PROGRAMME QUALITY HANDBOOK 2025-26

HNC Electrical Electronic Engineering

1. Welcome and Introduction to HNC Electrical Electronic Engineering.

Welcome to HNC Electrical Electronic Engineering delivered at our Oceans Gate Road Campus at City College Plymouth.

This programme has been designed to develop and practically apply a broad knowledge base of electrical and electronic systems theory as well as essential skills required in the field of Electrical and Electronic Engineering.

Students will initially study a range of underpinning theories covering science, mathematics, electrical and electronic principles, management theory and design and microprocessor control. Candidates will then progress on to more advanced applications of the theories in areas including Electrical Power, Analogue and Digital Electronics and Industrial Control and Mechatronics. Students will also undertake a Work-Based Project to practically demonstrate the essential management and research skills required at this level of study and within the workplace. This will be driven by close liaison with employers to ensure that delivery is both current and relevant, thus enhancing the employability skills of students.

This programme has been designed to equip you with the skills and knowledge base required to work in your chosen specialism or other graduate opportunities. It is also a platform from which you can undertake additional vocational and academic qualifications.

This Programme Quality handbook contains important information including:
The approved programme specification
Module records

Note: The information in this handbook should be read in conjunction with the current edition of:
Your Programme Institution & University Student Handbook which contains student support based information on issues such as finance and studying at HE

    - available in your Google Classroom
- Your Module, Teaching, Learning and Assessment Guide
    - available in your Google Classroom
- Plymouth University's Student Handbook
    - available at: https://www.plymouth.ac.uk/your-university/governance/student-handbook

1. Programme Specification

Plymouth University

City College Plymouth

Programme Specification

HNC Electrical and Electronic Engineering

1. HNC Electrical and Electronic Engineering

Final award title **HNC Electrical and Electronic Engineering**

Level X Intermediate award title(s) **N/A**

Level X Intermediate award title(s) **N/A**

UCAS code H602

JACS code **H600**

2. Awarding Institution: University of Plymouth

Teaching institution(s): City College Plymouth

3. Accrediting body(ies)

Summary of specific conditions/regulations

Date of re-accreditation

4. Distinctive Features of the Programme and the Student Experience

The delivery of the HNC in Electrical Electronic Engineering has been designed to be the same as the first year of the FdSc Electrical Electronic Engineering, enabling smooth progression onto a level 5 qualification through Approved Prior Credited Learning. The course contains 6 x 20 credit modules covering the key aspects of Electrical Electronic Engineering, such as science, maths, electrical and electronic principles, management theory, design and microprocessor control. The course has been designed around the Engineering Council's Technician Standard..

Delivery will be supported by practical activities using industry standard hardware and software development environments within specialist workshop/ laboratory areas. This will take full advantage of the College's £13m investment in the

state-of-the-art Regional Centre of Excellence for STEM and the New Higher Education Campus at Oceansgate.

A range of assessment methods are used to ensure that students have gained a thorough grounding in not only the underlying principles but also how they apply in practical, industrial applications. Close links have been established with local industries which drives the development and continuous updating of the course. This ensures that the skills learnt are relevant to employment in the engineering sector both locally and globally. It also provides the underpinning research based academic skills required of managers within industry and to allow successful candidates to continue into further, higher level studies.

Delivery is planned to be flexible to accommodate both our part time and full time students. Employed, part time students will undertake a day release delivery model to ensure that the impact on employers is kept to a minimum.

5. Relevant QAA Subject Benchmark Group(s)

The subject benchmark statement (2015)[1] defines the academic standard expected of graduates with an engineering degree. The defined learning outcomes are those published by the Engineering Council in the UK-SPEC UK standard for professional engineering competence www.engc.co.uk Third edition[2]. Another Document referred to during the design of the programme was the QAA Quality Code.[3]

1. http://www.qaa.ac.uk/en/Publications/Documents/SBS-engineering-15.pdf
2. http://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf
3. http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

6. Programme Structure

The Programme of study comprises of 120 module credits at level 4. The aim of the programme is to develop skills consistent with Engineering Council and Engineering Subject Benchmarks. Due to our strong links with employers in the city and high number of part time learners who are already employed in industry our programme has been developed to provide for the varied roles across the city as Electrical Electronic Engineers. This course is only offered as a part time programme.

