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

Engineering Workshop Processes

Level 5    C20019

www.fetac.ie
**Level 5 Module Descriptor**

### Summary of Contents

<table>
<thead>
<tr>
<th>Section</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Introduction</strong></td>
<td>Describes how the module functions as part of the national vocational certificate framework.</td>
</tr>
<tr>
<td><strong>Module Title</strong></td>
<td>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>.</td>
</tr>
<tr>
<td><strong>Module Code</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Level</strong></td>
<td>Indicates where the module is placed in the national vocational certificate framework, from Level 3 to Level 6.</td>
</tr>
<tr>
<td><strong>Credit Value</strong></td>
<td>Denotes the amount of credit that a learner accumulates on achievement of the module.</td>
</tr>
<tr>
<td><strong>Purpose</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Preferred Entry Level</strong></td>
<td>Recommends the level of previous achievement or experience of the learner.</td>
</tr>
<tr>
<td><strong>Special Requirements</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>General Aims</strong></td>
<td>Describe in 3-5 statements the broad skills and knowledge learners will have achieved on successful completion of the module.</td>
</tr>
<tr>
<td><strong>Units</strong></td>
<td>Structure the learning outcomes; there may be no units.</td>
</tr>
<tr>
<td><strong>Specific Learning Outcomes</strong></td>
<td>Describe in specific terms the knowledge and skills that learners will have achieved on successful completion of the module.</td>
</tr>
<tr>
<td><strong>Portfolio of Assessment</strong></td>
<td>Provides details on how the learning outcomes are to be assessed.</td>
</tr>
<tr>
<td><strong>Grading</strong></td>
<td>Provides details of the grading system used.</td>
</tr>
<tr>
<td><strong>Individual Candidate Marking Sheets</strong></td>
<td>List the assessment criteria for each assessment technique and the marking system.</td>
</tr>
<tr>
<td><strong>Module Results Summary Sheet</strong></td>
<td>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.</td>
</tr>
<tr>
<td><strong>Appendices</strong></td>
<td>Can include approval forms for national governing bodies.</td>
</tr>
<tr>
<td><strong>Glossary of Assessment Techniques</strong></td>
<td>Explains the types of assessment techniques used to assess standards.</td>
</tr>
<tr>
<td><strong>Assessment Principles</strong></td>
<td>Describes the assessment principles that underpin FETAC approach to assessment.</td>
</tr>
</tbody>
</table>
Introduction

A module is a statement of the standards to be achieved to gain an 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.
Module Title  Engineering Workshop Processes

Module Code  C20019

Level  5

Credit Value  1 credit

Purpose  This module is designed to develop the learner’s ability to carry out a range of engineering processes competently and safely.

This module is mandatory on the Level 5 Certificate in Engineering Technology award.

Preferred Entry Level  Level 4 Certificate, Leaving Certificate or equivalent qualifications and/or relevant life and work experiences.

Special Requirements  None.

General Aims

Learners who successfully complete this module will:

8.1  develop safe working practices

8.2  become familiar with a variety of engineering processes

8.3  develop competence in the use of tools and equipment associated with a range of engineering processes

8.4  develop good work practices

8.5  appreciate the importance of accuracy in engineering processes.
The specific learning outcomes are grouped into 10 units.

Unit 1 Health and Safety
Learners should be able to:

10.1.1 operate tools and equipment safely

10.1.2 wear the most appropriate form of PPE during a given task to ensure protection of the:

- eyes
- ears
- hands
- feet
- skin
- respiratory system

10.1.3 interpret common hazard symbols and material safety data sheets

10.1.4 outline the rights and responsibilities of employees and employers as specified in the Safety Health and Welfare at Work Act and associated regulations.

Unit 2 Marking Out and Measuring
Learners should be able to:

10.2.1 apply the following co-ordinate systems as appropriate

- absolute
- relative
- polar
10.2.2 use the following marking out tools
   • rule
   • scribe
   • vernier protractor
   • dividers
   • centre punch
   • vernier height gauge
   • surface plate
   • vee blocks

10.2.3 use the following measuring tools
   • vernier calipers
   • micrometer screw gauge.

Unit 3 Hand Tools

Learners should be able to:

10.3.1 remove material using the following
   • file
   • snips
   • guillotine
   • saw

10.3.2 file to a tolerance of ± 0.5mm.

Unit 4 Drilling Machine

Learners should be able to:

10.4.1 remove material using fixed and portable drilling machines

10.4.2 correctly fit
   • parallel shank drill bits
   • morse taper shank drill bits
   • machine reamers

10.4.3 secure parts while drilling using
   • machine vice
   • clamps

10.4.4 change spindle speed

10.4.5 demonstrate the following:
   • pilot hole
   • blind hole
   • countersink hole
   • counter bore
   • spot face.
Unit 5  
Lathe

Learners should be able to:

10.5.1 perform the following operations on the lathe
• facing
• diameter reduction
• taper turning
• drilling
• knurling
• parting off

10.5.2 secure material on the lathe using:
• three jaw chuck
• four jaw chuck
• chuck and tailstock

10.5.3 turn material to a tolerance of ± 0.2mm

10.5.4 apply cutting fluid.

