function and operation of the main components of marine hydraulic and pneumatic systems
- 10.5.2**                    interpret a marine hydraulic and pneumatic circuit drawing
- 10.5.3**                    identify the problems associated with marine hydraulics and pneumatics e.g. contamination and leakage
- 10.5.4**                    carry out routine maintenance on marine hydraulic or pneumatic systems

**Unit 6                    Health, Safety and Environment**

*Learners should be able to:*

- 10.6.1**                    plan for a voyage to include:
  - safety checks
  - carriage of spares
  - consumables
  - safety equipment
  - tools
  - manuals
- 10.6.2**                    describe the need for planned maintenance and record keeping on small vessels
- 10.6.3**                    identify the hazards, associated risks and action required for safe operations on small vessels
- 10.6.4**                    interpret M-Notices, Statutory Instruments and other regulations applying to small vessels
- 10.6.5**                    describe the use of fixed and portable safety equipment in emergency situations such as fire and flooding
- 10.6.6**                    identify the principal health, safety and environmental issues associated with liquid and solid waste transfer and disposal

## 11 Assessment

|         |                               |     |
|---------|-------------------------------|-----|
| Summary | Examination ( Theory- based ) | 60% |
|         | Skills Demonstration          | 40% |

### 11.1 Examination

The internal assessor will devise a theory-based examination that assesses candidates' ability to recall and apply theory and understanding requiring responses to a number of structured questions. The questions may be answered in a variety of media such as in writing or orally.

The examination will be based on a range of specific learning outcomes covering each unit and will be two hours in duration.

The format of the examination will be as follows:

5 structured questions - not more than one from each unit  
Candidates are required to answer 4 (15 marks each)

### 11.2 Skills Demonstration

In one or more skills demonstrations, candidates will be assessed carrying out maintenance tasks in each of the following areas.

1. Main Propulsion system
2. Auxiliary Machinery
3. Electrical systems
4. Hydraulic & Pneumatic systems

Candidates will demonstrate adherence to safe working practices throughout the skills demonstration.

Candidates will maintain a record of measurements and/or observations or other relevant information as part of the skills demonstration

The skills may be assessed at any time during the learning process

## 12 Grading

|             |           |
|-------------|-----------|
| Pass        | 50 - 64%  |
| Merit       | 65 - 79%  |
| Distinction | 80 - 100% |



|   |   |
|---|---|
| <b>Individual Candidate<br/>Marking Sheet 1</b> | <b>Marine Engineering Processes<br/>C20226<br/>Examination (Theory-Based) 60%</b> |
|---|---|

**Candidate Name:** \_\_\_\_\_ **PPSN:** \_\_\_\_\_

**Centre:** \_\_\_\_\_ **Centre No:** \_\_\_\_\_

| Assessment Criteria  | Maximum Mark | Candidate Mark |
|--|--------------|----------------|
| 5 structured questions,<br>answer any 4 (15 marks each)<br>(*Indicate questions answered)        |              |                |
| Question No.:* _____   | <b>15</b>    |                |
| _____  | <b>15</b>    |                |
| _____  | <b>15</b>    |                |
| _____  | <b>15</b>    |                |
| <b>TOTAL MARKS</b><br><i>This mark should be transferred to the Module Results Summary Sheet</i> | <b>60</b>    |                |

**Internal Assessor's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**External Authenticator's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

\* The internal assessor is required to enter here the question numbers answered by the candidate.

|   |   |
|---|---|
| <b>Individual Candidate<br/>Marking Sheet 2</b> | <b>Marine Engineering Processes<br/>C20226<br/>Skills Demonstration 40%</b> |
|---|---|

**Candidate Name:** \_\_\_\_\_ **PPSN:** \_\_\_\_\_

**Centre:** \_\_\_\_\_ **Centre No.:** \_\_\_\_\_

| Assessment Criteria   | Maximum Mark | Candidate Mark |
|---|--------------|----------------|
| <ul style="list-style-type: none"> <li>• Appropriate preparation and planning of tasks</li> </ul>                                     | <b>8</b>     |                |
| <ul style="list-style-type: none"> <li>• Effective carrying out of the tasks demonstrating mastery of tools and techniques</li> </ul> | <b>16</b>    |                |
| <ul style="list-style-type: none"> <li>• Safe use and careful maintenance of tools and equipment</li> </ul>                           | <b>8</b>     |                |
| <ul style="list-style-type: none"> <li>• Accurate recording of measurements and/or observations for each task</li> </ul>              | <b>8</b>     |                |
| <b>TOTAL MARKS</b>  | <b>40</b>    |                |
| <i>This mark should be transferred to the Module Results Summary Sheet</i>  |              |                |

**Internal Assessor's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

**External Authenticator's Signature:** \_\_\_\_\_ **Date:** \_\_\_\_\_

# FETAC Module Results Summary Sheet

**Module Title:** Marine Engineering Processes  
**Module Code:** C20226

**Assessment Marking Sheets**  
**Maximum Marks per Marking Sheet**

|                        |           |
|------------------------|-----------|
| Mark Sheet<br><b>1</b> | <b>60</b> |
| Mark Sheet<br><b>2</b> | <b>40</b> |

|                       |
|-----------------------|
| <b>Total<br/>100%</b> |
|-----------------------|

|               |
|---------------|
| <b>Grade*</b> |
|---------------|

*Candidate Surname*                                  *Candidate Forename*

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*Signed:* \_\_\_\_\_ *Internal Assessor:* \_\_\_\_\_ *Date:* \_\_\_\_\_  
**This sheet is for internal assessors to record the overall marks of individual candidates. It should be retained in the centre. The marks awarded should be transferred to the official FETAC Module Results Sheet issued to centres before the visit of the external Authenticator.**