8. Programme Structure for the HNC Electrical and Electronic Engineering (part-time) 2025/26

Year 1			
Module Code	**Module Title**	**No. of Credits**	**Core / Optional**
CITY 1077	Engineering Mathematics	20	Core
CITY 1078	Engineering Science	20	Core
CITY 1079	Digital and Analogue Devices and Circuits	20	Core
CITY 1080	Project Design and Business Management	20	Core

Year 2			
Module Code	**Module Title**	**No. of Credits**	**Core / Optional**
CITY 1081	Electrical and Electronic Principles	20	Core
CITY 1082	Microprocessor Systems and High Level Programming	20	Core

7. Programme Aims

- To develop engineering knowledge and understanding to apply technical and practical skills.
- Prepare students to ‘contribute towards design’ via practical and project based work.
- Develop skills in ‘accepting and exercising personal responsibility.’
- Prepare students to use effective communication and interpersonal skills.

8. Programme Intended Learning Outcomes

8.1. Knowledge and understanding

On successful completion graduates should have developed:

1) A theoretical approach to the application of technology in electrical / electronic engineering practice.
2) Appropriate theory and practical skills to manufacture, construct, operate and maintain electrical / electronic engineering

8.2. Cognitive and intellectual skills

On successful completion graduates should have developed:

1) The ability to review and select techniques, procedures and methods to undertake electrical / electronic engineering tasks.

8.3. Key and transferable skills

On successful completion graduates should have developed the ability to:

1) Use oral, written and electronic methods for the communication of technical and other information.

8.4. Employment related skills

On successful completion graduates should have developed:

1) Good student centred learning skills which will promote lifelong learning and a commitment to continuing professional development to achieve flexibility within the work environment.

8.5. Practical skills

On successful completion graduates should have developed:

1) The ability to select and use appropriate equipment to perform engineering tests.

9. Admissions Criteria, including APCL, APEL and DAS arrangements

All applicants must have GCSE (or equivalent) Maths and English at Grade C or above.

Entry Requirements for HNC Electrical Electronic Engineering	
A-level/AS-level	Normal minimum entry requirements are 56 on new UCAS Tariff at A-level to include Grade D in Maths or Physics
BTEC National Diploma/QCF Extended Diploma	Candidates are interviewed before an offer is made. But an equivalent of 56 UCAS points in an Engineering Subject
Access to Higher Education at level 3	Candidates are interviewed before an offer is made. Pass an Access to HE Diploma in Science with an equivalent of 56 UCAS points
Welsh Baccalaureate	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
Scottish Qualifications Authority	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
Irish Leaving Certificate	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
International Baccalaureate	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
Non Standard Qualifications with experience	All non-standard applicants are interviewed by the tutor and screened centrally to ensure impartial oversight.

All Students have the opportunity to APL modules up to 120 credits in accordance to the College and University APL policies these must be applied for at the start of term.

Level 5 entry:
N/A

10. Progression

Progression from the HNC Electrical and Electronic Engineering is guaranteed to the FdSc Electrical and Electronic Engineering (Level 5).

11. Exceptions to Regulations

If a student is studying part time, and know they wish to progress they will study two level 5 modules in addition to the level 4 modules in order to complete the Part time FdSc course within 3 years, this has been approved by exception to regulations. The two level 5 modules which will be studied as a short course are:

CITY 2075	Electrical Power	20 credits
CITY 2076	Further Analogue Electronics	20 credits

12. Transitional Arrangements

The College is currently delivering both an HNC and FdSc Electrical and Electronic Engineering. It is planned that all students currently enrolled on these programmes will remain enrolled on the old programme structure to support in ensuring the meeting of programme level learning outcomes. Any student moving from old HNC will transfer to old FdSc.

However – due to the identified issues with over-assessment at element level the team will be submitting minor changes for some key modules on the old programme structure to support in ensuring alignment with the Plymouth University Assessment Policy for existing students.

All new students from September 2017 will enrol on the completely new structure.

