UNIVERSITY OF
PLYMOUTH

Programme Quality Handbook 2023/24

HNC Manufacturing Maintenance Engineer

Welcome to HNC Manufacturing Maintenance Engineer delivered at Kings Road Campus by City College Plymouth.

With the ever growing need for multi-skilled personnel this HNC equips you with the knowledge to understand, design, develop and maintain electrical and mechanical systems within a manufacturing environment.
This programme has been designed to give the student a broad knowledge of manufacturing engineering, covering essential engineering topics such as mathematics, engineering science and principles, as well as essential design methodologies. Students will embark on design projects throughout the course where they will be able to use Computer Aided Design along with other industry based software to showcase their new found knowledge and skills. Throughout the course many of the module's assessments have been arranged to gain essential knowledge that will carry through to other modules. A wide range of assessments have been adopted to ensure student engagement including practical based assessments, reports, exams, portfolios and presentations.

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=3560 - Plymouth University's Student Handbook**
  - **available at: https://www.plymouth.ac.uk/your-university/governance/student-handbook**

HNC Manufacturing Maintenance Engineer

Final award title: HNC Manufacturing Maintenance Engineer Level X Intermediate award title(s): N/A
Level X Intermediate award title(s): N/A
UCAS code - N/A
HECOS code N/A
Awarding Institution: University of Plymouth
Teaching institution(s): City College Plymouth
Accrediting body(ies) N/A

Distinctive Features of the Programme and the Student Experience

This HNC contributes to the important role manufacturing plays for the UK's, and more specifically Plymouth's, economies. Locally, manufacturing accounts for nearly 13 per cent of the total economy and a similar proportion of the labour market. Plymouth Manufacturing Group (PMG) members alone have a collective turnover of £1.6bn, which equates to 15.3% of the local economy (www.mypmg.co.uk, 2019).
The delivery of the HNC Manufacturing Maintenance Engineer encompasses today's manufacturing requirements and that of their project and lead staff. The course is in 6 parts, or modules, covering the key aspects of Electrical, Electronic and Mechanical Engineering such as engineering science and maths, electrical and electronic principles and design with CAD. The programme is therefore to equipped to provide the manufacturing maintenance engineers of today with the knowledge to understand the principles behind electrical and mechanical systems, design and analyses.
Classroom lecturing is supported by practical workshops using industry standard hardware and software development environments within the College's specialist facilities. This will take full advantage of the College's £13m investment in the state-of-the-art Regional Centre of Excellence for STEM (Science, Technology, Engineering and Mathematics).
A rich range of assessment is employed to immerse students within their learning, not only on the underlying academic 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 this course. Combined with continued consideration of wider engineering sectors, this ensures that the attributes and skills exercised by students on this course remain relevant to employment in the manufacturing sector locally, nationally and globally.
Delivery is flexible, aiming to accommodate, as much as is feasible, part-time students who are in full-time employment by utilising a day release delivery model to ensure that the impact on employment is kept to a minimum.

Relevant QAA Subject Benchmark Group(s)

As a level-4 HNC, this programme is informed by:

- The QAA Framework for Higher Education Qualifications (FHEQ) 2014
- The QAA Foundation Degree Characteristics Statement (FDCS) 2015
- The QAA Subject Benchmark Statement for Engineering 2015 and link to the UK Engineering Council's UK-SPEC UK Standard for Professional Engineering Competence
  https://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20Education%20Programmes%20third%20edition%20(1).pdf

- The QAA Quality Code 2018 https://www.qaa.ac.uk/quality-code
- The Pearson BTEC Level 4 HNC Diploma in Manufacturing Engineering 2010 – Appendix 1
  https://qualifications.pearson.com/en/qualifications/btec-higher-nationals/manufacturing-engineering 2010.html

Programme Structure

The Programme of study comprises of 120 module credits at level 4.

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 following on from and as a progression route for those students who undertake the level 3 Engineering Diploma (NDMD) at City College Plymouth. Therefore, this course is only offered as a part-time programme only.

