FETAC

Further Education and
Training Awards Council
Comhairle na nDámhachtainí
Breisoideachais agus Oiliúna

Module Descriptor

Computer Architecture and Systems

Level 5   C20012

www.fetac.ie

Level 5 Module Descriptor

Summary of Contents

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

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.

1	**Module Title**	**Computer Architecture and Systems**

2	**Module Code**	C20012

3	**Level**	5

4	**Credit Value**	**1 credit**

5 Purpose

This module is a statement of the standards to be achieved to gain an FETAC credit in Computer Architecture and Systems at Level 5.

This module is designed to provide the learner with an understanding and appreciation of the fundamental role played by computing systems in modern society.

It is designed to encourage the learner to understand how the components in a computing system function and how these components communicate to provide a user environment.

This module is one of the two mandatory vocational modules on the Level 5 Certificate in Information Technology.

6 Preferred Entry Level

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

7 Special Requirements

None.

8 General Aims

Learners who successfully complete this module will:

8.1 understand and appreciate the fundamental role played by computing systems in the modern world of industry, education, communications and business

8.2 discuss the role of computing systems in Irish society

8.3 acquire knowledge of the role played by Information Technology systems

8.4	identify and explain the role played by different components in a computer system
8.5	understand how hardware and system software combine to provide a working environment for system users
8.6	develop safe working practices.

9   Units   The specific learning outcomes are grouped into 5 units.

Unit 1	**Introduction to Computer Systems**
Unit 2	**Computer Architecture**
Unit 3	**Data Communications**
Unit 4	**Operating Systems**
Unit 5	**System Applications**

10   Specific Learning Outcomes

Unit 1	**Introduction to Computer Systems**

Learners should be able to:

10.1.1	list the main components of a computer system
10.1.2	state the function of each of these components
10.1.3	distinguish between hardware and software
10.1.4	list common examples of the use of a computing system
10.1.5	list the main types of computer
10.1.6	list uses of each type of computer
10.1.7	know the main elements of an information system (a typical business system)
10.1.8	list two examples of information systems
10.1.9	explain how the computer can be used as a means of communication
10.1.10	outline the historical development of computers.
Unit 2	**Computer Architecture**

**CENTRAL PROCESSING
UNIT (CPU)**

Learners should be able to:

10.2.1   explain the role of the CPU in a computer

10.2.2   list the component parts in the CPU e.g. ALU, registers, decoder

10.2.3   explain the role of each component

10.2.4   explain the purpose of the instruction pointer

10.2.5   outline the steps involved in processing an instruction

10.2.6   explain the fetch – execute cycle.

MEMORY

Learners should be able to:

10.2.7   describe the purpose of a memory cell

10.2.8   distinguish between random access memory (RAM) and read only memory (ROM)

10.2.9   list the different types of read only memory

10.2.10   distinguish between bit, byte, word, kilobyte and megabyte

10.2.11   distinguish between primary and secondary memory

10.2.12   explain the term cache memory

10.2.13   explain how cache memory can be used to improve the performance of the CPU

10.2.14   define a bus

10.2.15   distinguish between internal buses and external buses

10.2.16   list the different buses, which connect the CPU to the computer's main memory chips.

COMPUTER PERIPHERALS

Learners should be able to:

10.2.17	distinguish between different types of character recognition devices
10.2.18	list applications of character recognition devices
10.2.19	explain bar codes and list their uses
10.2.20	give examples of different types of user interface devices
10.2.21	explain the purpose of a magnetic tape
10.2.22	list advantages and disadvantages of using tapes
10.2.23	explain the purpose of a magnetic disk
10.2.24	explain the terms: track and sector
10.2.25	distinguish between hard disks and floppy disks
10.2.26	outline the basic disk structure
10.2.27	draw a diagram of a floppy disk, outlining its main components
10.2.28	draw a diagram of a hard disk, outlining its main components
10.2.29	explain the terms: access time, seek time and latency
10.2.30	list the advantages of hard disks over floppy disks
10.2.31	explain how direct memory access (DMA) improves the transfer of data from disks to main memory
10.2.32	explain the purpose of optical disks
10.2.33	explain how data is stored on optical disks
10.2.34	explain how data compression works
10.2.35	explain what voice recognition software does
10.2.36	list the uses of voice recognition software
10.2.37	explain how voice recognition makes computer systems accessible to those with a disability
10.2.38	list devices used to produce computer output

10.2.39	list the different classifications of printers
10.2.40	describe how images are displayed on a visual display unit
10.2.41	describe specialised types of input/output devices, e.g. scanners, digital cameras, etc.
10.2.42	describe how special purpose storage devices such as smart cards can be used.