13. Mapping and Appendices:

13.1. ILO's against Modules Mapping (Template attached)

Please see appendix 13.1

13.2. Assessment against Modules Mapping

Please see appendix 13.2

13.3. Skills against Modules Mapping

Please see appendix 13.3

13.4. Appendices

Appendix 13.1 – Learning Outcomes map

	LEVEL 4			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Students will have demonstrated: Knowledge of the underlying concepts and principles associated with their areas of study;	A2, Use appropriate scientific, technical or engineering principles.	1. To develop engineering knowledge and understanding to apply technical and practical skills.	1) A sound theoretical approach to the application of technology in electrical / electronic engineering practice.	CITY1077 Engineering Mathematics CITY1078 Engineering Science CITY1079 Digital and Analogue Devices and Circuits CITY1080 Project Design and Business Management CITY1081 Electrical and Electronic Principles CITY1082 Microprocessors and High Level Programming
Ability to evaluate and interpret these within the context of that area of study;	A1, Review and select appropriate techniques, procedures and methods to undertake tasks. B1, Identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions. B2, Identify, organise and use resources effectively to complete tasks, with consideration for cost, quality, safety, security and environmental impact.	1. To develop engineering knowledge and understanding to apply technical and practical skills. 2. Provide the opportunity to 'contribute towards design' via practical and project based work. 4. Provide the opportunity to 'learn through design' via practical and project based work, particularly within the context of electrical and electronic design.	8.1.2) Appropriate theory and practical skills to design, develop, manufacture, construct, commission, operate, maintain, decommission and re-cycle electrical / electronic engineering processes, systems, services and products. 8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement.	CITY1077 Engineering Mathematics CITY1078 Engineering Science CITY1079 Digital and Analogue Devices and Circuits CITY1080 Project Design and Business Management

	LEVEL 4			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Ability to present, evaluate and interpret qualitative and quantitative data;	D1, Use oral, written and electronic methods for the communication in English1 of technical and other information. D2,Present and discuss proposals.	4. Provide the opportunity to use effective communication and interpersonal skills.	8.3.1) Use oral, written and electronic methods for the communication of technical and other information.	CITY1080 Project Design and Business Management
Students will be able to: Evaluate the appropriateness of different approaches to solving problems related to their area of study;	A1, Review and select appropriate techniques, procedures and methods to undertake tasks. A2, Use appropriate scientific, technical or engineering principles. B1, Identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions.	4. Provide the opportunity to use effective communication and interpersonal skills.	8.2.1) The ability to review and select techniques, procedures and methods to undertake electrical / electronic engineering tasks.	CITY1077 Engineering Mathematics CITY1078 Engineering Science CITY1080 Project Design and Business Management CITY1082 Microprocessors and High Level Programming
Communicate the results of their study accurately and reliably and with structured and coherent argument	D1, Use oral, written and electronic methods for the communication in English1 of technical and other information.	4. Provide the opportunity to use effective communication and interpersonal skills.	8.3.1) Use oral, written and electronic methods for the communication of technical and other information.	CITY1080 Project Design and Business Management CITY1082 Microprocessors and High Level Programming
				CITY1077 Engineering Mathematics

	LEVEL 4			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Undertake further training and develop new skills within a structured and managed environment	E4, Carry out and record CPD necessary to maintain and enhance competence in own area of practice including: • Undertake reviews of own development needs • Plan how to meet personal and organisational objectives • Carry out planned (and unplanned) CPD activities • Maintain evidence of competence development • Evaluate CPD outcomes against any plans made • Assist others with their own CPD.	1.) To develop engineering knowledge and understanding to apply technical and practical skills. 2.) Provide the opportunity to 'contribute towards design' via practical and project based work. 3.) Provide an opportunity for 'accepting and exercising personal responsibility.' 4.) Provide the opportunity to use effective communication and interpersonal skills.	8.4.1) Good student centred learning skills which will promote lifelong learning and a commitment to continuing professional development to achieve flexibility within the work environment.	CITY1078 Engineering Science CITY1079 Digital and Analogue Devices and Circuits CITY1080 Project Design and Business Management CITY1081 Electrical and Electronic Principles CITY1082 Microprocessors and High Level Programming
Students will also have: The qualities and transferable skills necessary for employment requiring the exercise of some personal responsibility	C1, Work reliably and effectively without close supervision, to the appropriate codes of practice. E1, Comply with the Code of Conduct of your institution. E2, Manage and apply safe systems of work.	4.) Provide the opportunity to use effective communication and interpersonal skills.	8.4.1) Good student centred learning skills which will promote lifelong learning and a commitment to continuing professional development to achieve flexibility within the work environment.	CITY1077 Engineering Mathematics CITY1078 Engineering Science CITY1079 Digital and Analogue Devices and Circuits CITY1080 Project Design and Business Management CITY1081 Electrical and Electronic Principles CITY1082 Microprocessors and High Level Programming

Appendix 13.2 Assessment against modules Map

	CITY1077 Engineering Mathematics (Core)	CITY1078 Engineering Science (Core)	CITY1079 Digital and Analogue Devices (Core)	CITY1081 Electrical and Electronic Principles (Core)	CITY1080 Project Design and Business Management (Core)	CITY1082 Microprocessor Systems and High Level Programming (Core)
Essay						
Report		✔			✔	✔
Engineering Problem Assignment	✔			✔		
Portfolio						
Exam	✔	✔	✔	✔		
In Class Test						
Practical						
Presentation			✔		✔	✔

