PETROC

UNIVERSITY OF PLYMOUTH

ACADEMIC PARTNERSHIPS PROGRAMME QUALITY HANDBOOK 2021-22

HNC Electronics

Full time code: HEB600

Part time code: PTB482

Date of Approval: July 2019

Start date: September 2020

First award: July 2021

Contents

Welcome and Introduction

Welcome to HNC Electronics delivered at the North Devon Campus by Petroc.

Many businesses in the South West either produce electronic equipment or use them in the manufacture of their own products. There is a strong demand for higher technical skills gained in assessing electronic circuits and systems, and in the testing and evaluation of electronic equipment. This HNC Electronics programme combines academic and practical skills, hand-in-hand, to meet these needs and produce graduates who hold the key to driving forward electronic solutions in engineering.

The HNC Electronics programme provides sufficient flexibility in its delivery to enable modules to be selected to suit a variety of contexts for those working toward being higher technicians in the electronic field. This programme also contributes to the level 4 apprenticeship programmes, which underpins knowledge requirements in industry. The delivery is either one-year full time or two-year part time day release, and each module studied is supported by a virtual learning environment with study materials that supplement the in-class or workshop sessions.

Students are exposed to and use industry standard assembly techniques, demonstrating their skills through both laboratory work and their individual project, evidencing their adaptability to enhance current and increase the efficiency of less productive elements of current electronic circuits. Students are expected to embrace emerging technologies, understand and work to timely completion and use creativity to incorporate these into project work in-line with current industry standards. The HNC Electronics programme will develop high quality electronic engineers with a sound understanding of engineering principles.

The course will provide a focus on analytical techniques, design and practical investigation to help students solve actual electronic engineering problems. The course provides a grounding in the key concepts (electrical and electronic principles) and practical skills required in the modern engineering industry. There will be access to our excellent industry standard software such as CAD (Computer Aided Design). The course will stretch academically and encourage application of understanding in our purposely equipped laboratory.

The course is designed to support the needs of local electronic engineering companies and to address a range of regional skill shortages. Opportunities have been created throughout the programme for students to engage and work on a variety of projects with local business. The programme will develop high quality electronic engineers, with appropriate people and communication skills to succeed in the modern working environment. Individuals will be provided with the opportunity to develop employability skills through team projects, formal presentations, and the need to submit technical reports to a professional standard.

This course is delivered at main site campus in Barnstaple where classes take place in the new technology building where specialised electronic laboratories are designed to provide

maximum opportunity for students to gain practical learning relating to design, build and test methodology. Students have access to high quality equipment, including computer with simulation, cad and cam applications, a wide range of measuring tools including virtual testing instruments, various microcontrollers and microprocessor based systems. There is also access to the mechanical workshops which include CNC machines and 3D printers.

The majority of students are already in the workplace contribute with first-hand knowledge and experience in seminars and peer discussions, sharing of workplace experiences across the cohort, giving those not yet in a related employment insights to applications and those in the workplace can compare and contrast working experiences, skills and ideas with others in the group.

There is a positive working relationship with local employers that allows visits to nearby industries which are useful in supporting particular modules and are close enough to allow short trips out without interrupting on other teaching sessions. Students can therefore expect a varied and enriched teaching and learning experience due to the location of the college and their positive engagement with local industries.

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 University Student Institution Handbook which contains student support based information on issues such as finance and studying at HE available at: https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=3059
- Your Module Guide available at: https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=2035
- Your University of Plymouth Student Handbook available at: https://www.plymouth.ac.uk/your-university/governance/student-handbook

Programme Specification

Programme Specification

Programme Details

Awarding Institution:	University of Plymouth
Partner Institution and delivery site (s):	Petroc
Accrediting Body:	N/A
Language of Study:	English
Mode of Study:	Full-time and Part-time
Final Award:	HNC Electronics
Intermediate Award:	N/A
Programme Title:	Electronics
UCAS Code:	H700
JACS Code:	
Benchmarks:	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 • The QAA Quality Code 2013-2018 https://www.qaa.ac.uk/quality-code/UKQuality-Code-for-Higher-Education-2013-18 • The Pearson BTEC Level 4 HNC Diploma in Engineering (Electrical & Electronic Engineering) 2017
Date of Programme Approval:	July 2019