Unit 3	**Data Communications**
	Learners should be able to:
10.3.1	define the term communications
10.3.2	list examples of how communications technology is used to-day
10.3.3	list the components that make up a communications system
10.3.4	describe the different types of transmission media used for communications channels
10.3.5	describe the ways in which the transmission media are connected
10.3.6	explain how data is transmitted
10.3.7	describe the communications equipment used in a communications system
10.3.8	list the functions performed by communications software
10.3.9	list the categories of network
10.3.10	describe the most common network layouts
10.3.11	explain the use of communications protocols
10.3.12	describe the Internet and how it works
10.3.13	list services provided by the Internet (email, ftp, etc.)
10.3.14	explain how to connect to the Internet and WWW.

Unit 4	**Operating Systems**

Learners should be able to:

10.4.1	list the functions of an operating system
10.4.2	explain how an operating system makes the computer hardware usable
10.4.3	explain the different types of operating system architecture: • single-user • multi-tasking • multi-user • networks
10.4.4	name and describe the major operating systems in use to-day
10.4.5	list some services provided by an operating system to a user
10.4.6	use the operating system user interface
10.4.7	give examples of different user interfaces
10.4.8	list the advantages and disadvantages of different types of user interface.

Unit 5	**System Applications**

Learners should be able to:

10.5.1	outline the main features of the Data Protection Act
10.5.2	discuss the role of computing systems in modern society
10.5.3	list the advantages of computing technology
10.5.4	identify examples of this technology in the local environment
10.5.5	list the advantages of electronic mail
10.5.6	list the advantages of modern telecommunications
10.5.7	describe a computerised office.

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	**60%**
Examination (Theory-Based)	**40%**

11.1   Project

The internal assessor will devise a project brief that requires candidates to demonstrate:

- understanding and application of concepts in computer architecture and systems
- use of research techniques and sources of information, referencing/bibliography
- ability to analyse, evaluate, draw conclusions and make recommendations.

Candidates will carry out an investigation of the computer system in a specific business. The investigation will cover the software, operating system, hardware, hardware architecture, and plans for future development of the system. Candidates will evaluate the existing system and make recommendations on improvements where appropriate.

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

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

11.2   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 range of question types, short answer and structured. These questions may be answered in different media such as in writing or orally.

The examination will be based on a range of specific learning outcomes and will be 2 hours in duration.

The format of the examination will be as follows:

Section A
12 short answer questions
Candidates are required to answer 10 (2 marks each)

Section B
3 structured questions
Candidates are required to answer 2 (10 marks each).

12   Grading

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

Individual Candidate Marking Sheet 1		Computer Architecture and Systems **C20012** Project 60%

Candidate Name: _____ PPSN.: _____

Centre: _____ Centre No.: _____

Assessment Criteria	Maximum Mark	Candidate Mark
• clear understanding and application of concepts in computer architecture and systems	**20**	
• appropriate use of research, with careful observations and recording of relevant information	**15**	
• comprehensive analysis and evaluation of the system	**15**	
• logical conclusions/recommendations based on evaluation	**10**	
TOTAL MARKS *This mark should be transferred to the Module Results Summary Sheet*	**60**	

Internal Assessor's Signature: _____ *Date:* _____

External Authenticator's Signature: _____ *Date:* _____

Individual Candidate Marking Sheet 2		Computer Architecture and Systems C20012 Examination (Theory-Based) 40%

Candidate Name: _____ **PPSN.:** _____

Centre: _____ **Centre No.:** _____

Assessment Criteria	Maximum Mark	Candidate Mark
Section A: short answer questions 12 short answer questions, answer any 10 (2 marks each) (Indicate questions answered) Question No.:* _____	2	
_____	2	
_____	2	
_____	2	
_____	2	
_____	2	
_____	2	
_____	2	
_____	2	
_____	2	
Subtotal	**20**	
Section B: structured questions 3 structured questions, answer any 2 (10 marks each) (Indicate questions answered) Question No.:* _____	**10**	
_____	**10**	
Subtotal	**20**	
TOTAL MARKS *This mark should be transferred to the Module Results Summary Sheet*	**40**	

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.

FETAC Module Results Summary Sheet

Module Title: **Computer Architecture and Systems**
Module Code: **C20012**

Candidate Surname	Candidate Forename	Mark Sheet 1	Mark Sheet 2	Total 100%	Grade*
		Assessment Marking Sheets			
		Maximum Marks per Marking Sheet			
		60	40		

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.

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