HNC Full Time			
Module Code	**Module Title**	**No. of Credits**	**Core / Optional**
CITY1077	Engineering Mathematics	20	**Core**
CITY1078	Engineering Science 1	20	**Core**
CITY1092	CAD Techniques & Design	20	**Core**
CITY1095	Applications of Pneumatics and Hydraulics	20	**Core**
CITY 1079	Digital and Analogue Devices and Circuits	20	**Core**
CITY 1081	Electrical and Electronic Principles	20	**Core**

HNC Part Time Stage 1			
Module Code	**Module Title**	**No. of Credits**	**Core / Optional**
CITY1077	Engineering Mathematics	20	**Core**

CITY1078	Engineering Science 1	20	**Core**
CITY1092	CAD Techniques & Design	20	**Core**
Stage 2			
CITY1095	Applications of Pneumatics and Hydraulics	20	**Core**
CITY 1079	Digital and Analogue Devices and Circuits	20	**Core**
CITY 1081	Electrical and Electronic Principles	20	**Core**

Programme Aims

1. To develop knowledge and understanding of engineering principles related to manufacture
2. To develop analytical skills related to the solving of manufacturing problems 3. To enable the opportunity to apply technical and practical skills.
4. To prepare students to 'contribute towards design' via practical and project-based work.
5. To develop students' skills in 'accepting and exercising personal responsibility.' 6. To prepare students to use effective communication and interpersonal skills.

Programme Intended Learning Outcomes

Knowledge and understanding

On successful completion graduates should have developed knowledge and understanding of:

1) the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in -manufacturing.
2) relevant materials, equipment, tools, processes, products and practice to be employed for manufacture of engineering solutions.

Cognitive and intellectual skills

On successful completion graduates should have developed the cognitive and intellectual skills to analyse and apply:

1) information sourced from academic and technical literature and other sources. 2) knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for electrical and mechanical manufacturing solutions.

Key and transferable skills

On successful completion graduates should have developed the key and transferable skills to:

1) conduct and manage themselves to contribute through personal and team programmes of work with the ability to communicate appropriately within working environments.
2) engage with and effectively employ general IT applications and facilities.

Employment-related skills

On successful completion graduates should have developed the employment related skills to:

1) analyse and solve problems of an engineering nature.

Practical skills

On successful completion graduates should have developed the practical skills to: 1) work safely and competently within a workshop or laboratory environment. 2) Work with information that may be incomplete or uncertain to monitor, analyse and evaluate electrical and mechanical systems in practice.

Admissions Criteria, including APCL, APEL and Disability Service arrangements All applicants must have GCSE (or equivalent) Maths and English at Grade C or above.

Entry Requirements for HNC Engineering for Manufacture	
A-level/AS-level	Normal minimum entry requirements are 48 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 48 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 48 UCAS points
Welsh Baccalaureate	Normal minimum entry requirements are an equivalent of 48 on new UCAS Tariff include Maths, Physics or Engineering
Scottish Qualifications Authority	Normal minimum entry requirements are an equivalent of 48 on new UCAS Tariff include Maths, Physics or Engineering
Irish Leaving Certificate	Normal minimum entry requirements are an equivalent of 48 on new UCAS

	Tariff include Maths, Physics or Engineering
International Baccalaureate Non-Standard Qualifications with experience	Normal minimum entry requirements are an equivalent of 48 on new UCAS Tariff include Maths, Physics or Engineering
	All non-standard applicants are interviewed by the tutor and screened centrally to ensure impartial oversight.
Disability	**The College has a dedicated Learning Support team who support in every aspect of the student journey, including recruitment and admissions. Students who declare they have a disability may be invited to meet the team to discuss support needs relevant to the course and to determine any physical barriers that may be in place. The College is committed to being an inclusive environment and will work to ensure all reasonable adjustments are made.**

Progression criteria for Final and Intermediate Awards

N/A

Non-Standard Regulations

N/A

Transitional Arrangements

None

Appendices

Programme Specification Mapping (UG) – core/elective modules

CORE MODULES: tick those Award Learning Outcomes the module contributes to through its assessed learning outcomes. Insert rows and columns as required.