Programme Structure

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

FHEQ Level: 4 For: HNC Electronics Full Time (F/T)			
F/T Route Year	**Core or Option Module**	**Credits**	**Module**
1	Core	20	PETR1092 Analytical Methods
1	Core	20	PETR1142 Electrical and Electronic Fundamentals
1	Core	20	PETR1091 Electronics
1	Core	20	PETR1097 Level 4 Project
1	Option	20	PETR1141 Mechatronics
1	Option	20	PETR1098 Industrial Electronics
1	Option	20	PETR1095 Introduction to Engineering Software
1	Option	20	PETR1143 Advanced CAD Techniques

FHEQ Level: 4 For: HNC Electronics Part Time (P/T)			
P/T Route Year	**Core or Option Module**	**Credits**	**Module**
1	Core	20	PETR1092 Analytical Methods
1	Core	20	PETR1142 Electrical and Electronic Fundamentals
1	Core	20	PETR1091 Electronics
2	Core	20	PETR1097 Level 4 Project
2	Option	20	PETR1141 Mechatronics
2	Option	20	PETR1098 Industrial Electronics
2	Option	20	PETR1095 Introduction to Engineering Software
2	Option	20	PETR1143 Advanced CAD Techniques

With strong links with employers in North Devon and a high number of part-time learners who are already employed in the industry, our programme has been developed to provide knowledge and understanding for the diverse roles the field of Electronics across the North Devon. As a progression route for those students who undertake the level 3 Engineering Diploma or A levels. This can be used as the knowledge element of a level 4 Apprenticeship.

Programme Aims

The programme aims to enable graduates to be able to demonstrate the:

Aim 1 use of knowledge and understanding of the common established principles in their field of electronic fundamentals, and understanding of the limits of their knowledge

Aim 2 use of knowledge of common applications in electronic engineering and the ability to use established techniques to undertake with support the analysis of information in order to test against specifications

Aim 3 the ability to assess the appropriateness of different approaches to solving problems and to apply these in a work context

Aim 4 the ability to apply their knowledge and skills to familiar situations, including in the workplace

Aim 5 use effective communication skills in a variety of forms and for a range of audiences.

Programme Intended Learning Outcomes.

Knowledge and understanding

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

i the scientific, mathematical and statistical principles underpinning the application of current technologies, and their evolution, in engineering.

ii product placement, management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors.

iii relevant materials, equipment, tools, processes, products, and practice to be employed within workshop and laboratory practice.

Cognitive and intellectual skills

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

i. information sourced from academic and technical literature and other sources.

ii. through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering.

iii. knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering

Key and transferable skills

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

i. conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally.
ii. engage with and effectively employ general IT applications and facilities.

Employment related skills

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

i. use appropriate codes of practice and industry standards.
ii. focus and reflect on professional development so as to target their lifelong learning within the working environment.

Practical skills

On successful completion, graduates should have developed the practical skills to:

i. select appropriate equipment and work safely and competently within a workshop or laboratory environment.
ii. Work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering 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 Electronics	
A-level/AS-level	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
BTEC National Diploma/QCF Extended Diploma	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering, Should have studied Further Mathematics.
Access to Higher Education at level 3	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
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	If overseas and not studying English within IB, must have IELTS 6.0 overall with 5.5 in all other elements.
Progression from Extended Science	Students who pass the Extended Science year are guaranteed progression to one of the Faculty's BSc (Hons) programmes and detailed advice will be provided by the Admissions Tutor.
Non-Standard Qualifications with experience	All non-standard applicants are interviewed by the tutor and screened centrally to ensure impartial oversight. APEL and APCL may take place at this time or by prior arrangement
Capability and disability	The College would advise on the requirements of the programme in relation to workshop and lab work. Prospective students will be meet a team member for an interview, where your needs can be discussed.

Progression criteria for Final and Intermediate Awards

This programme is a standalone HNC designed on the needs and in consultation with our local manufacturing sector. Progression to a Foundation Degree in either Embedded Systems Design or Electronics and Communications. Progressing students would need to complete any outstanding Level 4 modules and level 5 modules for the programme selected.

Module Records

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: PETR1091 **MODULE TITLE:** **Electronics**

CREDITS: 20 **FHEQ LEVEL:** 4 **HECOS CODE:100163**
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE: Yes**
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module provides an introduction to fundamental electronic theory considering a range of analogue and digital circuits and components so that students will have a firm base from which to work when they undertake further studies.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	50%	**C1** (Coursework)	50%	**P1** (Practical)	0%
E2 (Clinical Examination)	0%	**A1** (Generic assessment)	~~Pass/Fail~~		
T1 (Test)	0%				

SUBJECT ASSESSMENT PANEL to which module should be linked: Science & Technology
Professional body minimum pass mark requirement: N/A
MODULE AIMS:

- To develop a good fundamental understanding of analogue and digital electronic principles.
- To develop knowledge by carrying out analysis of electronic circuits and devices.
- To mathematically model electronic circuits and investigate their performance.

