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**PROGRAMME QUALITY HANDBOOK**

**2024-25**

**HNC Electrical Electronic Engineering**

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# Welcome and Introduction to HNC Electrical Electronic Engineering.

Welcome to HNC Electrical Electronic Engineering delivered at Kings Road Campus by 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 at <http://hemoodle.cityplym.ac.uk/course/view.php?id=3305>
* Your Module, Teaching, Learning and Assessment Guide
* available at: <http://hemoodle.cityplym.ac.uk/course/view.php?id=3603>
* Plymouth University’s Student Handbook
	+ available at:

<https://www.plymouth.ac.uk/your-university/governance/student-handbook>

# 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**

1. **Awarding Institution:** University of Plymouth

**Teaching institution(s):** City College Plymouth

1. **Accrediting body**(ies)

Summary of specific conditions/regulations

Date of re-accreditation

1. **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.

1. **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](http://www.engc.co.uk) Third edition2. 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](http://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20%281%29.pdf)
3. <http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx>
4. **Programme Structure**

The Programme of study comprises of 120 module credits at level 4. The aim of the programme is too 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.

1. 
2. **Programme Structure for the HNC Electrical and Electronic Engineering (part-time) 2017/18**

| **Year 1** |  | **Year 2** |
| --- | --- | --- |
| **Module Code** | **Module Title** | **No. of Credits** | **Core / Optional** |  | **Module Code** | **Module Title** | **No. of Credits** | **Core / Optional** |
| CITY 1077 | Engineering Mathematics | 20 | Core |  | CITY 1081 | Electrical and Electronic Principles | 20 | Core |
| CITY 1078 | Engineering Science  | 20 | Core |  | CITY 1082 | Microprocessor Systems and High Level Programming | 20 | Core |
| CITY 1079 | Digital and Analogue Devices and Circuits | 20 | Core |  |  |  |  |  |
| CITY 1080 | Project Design and Business Management | 20 | Core |  |  |  |  |  |

1. **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.
1. **Programme Intended Learning Outcomes**
	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.

1. **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

1. **Progression**

Progression from the HNC Electrical and Electronic Engineering is guaranteed, 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 |

1. **Exceptions to Regulations**
2. **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.

1. **Mapping and Appendices:**
	1. **ILO’s against Modules Mapping (Template attached)**

Please see appendix 13.1

* 1. **Assessment against Modules Mapping**

Please see appendix 13.2

* 1. **Skills against Modules Mapping**

Please see appendix 13.3

* 1. **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;Ability to evaluate and interpret these within the context of that area of study;Ability to present, evaluate and interpret qualitative and quantitative data; | A2, Use appropriate scientific, technical orengineering principles.A1, Review and select appropriate techniques,procedures and methods to undertake tasks.B1, Identify problems and apply appropriatemethods to identify causes and achievesatisfactory solutions.B2, Identify, organise and use resourceseffectively to complete tasks, withconsideration for cost, quality, safety, securityand environmental impact.D1, Use oral, written and electronic methods forthe communication in English1 of technicaland other information.D2,Present and discuss proposals. | 1. To develop engineering knowledge and understanding to apply technical and practical skills.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.4. Provide the opportunity to use effective communication and interpersonal skills. | 1) A sound theoretical approach to the application of technology in electrical / electronic engineering practice.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.8.3.1) Use oral, written and electronic methods for the communication of technical and other information. | CITY1077 Engineering MathematicsCITY1078 Engineering ScienceCITY1079 Digital and Analogue Devices and CircuitsCITY1080 Project Design and Business ManagementCITY1081 Electrical and Electronic PrinciplesCITY1082 Microprocessors and High Level ProgrammingCITY1077 Engineering MathematicsCITY1078 Engineering ScienceCITY1079 Digital and Analogue Devices and CircuitsCITY1080 Project Design and Business ManagementCITY1080 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;Communicate the results of their study accurately and reliably and with structured and coherent argument | A1, Review and select appropriate techniques,procedures and methods to undertake tasks.A2, Use appropriate scientific, technical orengineering principles.B1, Identify problems and apply appropriatemethods to identify causes and achievesatisfactory solutions.D1, Use oral, written and electronic methods forthe communication in English1 of technicaland other information. | 4. Provide the opportunity to use effective communication and interpersonal skills.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.8.3.1) Use oral, written and electronic methods for the communication of technical and other information. | CITY1077 Engineering MathematicsCITY1078 Engineering ScienceCITY1080 Project Design and Business ManagementCITY1082 Microprocessors and High Level ProgrammingCITY1080 Project Design and Business ManagementCITY1082 Microprocessors and High Level Programming |
| Undertake further training and develop new skills within a structured and managed environment | E4, Carry out and record CPD necessary tomaintain and enhance competence in ownarea of practice including:• Undertake reviews of own developmentneeds• Plan how to meet personal andorganisational objectives• Carry out planned (and unplanned) CPDactivities• Maintain evidence of competencedevelopment• Evaluate CPD outcomes against any plansmade• 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. | CITY1077 Engineering MathematicsCITY1078 Engineering ScienceCITY1079 Digital and Analogue Devices and CircuitsCITY1080 Project Design and Business ManagementCITY1081 Electrical and Electronic PrinciplesCITY1082 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 closesupervision, to the appropriate codes ofpractice.E1, Comply with the Code of Conduct of yourinstitution.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 MathematicsCITY1078 Engineering ScienceCITY1079 Digital and Analogue Devices and CircuitsCITY1080 Project Design and Business ManagementCITY1081 Electrical and Electronic PrinciplesCITY1082 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** | **✔** | **✔** | **✔** | **✔** | **✔** |  |