Appendix 13.3 Skills against modules Map

	Engineering Mathematics (Core)	Engineering Science (Core)	Digital and Analogue Devices (Core)	Electrical and Electronic Principles (Core)	Project Design and Business Management (Core)	Microprocessor Systems and High Level Programming (Core)
Essay Writing						
Report Writing		✔			✔	✔
Project Planning / Management					✔	
Research	✔	✔	✔	✔	✔	✔
IT Skills			✔	✔	✔	✔
Team Work					✔	
Evaluation	✔	✔	✔	✔	✔	✔
Data Analysis	✔	✔	✔	✔	✔	

2. Module Records

<u>SECTION A: DEFINITIVE MODULE RECORD</u>. Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.

MODULE CODE: CITY 1077	**MODULE TITLE**: Engineering Mathematics

CREDITS: 20	**FHEQ LEVEL**: 4	**JACS CODE**: G160

PRE-REQUISITES: N	**CO-REQUISITES**: N	**COMPENSATABLE**: Y

SHORT MODULE DESCRIPTOR:
To develop the student's mathematical ability and to apply principles to the solution of engineering problems and to make use of mathematical computer based packages.

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ELEMENTS OF ASSESSMENT					
WRITTEN EXAMINATION		**COURSEWORK**		**PRACTICE**	
E1 (Formally scheduled)	50%	**C1**	50%	**P1**	
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL Technology

Professional body minimum pass mark requirement: n/a

MODULE AIMS:

- To gain a solid foundation in algebra, trigonometry, functions and calculus in order to associate and recognise the importance of mathematics in the analysis of engineering problems
- To develop mathematical problem solving simultaneously with other science and engineering modules.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of a module the learner **will be expected to be able to:**

LO1. use basic mathematical techniques to solve engineering problems of an electrical, mechanical or civil engineering nature.
LO2. recognise and solve 1st and 2nd order ordinary differential equations
LO3. understand the use of complex number and matrix theory in practical engineering applications
LO4. understand a variety of techniques of differential and integral calculus to calculate various functions in their associated applications in engineering

DATE OF APPROVAL: May 2017	**FACULTY/OFFICE: Academic Partnerships**

DATE OF IMPLEMENTATION: Sep 2017	**SCHOOL/PARTNER: City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**

Additional notes (for office use only):

Additional Guidance for Learning Outcomes:
To ensure that the module is pitched at the right level check your intended learning outcomes against the following nationally agreed standards

- Framework for Higher Education Qualifications

http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/FHEQ08.pdf

- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx

- SEEC level descriptors http://www.seec.org.uk/academic-credit/seec-credit-level-descriptors-2010 (scroll to pdf link at bottom of page)

- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)

- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

Items in this section must be considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2025/26	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Owais Raja	**OTHER MODULE STAFF: N/A**

Summary of Module Content

Revision of Algebra and Arithmetic

Basic number and arithmetic operations, algebraic techniques including evaluation of formula, rearranging formula, solving simple equations, laws of logarithms, laws of indices, etc. These skills will be built upon throughout the delivery of each individual topic in this module.

Trigonometric functions and graphs

Simple trigonometric functions of sine, cosine, tangent and hyperbolic functions of $\sinh^{-1}$, $\cosh^{-1}$ and $\tanh^{-1}$. The applications of these functions in engineering including vectors and waveform combination.

Complex numbers

Addition, subtraction, multiplication and division of complex numbers in Polar and Cartesian form. The Argand diagram. The modulus and argument. Applications in engineering.

Differential Calculus

Basic differentiation techniques of polynomial, trigonometric, exponential and logarithmic functions. Further techniques including the product, quotient and chain rules. Engineering applications to optimisation and higher order differentials.

Integral calculus

Basic integration techniques of polynomial, trigonometric and exponential functions. Further techniques including integration by parts and substitution. The methodical applications of definite and indefinite integration with and without engineering scenarios including the interpretation of areas under a curve.