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
	FdSc Embedded Systems Design FdSc Electronics and Communications HNC Electronics
1. Explain and test the principles of the common electronic devices and their use in electronic circuits	KU 8.1 i – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering.

2.	Analyse analogue and digital electronic circuits and determine their performance.	KU 8.1 ii – product placement, management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political Economic Social, Technological, Legal and Environmental Factors. KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.
3.	Investigate single and multi-stage circuits and carry out performance calculations to draw meaningful conclusions.	CIS 8.2 i - information sourced from academic and technical literature and other sources. CIS 8.2 ii - through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering.
4.	Assess analogue and digital electronic circuits to meet a technical specification	PS 8.5 i – select appropriate equipment and work safely and competently within a workshop or laboratory environment. PS 8.5 ii – Work with information that may be incomplete or uncertain to monitor, analyse and evaluate in practice

DATE OF APPROVAL: XX/06/2019	**FACULTY/OFFICE:** Academic Partnerships
DATE OF IMPLEMENTATION: XX/09/2019	**SCHOOL/PARTNER:** PETROC
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER:** Semester 2

Notes:

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/information-and-guidance/publication/?PubID=2718#.VW2INtJVikp
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- 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: 2021 - 2022 **NATIONAL COST CENTRE:120**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF: Robert Coombes**

Summary of Module Content

1. the function and performance of different types of electronic circuit devices.
2. the performance of a selection of circuits using modelling
3. Use simulation ECAD to provide support for determining circuit performance.
4. internal structure implemented in common integrated circuits.
5. the effects of feedback in analogue circuits
6. digital devices in fundamental combinational and sequential circuits
7. test, fault finding and evaluate, analogue and digital electronic circuits,
8. modified electronic circuits to meet customer specifications.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	10	Guided Learning and teaching
Seminar	10	Solving student centred problems
Guided Independent Study	140	Online worksheets and learning materials
Practical Classes & workshops	40	Support and feedback from tutor.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Written exam	Exam LO2 and LO3 electronic devices and circuit principles	100% Total = 100%
Coursework	Assignment LO1 and LO4 investigate and assess circuits	100% Total = 100%%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Written exam	Exam LO2 and LO3 electronic devices and circuit principles	100% Total = 100%
Coursework	Assignment LO1 and LO4 investigate and assess circuits	100% Total = 100%%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 10/2021	**Approved by**: Date: XX/XX/XXXX

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: PETR1092 **MODULE TITLE:** Analytical Methods

CREDITS: 20 **FHEQ LEVEL:** 4 **HECOS CODE:** 100400

PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE: No**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module focuses upon the mathematical strategies and processes involved in solving a wide range of engineering problems. Develops analytical and algebraic skills transferable to engineering subjects. Gives students the analytical tools to solve problems in their own field and also exposes them to the application of complex number, matrix methods, calculus and statistics across engineering**.**

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	40%	**C1** (Coursework)	60%	**P1** (Practical**)**	0% or ~~Pass/Fail~~
E2 (Clinical Examination)	0% or ~~Pass/Fail~~	**A1** (Generic assessment)	0%		
T1 (Test)	0%				

SUBJECT ASSESSMENT PANEL to which module should be linked: Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- Develop an appreciation of the need for accurate analysis of engineering problems.
- Improve confidence and competence in the use of numerical and analytical techniques.
- Motivate students to use Mathematics software package for engineering solutions.

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
	FdSc in Production and Manufacture Engineering FdSc Embedded Systems Design FdSc Electronics and Communications HNC Electronics HNC Mechanical Design and Manufacture
1. Analyse engineering data and evaluate information from various sources e.g. apply probability or statistics.	KU 8.1 i – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in electrical and electronic engineering.

2.	Determine solutions to engineering problems using differential and integral calculus.	CIS 8.2 iii – knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering
3.	Solve first and second order ordinary differential equations.	KTS 8.3 ii - engage with and effectively employ general IT applications and facilities.
4.	Use matrix algebra and complex number theory in practical applications.	CIS 8.2 ii - through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering.
5.	Apply routine and non-routine mathematical techniques to solve engineering problems.	KTS 8.3 i conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally. CIS 8.2 iii – knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering ERS 8.4 focus and reflect on professional development so as to target their lifelong learning within the working environment.