Appendix 1: Programme Specification Mapping (UG): module contribution to the meeting of Award Learning Outcomes

Core Modules		Award Learning Outcomes contributed to (for more information see Section 8)																	
		Knowledge & understanding				Cognitive & intellectual skills				Key & transferable skills				Employment related skills				Practical	
		1	2			1	2			1	2			1				1	2
	CITY1077 Engineering Mathematics (Core)	/									/			/					/
	CITY1078 Engineering Science 1 (Core)	/	/															/	
	CITY1079 Digital and Analogue Devices and Circuits (Core)		/			/	/			/	/							/	/
	CITY1081 Electrical and Electronic Principles (Core)		/			/					/							/	/
	CITY1095 Applications of Pneumatics and Hydraulics (Core)		/			/				/	/							/	/
	CITY1092 CAD Techniques and Design (Core)	/				/	/			/	/								
Level 4 LOs		3	4			4	2			3	5			1				4	4

Appendix 1 - Plymouth University

Module Mapping to Pearson BTEC (Programme title) units

As part of the University's approval process it has been confirmed that the core content for the Pearson BTEC HND in (Programme titles) is covered in the (Partner College plus Programme Title).

Date completed: 04/06/2023

Pearson BTEC (Programme Title)	**(Partner College plus Programme Title)**
BTEC Level 4 HNC in Manufacturing Engineering (RQF)	**City College Plymouth** **HNC Manufacturing Maintenance Engineer**

Unit name plus list of learning outcomes Unit 1 Analytical Methods for Engineers 1 Be able to analyse and model engineering situations and solve problems using algebraic methods 2 Be able to analyse and model engineering situations and solve problems using trigonometric methods 3 Be able to analyse and model engineering situations and solve problems using calculus 4 Be able to analyse and model engineering situations and solve problems using statistics and probability.	CITY1077 Engineering Mathematics LO1. recognise the essential application of mathematical techniques to solve en LO2. apply exact mathematical methods to analyse and solve problems of an en LO3. use complex number theory in practical engineering applications LO4. und integral calculus and their associated applications in engineering

Unit 2 Engineering Science 1 Be able to determine the behavioural characteristics of elements of static engineering systems 2 Be able to determine the behavioural characteristics of elements of dynamic engineering systems 3 Be able to apply DC theory to solve electrical and electronic engineering problems 4 Be able to apply single phase AC theory to solve electrical and electronic engineering problems.	CITY1078 Engineering Science 1 LO1. Demonstrate an understanding of basic static and dynamic mechanical sys LO2. Investigate energy transfer in thermal and fluid systems LO3. Recognise ar electrical machines LO4. Show knowledge and awareness of the fundamental principles of single ph
Unit 19 Computer-aided Design and Manufacture	CITY1092 CAD Techniques and Design

1 Be able to produce a component drawing suitable for transfer onto a CAM system and produce a simple 3D surface 2 Be able to transfer data generated in CAD to a CAM system for subsequent machining 3 Be able to simulate the cutter paths on a CAM system to optimise the machining	LO1. Produce 2D detail and assembly drawings usi British Standards. LO2. Have a good understanding of 3D Modelling a LO3. Produce 3D wireframe, surface, and solid mod LO4. Produce rendered and animated visualisations

sequences 4 Understand how to transfer a generated tape file to a CNC machine and produce the component.	
Unit 24 Applications of Pneumatics and Hydraulics 1 Be able to read and interpret pneumatic and hydraulic fluid power diagrams 2 Understand the construction, function and operation of pneumatic and hydraulic components, equipment and plant 3 Be able to design pneumatic and hydraulic circuits 4 Be able to evaluate and justify industrial applications of pneumatics and hydraulics.	CITY1095 Applications of Pneumatics and Hydraulic LO1. Interpret fluid power diagrams LO2. Analyse the construction and operation of pne plant LO3. Design pneumatic and hydraulic circuits LO4. and hydraulics.
Unit 22 Programmable Logic Controllers 1 Understand the design and operational characteristics of a PLC system 2 Understand PLC information and communication techniques 3 Be able to apply programmable logic programming techniques 4 Understand alternative implementations of programmable control.	CITY1079 Digital and Analogue Devices and Circuit LO1. Describe the operation and characteristics of a LO2. Describe the operation and use of a range of l simulation and/or practical build an analogue circuit LO4. Design and test, using computer simulation an specification
Unit 5 Electrical and Electronic Principles 1 Be able to apply electrical and electronic circuit theory 2 Be able to apply two-port network models 3 Understand the use of complex waves 4 Be able to apply transients in R-L-C circuits.	CITY1081 Electrical and Electronic Principles LO1. Demonstrate an understanding of dc circuit the circuit problems. Understand the application of vect circuits. LO2. Investigate and develop analytical mo LO3. Demonstrate an understanding of the analysis Develop an understanding of the analysis of circuit

WBL is an essential element of Foundation Degrees and therefore needs to be detailed here.