Unit 6  
Milling Machine

Learners should be able to:

10.6.1 machine material on the milling machine using:
• end mills
• slot mills
• form cutter

10.6.2 mill material to a tolerance of ± 0.2mm

10.6.3 apply cutting fluid

10.6.4 true milling machine head and vice

10.6.5 secure material on the milling machine using:
• machine vice
• clamps
• rotary table or dividing head.

Unit 7  
Forming Methods

Learners should be able to:

10.7.1 bend material into shape using
• box and pan
• formers
• folding bars
• strip heater
10.7.2 twist material

10.7.3 blow mould or vacuum from thermoplastics.

Unit 8 Fastening and Joining of Materials

Learners should be able to:

10.8.1 cut internal screw threads using taps

10.8.2 cut external screw threads using dies

10.8.3 assemble components using
- nuts
- bolts
- screws
- rivets

10.8.4 join material using the following metallurgical methods:
- soft solder
- brazing
- manual metal arc welding, MAGS welding or TAGS welding

10.8.5 join materials using the following adhesive types:
- cyanacrylate
- solvent based
- epoxy resin.

Unit 9 CNC

Learners should be able to:

10.9.1 set offsets

10.9.2 test run a programme

10.9.3 execute a programme

10.9.4 carry out the following operations:
- facing off
- diameter reduction
- taper turning
- parting off.
Unit 10 Coatings and Finishes

Learners should be able to:

10.10.1 apply a range of finishes to include:
- polishing
- lacquering
- painting
- dip-coating.

11 Portfolio of Assessment
Please refer to the glossary of assessment techniques and the note on assessment principles at the end of this module descriptor.
All assessment is carried out in accordance with FETAC regulations.
Assessment is devised by the internal assessor, with external moderation by FETAC.

Summary
- Project 50%
- Skills Demonstration 50%

11.1 Project
The internal assessor will devise a project brief that requires candidates to demonstrate
- understanding and application of concepts in engineering workshop processes
- mastery of tools and techniques, and adherence to safe working practices
- a range of skills in engineering workshop processes
- ability to evaluate a product.

Candidates will use a range of engineering processes to produce a finished functional product. Emphasis should be placed on adherence to tolerance and quality of finish.

The project brief will focus on a broad range of specific learning outcomes.

Evidence presented for the project will include:
- background information and planning
- plans, working drawings of the job
- the finished product
- an evaluation of the finished product.

Supporting evidence for the project may be presented using a variety of media, including written, oral, graphic, audio, visual
or any combination of these. Any audio or video evidence must be provided on tape.

The project may be undertaken as a group or collaborative project. The individual contribution of each candidate will be clearly identified.

11.2 Skills Demonstration

In one or more skills demonstrations, candidates will be observed carrying out at least 5 practical tasks based on a range of specific learning outcomes.

Candidates will demonstrate adherence to safe working practices throughout the skills demonstration and will submit supporting evidence for each practical task completed.

The skills can be assessed at any time throughout the learning process.

12 Grading

<table>
<thead>
<tr>
<th>Grade</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pass</td>
<td>50 - 64%</td>
</tr>
<tr>
<td>Merit</td>
<td>65 - 79%</td>
</tr>
<tr>
<td>Distinction</td>
<td>80 - 100%</td>
</tr>
</tbody>
</table>
## Individual Candidate Marking Sheet

### Engineering Workshop Processes

**C20019**  
Project 50%  
Skills Demonstration 50%

Candidate Name: ______________________________  PPSN: __________________________  
Centre: _________________________________________________  Centre No.: ___________

<table>
<thead>
<tr>
<th>Assessment Criteria</th>
<th>Maximum Mark</th>
<th>Candidate Mark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Project</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>effective use of engineering workshop processes</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>comprehensive use of plans, working drawings</td>
<td>25</td>
<td></td>
</tr>
<tr>
<td>excellent technical, visual and aesthetic quality to finished product</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>critical evaluation of the finished product</td>
<td>10</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><strong>Skills Demonstration</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>appropriate preparation and planning of each task</td>
<td>20</td>
<td></td>
</tr>
<tr>
<td>effective execution of each task demonstrating mastery and safe use of tools and techniques</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>excellent quality of finish and precision in finished tasks</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td><strong>Subtotal</strong></td>
<td>100</td>
<td></td>
</tr>
<tr>
<td><strong>TOTAL MARKS</strong></td>
<td>200</td>
<td></td>
</tr>
</tbody>
</table>

*This mark should be transferred to the Module Results Summary Sheet*

**Internal Assessor’s Signature:** ______________________________  **Date:** ____________

**External Authenticator’s Signature:** ____________________________  **Date:** ____________
FETAC Module Results Summary Sheet

Module Title: Engineering Workshop Processes
Module Code: C20019

<table>
<thead>
<tr>
<th>Candidate Surname</th>
<th>Candidate Forename</th>
<th>Total Marks</th>
<th>Total ÷ 2</th>
<th>Grade*</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>200</td>
<td>100%</td>
<td></td>
</tr>
</tbody>
</table>

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.
©FETAC 2001

Any part of this publication may be copied for use within the centre.

The development of the National Qualifications Framework is funded by the Department of Education and Science with assistance from the European Social Fund as part of the National Development Plan 2000-2006.