DATE OF APPROVAL: XX/09/2016	**FACULTY/OFFICE:** Academic Partnerships
DATE OF IMPLEMENTATION: 09/09/2019	**SCHOOL/PARTNER:** PETROC
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER:** Semester 1

Notes:

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/information-and-guidance/publication/?PubID=2718#.VW2INtJVikp
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- 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

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ACADEMIC YEAR:	**2021 - 2022**	**NATIONAL COST CENTRE:**	**119**
MODULE LEADER:	**Irina Spulber**	**OTHER MODULE STAFF:**	Robert Coombes

Summary of Module Content

- Addition, subtraction, multiplication and division of complex numbers. Polar form and Argand diagram.
- Matrix operators, inverse of a matrix, solution of non-singular linear systems of equations using matrix and determinant methods.
- Definition and interpretation of a derivative. Sum, product, quotient and function of a function rules. Rates of change, second derivative and the use of max/min theory to solve engineering problems. Define the partial derivative, functions of more than two variables, small changes and errors.
- Solve differential equations with general and particular solutions. Linear second order ordinary differential equations with real and complex roots. Complementary function and particular integral. Engineering applications: electrical and mechanical (damped and forced vibrations).
- Integration by parts, the definite integral. Engineering applications of integration e.g.- area, centroid of simple shapes, second moment of area, mean and RMS Mean, SD and variance of bi-variate data. Regression, Pearson's coefficient, Spearman's rank correlation coefficient.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	40	Guided learning
Seminar	15	Woking through student issues with set problems
Workshop	20	Computer based practical application work with support and feedback from tutor.
Guided Independent Study	125	Guidelines for this are provided on the Moodle and flip teaching activities, preparing for each lesson, is expected.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Written exam	Exam LO3 and LO5	100% Total =100%
Coursework	Assignment LO1 (statistics), LO2 (calculus), LO4 (complex numbers and matrices)	100% Total =100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Written exam	Exam LO3 and LO5	100% Total =100%
Coursework	Assignment LO1 (statistics), LO2 (calculus), LO4 (complex numbers and matrices)	100% Total =100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 10/2021	**Approved by**: Date: XX/XX/XXXX

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: PETR1095 **MODULE TITLE:** Introduction to Engineering Software

CREDITS: 20 **FHEQ LEVEL: 5** **HECOS CODE:** 100162
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: Yes**
SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module explores the application of engineering software to support solutions to engineering problems. These can range from mathematical solutions such as the use of Matlab, to electronic simulation, programmable logic controllers, CNC programming. A range of engineering software will allow students to select and explore engineering solutions

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	0%	**C1** (Coursework)	70%	**P1** (Practical)	30%
E2 (Clinical Examination)	0% or ~~Pass/Fail~~	**A1** (Generic assessment)	~~Pass/Fail~~		
T1 (Test)	0%				

SUBJECT ASSESSMENT PANEL to which module should be linked:

Professional body minimum pass mark requirement:

MODULE AIMS:

- To develop an understanding of the concepts of engineering application programming.
- To understand principles underlying efficient solutions.
- To apply appropriate skills in the design, coding, and testing of programs.
- To assess the effectiveness of commercial engineering software.

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	Award/ Programme Learning Outcomes contributed to
1. Apply an engineering software application to solve simple problems.	HNC Electronics HNC Mechanical Design & Manufacture KU 8.1 i – the scientific, mathematical and statistical principles underpinning application of

2. Produce documentation to commercial standards. 3. Develop and apply testing strategies to meet specifications. 4. Justify the use of the code in routine operations.	current technologies, and their evolution, in electrical and electronic engineering. KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice. CIS 8.2 i -information sourced from academic and technical literature and other sources. CIS 8.2 iii – knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering. KTS 8.3 i - conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally. KTS 8.3 ii- engage with and effectively employ general IT applications and facilities. PS 8.5 i – select appropriate equipment and work safely and competently within a workshop or laboratory environment. PS 8.5 ii – Work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering in practice

DATE OF APPROVAL: XX/10/2019	**FACULTY/OFFICE: Academic Partnership**
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER: PETROC**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1**

Notes:

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/information-and-guidance/publication/?PubID=2718#.VW2INtJVikp

- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- 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: 2021 – 2022 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF: Robert Coombes**