Matrices

General arithmetic operations on matrices. Solve equations by using the inverse matrix method and apply to engineering problems. Understand the different types of solutions: no, unique and infinite solutions. Diagonalisation to find eigenvalues and corresponding eigenvectors.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	Comments/Additional Information
Lecture	60	30 x 2 hour lectures
Tutorial	15	Academic Support (Contact and VLE)
Independent Study	125	Guided self-study
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1	Module Examination	100%	LO1,3
Coursework	C1	Assignment	100%	LO2,4
			N/A	

Updated by: Andrew Reed Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

Recommended Texts and Sources

The recommended texts for the course are:

Kuldeep Singh (2011) Engineering Mathematics Through Applications [Paperback] Palgrave Macmillan; 2nd edition edition

Stroud, K.A. and Booth, D.J. (2013) *Engineering mathematics*. 7th edn. Basingstoke: Palgrave Macmillan.

Stroud, K.A. and Booth, D.J. (2011) *Advanced engineering mathematics*. 5th edn. Basingstoke: Palgrave Macmillan.

Bird, J. (2014) Basic engineering mathematics. 6th edn. London: Routledge.

Bird, J. (2017) Higher engineering mathematics. 7th edn. United Kingdom: Routledge.

Greater Manchester university (no date) Available at: http://www.cse.salford.ac.uk/physics/gsmcdonald/PPLATO.php

SECTION A: DEFINITIVE MODULE RECORD*. Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

MODULE CODE: CITY1078	MODULE TITLE: Engineering Science

CREDITS: 20	FHEQ LEVEL: 4	JACS CODE: H100

PRE-REQUISITES: N	CO-REQUISITES: N	COMPENSATABLE: Y

SHORT MODULE DESCRIPTOR:

An introduction to mechanical principles, energy transfer and AC electrical theory. Mechanical principles including solid mechanics, statics, dynamics and mechanical vibrations. Modes of heat transfer and energy losses. Electrical principles and single phase AC theory.

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ELEMENTS OF ASSESSMENT					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)	50%	**C1**	50%	**P1**	
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL: Technology

Professional body minimum pass mark requirement: n/a

MODULE AIMS:

- To investigate the fundamental scientific principles which underpin the design and operation of engineering systems.
- To give a mechanical and electrical overview which will provide the basis for further study in specialist areas of engineering.

ASSESSED LEARNING OUTCOMES: (additional guidance below)

At the end of a module the learner **will be expected to be able to:**

LO1. Demonstrate an understanding of basic static and dynamic mechanical systems
LO2. Investigate energy transfer in thermal and fluid systems
LO3. Recognise and recall how DC theory relates to simple electrical machines
LO4. Show knowledge and awareness of the fundamental principles of single phase AC theory

DATE OF APPROVAL: June 2017	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: Sept 2017	**SCHOOL/PARTNER: CCP**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**

Additional notes (for office use only):

Additional Guidance for Learning Outcomes:

To ensure that the module is pitched at the right level check your intended learning outcomes against the following nationally agreed standards

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/FHEQ08.pdf
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- SEEC level descriptors http://www.seec.org.uk/academic-credit/seec-credit-level-descriptors-2010 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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ACADEMIC YEAR: 2025/26	**NATIONAL COST CENTRE: 115**

MODULE LEADER: Dr George Audu	**OTHER MODULE STAFF: Andrew Reed**

Summary of Module Content

Statics and Dynamics: SF and BM, bending stresses. Torsion . Uniform acceleration linear and angular. Newton's laws of motion, mass moment of inertia, kinetic energy, effects of friction. Vibrations, SHM, forcing and damping. Energy Transfer: Heat transfer: conduction, convection, radiation, thermal conductivity, forced convection, black and grey body radiation. insulated surfaces. Viscosity: boundary layer formation, laminar and turbulent flow, pressure loss in pipes. Energy losses: dynamic viscosity, power loss in bearings. pipe friction losses.
Electrical Principles: Conductors, insulators, voltage and current. Ohm's law, Kirchhoff''s law. Power: Electro-magnetic induction, transformers, Lenz's and Faraday's laws. Generator and motor principles. Single Phase AC theory: Non-resonant circuits: R-C-L circuits; Argand diagrams. Resonant circuits, L-C series and parallel, resonant frequency, Power factor correction, Complex waveforms: graphical analysis, odd and even-harmonics, phase shift, non-linear characteristics.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	50	25 x 2 hour lectures
Lab time	10	5 x 2 hour lab time (Contact)
Tutorial	15	Academic Support (Contact and VLE)
Independent Study	125	Guided self-study
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1	End of Module Examination	100%	LO1, LO2
Coursework	C1	Assignment *(Report on in class experiments)*	100%	LO3, LO4

Updated by: Andrew Reed Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

The recommended texts for the course are:

Bolton, W. (2004) Higher engineering science. 2nd edn. Amsterdam, [Pays-Bas]: Newnes (an imprint of Butterworth-Heinemann Ltd).