FHEQ **level:** 4			
WBL Activity	**Prog Intended LO**	**Related Modules**	**Assessed LO**
Work related activities	All LO's	All modules	**8.3.Key and transf** 1. conduct and affectively th team progra ability to co professional 2. Engage with general IT applicati **8.4.Employment-rel**

			1. Analyse and solv an engineering nat
An explanation of this map: When planning or designing our curriculum we make decisions about a wide range of interacting elements. These are considered together and not as a series of items. Therefore, choices about aims which affect methods of assessment or availability of resources may support or preclude methods of learning and practicalities of time and venue may dictate the mode of instruction. Also the views of different stakeholders, including the industry partners have a major impact. The students are central, but their needs must fit with the demands of the employers and the requirements of higher education. The City College Plymouth lecturers and the industry sponsors must share a common understanding of the curriculum pressures, and this is discussed utilising employer focus groups and forums.			

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

MODULE CODE: **CITY1077**	**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, to apply principles to the solution of engineering problems, and to make use of mathematical computer based packages.

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

S[redacted]

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. recognise the essential application of mathematical techniques to solve engineering problems
LO2. apply exact mathematical methods to analyse and solve problems of an engineering and scientific nature
LO3. use complex number theory in practical engineering applications
LO4. understand a variety of techniques of differential and integral calculus and their associated applications in engineering

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

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.

ACADEMIC YEAR: 2023/24	**NATIONAL COST CENTRE: 122**

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 $\sinh^{-}$, cosh and tanh. 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.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	Comments/Additional Information
Lecture	60	30 x 2 hour lectures
Tutorial	30	Group and individual academic tutorials
Independent Study	110	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%	LO1-4 (Covering topics not assessed in coursework)
Coursework	C1	Assignment	100%	LO1-4

Updated by: Owais Raja Date: July 2023	**Approved by**: Alan Austin Date: July 2022

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.

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

[redacted]

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**

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.

ACADEMIC YEAR: 2023/24	**NATIONAL COST CENTRE: 114**

MODULE LEADER: Tamal Barman	**OTHER MODULE STAFF:**

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	60	30 x 2hr sessions
Tutorial	30	30 x 1hr

Independent Study	110	A mixture of guided study and self-study.
Total	**200**	

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

Updated by: Tamal Barman **Date:** July 2022	**Approved by:** Alan Austin **Date:** July 2022

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 1092	**MODULE TITLE:** CAD Techniques and Design

CREDITS: 20	**FHEQ LEVEL:4**	**JACS CODE: H130**

PRE-REQUISITES: None	**CO-REQUISITES:** None	**COMPENSATABLE: Yes**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
An Introduction into CAD in the Design Process, progressing swiftly through 2D draughting to explore 3D conceptual design and visualisation. During this module students will take part in a relevant work based design project.

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ELEMENTS OF ASSESSMENT ***[Use HESA KIS definitions}***					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)		**C1**	100%	**P1**	

E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL Group to which module should be linked: Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
Investigation of how formal draughting forms a corner stone of the design process Practice of the skills necessary to produce and interpret drawings and computer models to British Standards
Experimentation in to the use of 3D visualisation as an engineering tool
Introduce Design techniques and carry out a work based design project.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
LO1. Produce 2D detail and assembly drawings and 3D wireframe, surface and solid models using an industry standard CAD package to British Standards.
LO2. Produce rendered and animated visualisations to present to employers
LO3. Formulate, implement, evaluate and present a work based design project **LO4.** Report to employers on the sustainability and ecology in design and the product life cycle

DATE OF APPROVAL: May 2017	**Academic Partnerships**
DATE OF IMPLEMENTATION: Sept 2017	**City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: All year**

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.