Summary of Module Content

- Use a variety of engineering software applications
- graphical user interfaces, and numerical programming exercises
- range from heavily mathematical solutions such as the use of matlab, to electronic simulation, programmable logic controllers and CNC part programming.
- Students will explore a selection of these areas of applied engineering software

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	30	Develop programming skills in analytical and practical engineering
Case studies	15	Develop engineering programming skills through case
Self Directed	155	Students follow tutorial work sheets from VLE
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Coursework	Report LO2 Report LO1, 4	30% 70% Total=100%
Practical	Assessed programming exercise LO3	100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Report LO2 Report LO1 , LO4	30% 70% Total=100%
Practical	Assessed programming exercise LO3	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 10/2021	**Approved by**: Date: XX/XX/XXXX

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: PETR1097 **MODULE TITLE:** Level 4 Project

CREDITS: 20 **FHEQ LEVEL: 4** **HECOS CODE: 100182**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: Yes**
SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module is an individual investigation of an engineering problems through the application of agile scrum management philosophy. Student need to be proactive in managing their own learning, needing to find a solution to the task which will relate to a manufacturing situation.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	0%	**C1** (Coursework)	80%	**P1** (Practical**)**	20% or ~~Pass/Fail~~
E2 (Clinical Examination)	0% or ~~Pass/Fail~~	**A1** (Generic assessment)	~~Pass/Fail~~		
T1 (Test)	0%				

SUBJECT ASSESSMENT PANEL to which module should be linked:

Professional body minimum pass mark requirement:

MODULE AIMS:

- To develop an understanding of the inter-relationships between various engineering disciplines including solving routine problems.
- To develop an ability to integrate at least two engineering topics within the context of a specific project tasks.
- To broaden experience and develop a sense of responsibility and self-reliance.
- To introduce the culture of agile scrum into their project management

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Complete a design solution to an existing problem, and to carry out a project specify the framework within which the work will be carried out.	HNC Electronics HNC Mechanical Design and Manufacture KU 8.1 i – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering. KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be

2. Apply agile scrum as a planning and implementation tool to apply decision making during the project tasks 3. Make and test the product or solutions and reflect upon the process and outcomes. 4. Evaluate the information or data and assess whether the project objectives were achieved and what further work may be required, verbally presenting your findings.	employed within workshop and laboratory practice. CIS 8.2 i. -information sourced from academic and technical literature and other sources. CIS 8.2 ii. -through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. CIS 8.2 iii – knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering KTS 8.3 ii- engage with and effectively employ general IT applications and facilities. ERS 8.4 i – use appropriate codes of practice and industry standards. KU 8.1 ii - product placement, management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political Economic Social, Technological, Legal and Environmental Factors. PS 8.5 i – select appropriate equipment and work safely and competently within a workshop or laboratory environment. PS 8.5 ii – Work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering in practice

DATE OF APPROVAL: XX/09/2016	**FACULTY/OFFICE:** ACADEMIC PARTNERSHIP
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER: PETROC**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

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/information-and-guidance/publication/?PubID=2718#.VW2INtJVikp

- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- 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: 2020 - 2021 **NATIONAL COST CENTRE: 120**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF: Robert Coombes**

Summary of Module Content

- possible project aims, objectives and outcomes and proposals.
- project analysis, to include a planning charts, target dates and sources of information.
- agile / scrum as a planning and implementation tool to apply decision making during the project tasks.
- interim reports detailing progress to date.
- oral presentation skills
- final reports to include technical and self-evaluations.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	15	Underpinning theory and target setting
Group work	15	Practical experience of project management processes.
Guided Independent Study	130	Project work research and development
Practical Classes & workshops/labs	40	Students work towards own project outcomes with tutor support – to include one-to-one tutorials to help support progress and personal development in this area.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Coursework	Technical report. LO1,2,4	100% 0% Total=100%

Practical	Oral Presentation LO3	100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Technical report. LO1,2,4	100%
Practical	Oral Presentation LO3	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 10/21	**Approved by**: Date: XX/XX/XXXX

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: PETR1098 **MODULE TITLE**: Industrial Electronics

CREDITS: 20 **FHEQ LEVEL:** 4 **HECOS CODE 100165:**
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE:** Yes
SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module provides an introduction to the basic electrical theory to industrial electronics. A topic which is increasingly required by technical staff to be prepared to work safely in industrial environments using electrical power controls. This module provides an understanding of the basic technical knowledge and skills required to appreciate modern industrial systems.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	50%	**C1** (Coursework)	50%	**P1** (Practical)	0%
E2 (Clinical Examination)	0%	**A1** (Generic assessment)	~~Pass/Fail~~		
T1 (Test)	0%				

SUBJECT ASSESSMENT PANEL to which module should be linked: Science and Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To understand and appreciate the health and safety requirement in power electronic engineering environments
- To develop a good fundamental understanding of power electronic circuits, components and principles.
- To discuss power electronic control circuits and devices and there place in production systems.
- To use schematic diagrams to identify particular features of industrial electronic systems.