Tooley, M.H., Dingle, L., BA, M.T. and Technol.., A. (2012) Engineering science: For foundation degree and higher national. New York: Elsevier Science.

Bacon, D H and Stephens, R C (2000) Mechanical technology, Industrial Press, New York

SECTION A: DEFINITIVE MODULE RECORD. ***Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.***

MODULE CODE: CITY1079	MODULE TITLE: Digital and Analogue Devices and Circuits

CREDITS: 20	FHEQ LEVEL: 4	JACS CODE: H651

PRE-REQUISITES: N	CO-REQUISITES: N	COMPENSATABLE: Y

SHORT MODULE DESCRIPTOR:

This module provides learners with a practical understanding of a range of digital and analogue devices and circuits in common use within Electrical/Electronic Engineering Systems. Students will analyse the operational principles associated with a number of fundamental electronic building blocks and will consolidate their learning through the practical build, testing and presentation of real circuits.

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ELEMENTS OF ASSESSMENT					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)	50%	**C1**		**P1**	50%
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL : Technology

Professional body minimum pass mark requirement: n/a

MODULE AIMS:

- To give the learner a sound knowledge of the operational principles of a range of digital and analogue devices and circuits
- To develop the skills necessary to design construct and test common analogue and digital circuits.

ASSESSED LEARNING OUTCOMES: (additional guidance below)

At the end of a module the learner **will be expected to be able to:**

LO1. Describe the operation and characteristics of arrange of analogue devices and circuits
LO2. Describe the operation and use of a range of logic devices
LO3. Design and test, using computer simulation and/or practical build an analogue circuit to a given specification
LO4. Design and test, using computer simulation and/or practical build a digital circuit to a given specification

DATE OF APPROVAL: June 2017	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: Sept 2017	**SCHOOL/PARTNER: CCP**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**

Additional notes (for office use only):

Additional Guidance for Learning Outcomes:

To ensure that the module is pitched at the right level check your intended learning outcomes against the following nationally agreed standards

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/FHEQ08.pdf
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- SEEC level descriptors http://www.seec.org.uk/academic-credit/seec-credit-level-descriptors-2010 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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ACADEMIC YEAR: 2025/25	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Andrew Reed	**OTHER MODULE STAFF: Dr George Audu**

Summary of Module Content

Devices – dc and small signal operation of diodes and transistors, DC power supplies – operation, design and test of linear and switched mode power supplies.
Operational amplifiers – ideal and practical op-amps, operation, design and test of common operational amplifier circuits, use of simulation software.
Digital electronic circuits – logic devices and elements, combinational logic design, sequential logic circuit design, use of simulation software.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	44	22 x 2hr sessions
Lab Work	16	8 x 2hr lab sessions
Tutorial	15	Academic Support (Contact and VLE)
Independent Study	125	
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1	End of Module Examination	100%	LO1, LO2
Practice	P1	Presentation of digital circuit design and operation	100% 50% - presentation 50% - Supporting documentation (e.g. poster/handout)	LO3, LO4

Updated by: Andrew Reed Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

The recommended texts for the course are:

Floyd, T.L. (2014) *Digital fundamentals*. 11th edn. Boston, MA, United States: Prentice Hall.

Learn about electronics - home page (2016) Available at: http://www.learnabout-electronics.org/ (Accessed: 21 November 2016).

SECTION A: DEFINITIVE MODULE RECORD. ***Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.***

MODULE CODE: CITY1080	MODULE TITLE: Project Design and Business Management.

CREDITS: 20	FHEQ LEVEL: 4	JACS CODE: H221

PRE-REQUISITES: None	CO-REQUISITES: None	COMPENSATABLE: Y

SHORT MODULE DESCRIPTOR:
This module introduces concepts of current energy / business / project management techniques in accordance with current professional practice within the engineering sector. The module is project and case study based, investigating different industrial scenarios.

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ELEMENTS OF ASSESSMENT					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)		**C1**	60%	**P1**	40%
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL: Technology

Professional body minimum pass mark requirement:

MODULE AIMS:
To develop awareness of current business / project management techniques.
Investigate techniques to enhance the efficient use of energy and carbon footprint reduction methodologies. Investigate the management of distributed energy generation, energy conservation and business practice involving developing renewable energy technologies / protocols.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of a module the learner will be expected to be able to:

LO1. Identify and describe energy costing methodologies and the implications for the provision of engineering services.
LO2. Apply current business / marketing / project management techniques in an ethical and effective manner.
LO3. Demonstrate an understanding of ethical sustainability for waste management , carbon allowance and carbon footprint reduction methodologies.
LO4. Demonstrate an understanding of the practical and commercial constraints affecting the design and management of renewable and distributed energy generation.