# Module Records

**SECTION A: DEFINITIVE MODULE RECORD. 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:**1. use basic mathematical techniques to solve engineering problems of an electrical, mechanical or civil engineering nature.
2. recognise and solve 1st and 2nd order ordinary differential equations
3. understand the use of complex number and matrix theory in practical engineering applications
4. 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: 2024/25** | **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: July 2024 | **Approved by**: H Galpin-Mitchell Date: July 2024 |
| --- | --- |

**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  |
| --- |

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| --- | --- |

| **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: 2024/25** | **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 ReedDate: July 2024 | **Approved by**: H Galpin-MitchellDate: July 2024 |
| --- | --- |

**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**  |
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| **Professional body minimum pass mark requirement: n/a** |
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| **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.
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| **ASSESSED LEARNING OUTCOMES:** (additional guidance below)At the end of a module the learner **will be expected to be able to:**1. Describe the operation and characteristics of arrange of analogue devices and circuits
2. Describe the operation and use of a range of logic devices
3. Design and test, using computer simulation and/or practical build an analogue circuit to a given specification
4. Design and test, using computer simulation and/or practical build a digital circuit to a given specification
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| **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: 2024/25** | **NATIONAL COST CENTRE: 119** |
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| **MODULE LEADER: Andrew Reed** | **OTHER MODULE STAFF: Dr George Audu** |
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| **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% - presentation50% - Supporting documentation (e.g. poster/handout) | LO3, LO4 |

| **Updated by**: Andrew ReedDate: July 2024 | **Approved by**: H Galpin-MitchellDate: July 2024 |
| --- | --- |

**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**  |
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| **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:1. Identify and describe energy costing methodologies and the implications for the provision of engineering services.
2. Apply current business / marketing / project management techniques in an ethical and effective manner.
3. Demonstrate an understanding of ethical sustainability for waste management , carbon allowance and carbon footprint reduction methodologies.
4. Demonstrate an understanding of the practical and commercial constraints affecting the design and management of renewable and distributed energy generation.
 |
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| **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: 2024/25** | **NATIONAL COST CENTRE: 119** |
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| **MODULE LEADER: Dr George Audu** | **OTHER MODULE STAFF: Andrew Reed** |
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| **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: July 2024 | **Approved by**: H Galpin-MitchellDate: July 2024 |
| --- | --- |

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** |
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| **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**  |
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| **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.  |
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| **ASSESSED LEARNING OUTCOMES:** (additional guidance below)At the end of the module the learner will be expected to be able to:1. 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.
2. Investigate and develop analytical models of transformers and two-port networks.
3. Demonstrate an understanding of the analysis and synthesis of complex waveforms.
4. Develop an understanding of the analysis of circuit transients**.**
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| **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**

***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: 2024/25** | **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 ReedDate: July 2024 | **Approved by**: H Galpin-Mitchell Date: July 2024 |
| --- | --- |

**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** |
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| **CREDITS:** **20** | **FHEQ** **LEVEL: 4** | **JACS CODE: H221** |
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| **PRE-REQUISITES: N** | **CO-REQUISITES: N** | **COMPENSATABLE: Y** |
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| **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 systemLO2: Describe the interfacing and communication methods used to interact with a range of external hardware devicesLO3: 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: 204/25** | **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 codeWrite 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% - presentation50% - Supporting documentation (e.g. poster/handout) | LO3, LO4 Report on design methodology and outcomes of testing |

| **Updated by**: Andrew ReedDate: July 2024 | **Approved by**: H Galpin-MitchellDate: July 2024 |
| --- | --- |

**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).