**Grade\*:**  
D: 80 - 100%  
M: 65 - 79%  
P: 50 - 64%  
U: 0 - 49%  
W: candidates entered who did not present for assessment

## Glossary of Assessment Techniques

**Assignment** *An exercise carried out in response to a brief with specific guidelines and usually of short duration.*

Each assignment is based on a brief provided by the internal assessor. The brief includes specific guidelines for candidates. The assignment is carried out over a period of time specified by the internal assessor.

Assignments may be specified as an oral presentation, case study, observations, or have a detailed title such as audition piece, health fitness plan or vocational area profile.

**Collection of Work**

*A collection and/or selection of pieces of work produced by candidates over a period of time that demonstrates the mastery of skills.*

Using guidelines provided by the internal assessor, candidates compile a collection of their own work. The collection of work demonstrates evidence of a range of specific learning outcomes or skills. The evidence may be produced in a range of conditions, such as in the learning environment, in a role play exercise, or in real-life/work situations.

This body of work may be self-generated rather than carried out in response to a specific assignment eg art work, engineering work etc

**Examination**

*A means of assessing a candidate's ability to recall and apply skills, knowledge and understanding within a set period of time (time constrained) and under clearly specified conditions.*

Examinations may be:

- practical, assessing the mastery of specified practical skills demonstrated in a set period of time under restricted conditions
- oral, testing ability to speak effectively in the vernacular or other languages
- interview-style, assessing learning through verbal questioning, on one-to-one/group basis
- aural, testing listening and interpretation skills
- theory-based, assessing the candidate's ability to recall and apply theory, requiring responses to a range of question types, such as objective, short answer, structured, essay. These questions may be answered in different media such as in writing, orally etc.

**Learner Record**

*A self-reported record by an individual, in which he/she describes specific learning experiences, activities, responses, skills acquired.*

Candidates compile a personal logbook/journal/diary/daily diary/record/laboratory notebook/sketch book.

The logbook/journal/diary/daily diary/record/laboratory notebook/sketch book should cover specified aspects of the learner's experience.

## **Project**

*A substantial individual or group response to a brief with guidelines, usually carried out over a period of time.*

Projects may involve:

- research – requiring individual/group investigation of a topic
- process – eg design, performance, production of an artefact/event

Projects will be based on a brief provided by the internal assessor or negotiated by the candidate with the internal assessor. The brief will include broad guidelines for the candidate. The work will be carried out over a specified period of time.

Projects may be undertaken as a group or collaborative project, however the individual contribution of each candidate must be clearly identified.

The project will enable the candidate to demonstrate: (*some of these – about 2-4*)

- understanding and application of concepts in (specify area)
- use/selection of relevant research/survey techniques, sources of information, referencing, bibliography
- ability to analyse, evaluate, draw conclusions, make recommendations
- understanding of process/planning implementation and review skills/ planning and time management skills
- ability to implement/produce/make/construct/perform
- mastery of tools and techniques
- design/creativity/problem-solving/evaluation skills
- presentation/display skills
- team working/co-operation/participation skills.

## **Skills**

### **Demonstration**

*Assessment of mastery of specified practical, organisational and/or interpersonal skills.*

These skills are assessed at any time throughout the learning process by the internal assessor/another qualified person in the centre for whom the candidate undertakes relevant tasks.

The skills may be demonstrated in a range of conditions, such as in the learning environment, in a role-play exercise, or in a real-life/work situations.

The candidate may submit a written report/supporting documentation as part of the assessment.

Examples of skills: laboratory skills, computer skills, coaching skills, interpersonal skills.

## **FETAC Assessment Principles**

- 1** Assessment is regarded as an integral part of the learning process.
- 2** All FETAC assessment is criterion referenced. Each assessment technique has **assessment criteria** which detail the range of marks to be awarded for specific standards of knowledge, skills and competence demonstrated by candidates.
- 3** The mode of assessment is generally local i.e. the assessment techniques are devised and implemented by internal assessors in centres.
- 4** Assessment techniques in FETAC modules are valid in that they test a range of appropriate learning outcomes.
- 5** The reliability of assessment techniques is facilitated by providing support for assessors.
- 6** Arising from an extensive consultation process, each FETAC module describes what is considered to be an optimum approach to assessment. When the necessary procedures are in place, it will be possible for assessors to use other forms of assessment, provided they are demonstrated to be valid and reliable.
- 7** To enable all learners to demonstrate that they have reached the required standard, candidate evidence may be submitted in written, oral, visual, multimedia or other format as appropriate to the learning outcomes.
- 8** Assessment of a number of modules may be integrated, provided the separate criteria for each module are met.
- 9** Group or team work may form part of the assessment of a module, provided each candidate's achievement is separately assessed.