DATE OF APPROVAL: June 2017	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: Sept 2017	**SCHOOL/PARTNER: CCP**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**

Additional notes (for office use only):

Additional Guidance for Learning Outcomes:

To ensure that the module is pitched at the right level check your intended learning outcomes against the following nationally agreed standards

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/FHEQ08.pdf
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- SEEC level descriptors http://www.seec.org.uk/academic-credit/seec-credit-level-descriptors-2010 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

Items in this section must be considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2025/26	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Dr George Audu	**OTHER MODULE STAFF: Andrew Reed**

Summary of Module Content

Energy measurement, loading and costing techniques, energy and business management processes e.g. reduction, recovery and recycling in practice. Project leadership, financial and resource management techniques. Current and developing procedures in ethical sustainability for waste management and carbon allowance. Business management and costing techniques, carbon foot-printing, energy trading, emission / pollutant management. The basic concepts of distributed energy management, sustainable energy resources, and energy collection techniques.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	60	30 x 2 hours sessions
Tutorial	15	Academic Support (Contact and VLE)
Independent Study	125	Directed self-study
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Coursework	C1	Case Study	100%	LO1, LO2
Practice	P1	Presentation	100%	LO3, LO4

Updated by: Andrew Reed Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

Capehart, B.L., Turner, W.C. and Kennedy, W.J. (2016) *Guide to energy management*. United States: Productivity Press.

Harris, D.J. (2011) *A guide to energy management in buildings*. London, United Kingdom: Taylor & Francis.

Nicholas, J.M. and Steyn, H. (2011) *Project management for engineering, business and technology.* 4th edn. New York, NY: Butterworth-Heinemann.

SECTION A: DEFINITIVE MODULE RECORD*. Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

MODULE CODE: CITY1081	MODULE TITLE: Electrical & Electronic Principles

CREDITS: 20	FHEQ LEVEL: 4	JACS CODE: H600

PRE-REQUISITES: None	CO-REQUISITES: None	COMPENSATABLE: Y

SHORT MODULE DESCRIPTOR:
This module covers the Electrical Principles which learners in many branches of Electrical and Electronic Engineering need to understand. It builds on the elements of basic circuit theory and provides the basis for further study in the more specialist areas of Electrical and Electronic Engineering.

ELEMENTS OF ASSESSMENT

WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)	60%	**C1**	40%	**P1**	
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL : Technology

Professional body minimum pass mark requirement: n/a

MODULE AIMS:
The aim of this module is to develop the skills necessary to analyse circuits and waveforms, by gaining an understanding of the principles of circuit theory, the behaviour of passive and reactive components, two-port networks, complex waves and circuit transients.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:

LO1. Demonstrate an understanding of dc circuit theorems and be able to apply them to solve practical circuit problems. Understand the application of vectors and complex numbers to the solution of ac circuits.
LO2. Investigate and develop analytical models of transformers and two-port networks.
LO3. Demonstrate an understanding of the analysis and synthesis of complex waveforms.
LO4. Develop an understanding of the analysis of circuit transients.

DATE OF APPROVAL: June 2017	**FACULTY: Academic Partnerships**
DATE OF IMPLEMENTATION: Sept 2017	**PARTNER: City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**
Additional notes (for office use only):	

Additional Guidance for Learning Outcomes:

To ensure that the module is pitched at the right level check your intended learning outcomes against the following nationally agreed standards

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/FHEQ08.pdf
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- SEEC level descriptors http://www.seec.org.uk/academic-credit/seec-credit-level-descriptors-2010 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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ACADEMIC YEAR: 2025/26	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Dr George Audu	**OTHER MODULE STAFF: Andrew Reed**

Summary of Module Content

Circuit Theory-transformation theorems and equivalent circuit parameters, circuit theorems, magnetically coupled circuits and series and parallel tuned circuits.
Two-port networks-network models applied to practical circuits, transformers, modelling of common two-port networks.
Complex waves-properties, analysis and synthesis of complex waves.
Laplace transforms-definition, use of transform tables, solution of first order systems for step and sinusoidal inputs, solution of second order systems to step inputs.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	60	30 x 2 hour lectures
Tutorial	15	Academic Support (Contact and VLE)
Independent Study	125	Guided self-study
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1	End of Module Examination	100%	LO1,LO2, LO4
Coursework	C1	Assignment-Analysis of complex AC wave form	100%	LO3

Updated by: Andrew Reed Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

The recommended texts for this course are:

Hughes, E., Hiley, J. and McKenzie-Smith, I. (2016) *Hughes electrical and electronic technology*. Harlow, United Kingdom: Pearson Education.