ACADEMIC YEAR: 2023/24	**NATIONAL COST CENTRE: 143**

MODULE LEADER: Martin Boulter	**OTHER MODULE STAFF:**

Summary of Module Content
CAD & Drawings in the design process
Drawing standards and formats
The use of 2D CAD drawing and editing commands
Conceptual Design and 3D CAD
3D Wireframe, Surface and Solid Modelling commands
3D Visualisation
Sustainability and ecology in design and the product life cycle.
Material and process selection tools. Functionality, component simulation (free body diagrams, etc.) Design calculation tools - spread sheets. The design process - specifying, creating and evaluating ideas, developing and documenting. Working in a team. System design - team working.

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions}***		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	20	10 x 2 hr lectures
Practical Sessions	40	Application of techniques and methods learnt
Tutorial	15	A mixture of group and personal tutorials
Directed Independent Study	125	Working in groups and independently on their Projects
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc)**

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Coursework	C1	Portfolio of Evidence Report	75% 25%	LO1, LO2, LO3 LO4

Updated by: Martin Boulter Date: July 2022	**Approved by**: Alan Austin Date: July 2022

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

MODULE CODE: CITY1095	**MODULE TITLE:** Applications of Pneumatics and Hydraulics

CREDITS: 20	FHEQ LEVEL:4	JACS CODE: H141

PRE-REQUISITES: None	CO-REQUISITES: None	COMPENSATABLE: Yes

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
Learners will investigate pneumatic and hydraulic diagrams, examine the characteristics of components and equipment and evaluate the applications of pneumatics and hydraulics.

ELEMENTS OF ASSESSMENT ***[Use HESA KIS definitions}***					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally Scheduled)	**50 %**	**C1**	**50 %**	**P1**	
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL Group to which module should be linked: Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
The aim of this unit is for the student to develop their knowledge and understanding of fluid power systems, including hydraulics and pneumatics where they will analysis and evaluate circuits, systems and identify specifications for given engineering problems.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
LO1. Interpret fluid power diagrams
LO2. Analyse the construction and operation of pneumatic and hydraulic components, equipment and plant
LO3. Design pneumatic and hydraulic circuits
LO4. Evaluate industrial applications of pneumatics and hydraulics.

DATE OF APPROVAL: Jan 2017	**Academic Partnerships**
DATE OF IMPLEMENTATION: September 2017	**City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: All year**

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.*

ACADEMIC YEAR: 2023/24	**NATIONAL COST CENTRE: 115**

MODULE LEADER: Owais Raja	OTHER MODULE STAFF:

Summary of Module Content

Investigate fluid diagrams and review either fluid power diagrams and report on the design of either a pneumatic or hydraulic multi-actuator sequential operation using a minimum of four actuators or review fluid power diagrams and report on the design of either a pneumatic or hydraulic reversible rotary actuation with speed control in both directions.

Analyse the construction and operation of pneumatic and hydraulic components, equipment and plant

Design pneumatic and hydraulic circuits (design and draw a circuit for either a pneumatic or hydraulic multi-actuator sequential operation, including emergency stop functions)

Evaluate industrial applications of pneumatics and hydraulic.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions}*		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	40	20 x 2hrs lectures
Tutorial	15	A mix of group and individual tutorials
Directed Independent Study	50	Guided self-study
Self-Study	85	Individual self-study
Workshop time	10	5 x 2hrs workshop sessions
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc)**

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1	Exam	100%	LO2, LO4
Coursework	C1	Design Assignment	100%	LO1, LO3

Updated by: **Owais Raja Date:** July 2022	**Approved by:** Alan Austin **Date:** July 2022

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**

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.

ACADEMIC YEAR: 2023/24	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Andrew Reed	**OTHER MODULE STAFF: 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	50% - presentation 50% - Supporting documentation (e.g.	LO3, LO4

			poster/handout)	

Updated by: Andrew Reed Date: July 2022	**Approved by**: Alan Austin Date: July 2022

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**

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.

ACADEMIC YEAR: 2023/24	**NATIONAL COST CENTRE: 119**

MODULE LEADER: 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: George Audu Date: July 2022	**Approved by**: Alan Austin Date: July 2022