Bird, J. (2013) *Electrical and electronic principles and technology*. 5th edn. London, United Kingdom: Routledge.

Bird, J. (2013) *Electrical circuit theory and technology*. 5th edn. London: Routledge.

SECTION A: DEFINITIVE MODULE RECORD*. Proposed changes must be submitted via Faculty Quality Procedures for approval and issue of new module code.*

MODULE CODE: CITY1082	MODULE TITLE: Microprocessor Systems & High Level Programming

CREDITS: 20	FHEQ LEVEL: 4	JACS CODE: H221

PRE-REQUISITES: N	CO-REQUISITES: N	COMPENSATABLE: Y

SHORT MODULE DESCRIPTOR:
This unit is intended to give learners an understanding of the general principles and concepts of programming in high level language, to create and test simple programs capable of interfacing with external hardware.

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ELEMENTS OF ASSESSMENT					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)		**C1**	50%	**P1**	50%
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL :Technology

Professional body minimum pass mark requirement: n/a

MODULE AIMS:

- To investigate the characteristics and use of microcontroller systems.
- To investigate microprocessor interfacing and communication methods.
- To design and develop high level code using structured programming methods.
- To create and apply test schedules for a given application.

ASSESSED LEARNING OUTCOMES: (additional guidance below)

At the end of a module the learner **will be expected to be able to:**

LO1: Describe the internal architecture of a typical microprocessor/microcontroller system
LO2: Describe the interfacing and communication methods used to interact with a range of external hardware devices
LO3: Produce software to allow a microprocessor system to interact with external hardware using a structured design technique.
LO4: Use an appropriate development environment to implement, error check and test software compliance against a specification

DATE OF APPROVAL: June 2017	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: Sept 2017	**SCHOOL/PARTNER: CCP**
DATE(S) OF APPROVED CHANGE: May 2017	**TERM: All year**

Additional notes (for office use only):

Additional Guidance for Learning Outcomes:

To ensure that the module is pitched at the right level check your intended learning outcomes against the following nationally agreed standards

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/Publications/InformationAndGuidance/Documents/FHEQ08.pdf
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- SEEC level descriptors http://www.seec.org.uk/academic-credit/seec-credit-level-descriptors-2010 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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ACADEMIC YEAR: 2025/26	**NATIONAL COST CENTRE: 119**

MODULE LEADER: **Andrew Reed**	**OTHER MODULE STAFF:**

Summary of Module Content

Microcontroller architecture and instruction set – ALU, RAM, ROM, stack, etc., Bus architecture, use of registers and embedded features, e.g. timers, ADC, comparators. RISC architecture.
Program design – use of an algorithmic approach, e.g. structure charts, pseudo code
Write program – use of a high level language and software debugging tools e.g. Integrated Development Environment (IDE) and simulation.
Data storage - Integers, floating-point, characters, Boolean, strings, arrays and files.
Program structures – Iterative and selection structures, functions / procedures.
Programming standards – appropriate syntax, use of comments, layout e.g. indentation and descriptive identifiers.
Test schedules – error types; test data, plan and record of testing

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	40	20 x 2 hour lectures
Practical	20	10 x 2 hour practical labs
Tutorial	15	Academic Support (Contact and VLE)
Independent Study	125	Directed self-study
Totall	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Coursework	C1	Report 1	100%	LO1, LO2 Structured report
Practice	P1	Presentation of practical design activity	50% - presentation 50% - Supporting documentation (e.g. poster/handout)	LO3, LO4 Report on design methodology and outcomes of testing

Updated by: Andrew Reed Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

The recommended texts for the course are:

Crisp, J. (2003) *Introduction to microprocessors and microcontrollers*. 2nd edn. Amsterdam: Newnes (an imprint of Butterworth-Heinemann Ltd).

Websites:

(No Date) Available at: http://learn.mikroe.com/ebooks/piccprogramming/ (Accessed: 28 November 2016).

Arduino (2016) Home. Available at: http://www.arduino.cc (Accessed: 8 December 2016).