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	Award/ Programme Learning Outcomes contributed to
1. Explain the principles and working practices systems containing power electronic circuits.	HNC Electronics KU 8.1 i– the scientific, mathematical and statistical principles underpinning application

2. Discuss power electronic circuits in relation to their topologies. 3. Test industrial electronic circuits and carry out basic calculations. 4. Measure key parameters of power electronic circuits used in an industrial setting.	of current technologies, and their evolution, in electrical and electronic engineering. KU 8.1 ii product placement, management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors. KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice. CIS 8.2 I. - information sourced from academic and technical literature and other sources. ERS 8.4 i. use appropriate codes of practice and industry standards. ERS 8.4 I. - focus and reflect on professional development so as to target their lifelong learning within the working environment. PS 8.5 i – select appropriate equipment and work safely and competently within a workshop or laboratory environment. PS 8.5 ii – Work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering in practice.

DATE OF APPROVAL: XX/09/2016	**FACULTY/OFFICE:** ACADEMIC PARTNERSHIP
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER: PETROC**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 2**

Notes:

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/information-and-guidance/publication/?PubID=2718#.VW2INtJVikp
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- 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: 2021- 2022 **NATIONAL COST CENTRE: 119**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF: David Davies**

Summary of Module Content

- passive components and networks relating to their function in power electronic circuits including tolerances.
- the function and performance of different types of semiconductor power electronic devices.
- the performance a selection of basic power systems including converters.
- the operation of and identify possible failure modes in components in power circuits and systems.
- Test and evaluate, power electronic circuits, modified to meet given specifications including thermal management.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	10	Guided Learning and teaching
Seminar	10	To expand and develop understanding of lecture notes and research by peer feedback and discussion groups.
Guided Independent Study	140	Supported and guided through Moodle exercises and reading requests.
Practical Classes & workshops	40	Workshop practical problem solving through use of circuitry etc
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Written exam	Formal examination LO1 & 2 Principles and problem solving of power circuits	100%
Coursework	report/log of practical investigations LO3 & 4	100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Written exam	Formal examination LO1 & 2 Principles and problem solving of power circuits	100%
Coursework	report/log of practical investigations LO3 & 4	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 10/2021	**Approved by**: Date: XX/XX/XXXX

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: PETR1141 **MODULE TITLE:** Mechatronics

CREDITS: 20 **FHEQ LEVEL:** 4 **HECOS CODE:** 100170

PRE-REQUISITES: **CO-REQUISITES:** **COMPENSATABLE: Yes**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

On successful completion of this unit students will be able to explain the basic mechatronic system components and functions, design a simple mechatronic system specification for a given application, use appropriate simulation and modelling software to examine its operation and function, and solve faults on mechatronic systems using a range of techniques and methods

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	40%	**C1** (Coursework)	60%	**P1** (Practical)	Pass/Fail
E2 (Clinical Examination)		**A1** (Generic assessment)			
T1 (Test)					

SUBJECT ASSESSMENT PANEL to which module should be linked: Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To develop design skills and hands on experience of the characteristics of mechatronic systems
- To develop design mechatronic system specification for a given applications
- To apply simulation and modelling software to the operation and function of a mechatronics system
- To apply diagnostic tests to identify and correct faults in a mechatronic system

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Explain the design and operational characteristics of a mechatronic system.	FdSc in Production and Manufacture Engineering FdSc Embedded System Design FdSc Food Manufacturing HNC Electronics KU 8.1 1 – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering.
2. Design a mechatronic system specification for a given application.	CIS 8.2 2 - through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering.

3.	Examine the operation and function of a mechatronics system using simulation and modelling software.	KTS 8.3 2- engage with and effectively employ general IT applications and facilities
4.	Identify and correct faults in a mechatronic system.	ERS 8.4 1 - use appropriate codes of practice and industry standards PS3 8.5 1 – select appropriate equipment and work safely and competently within a workshop or laboratory environment. PS3 8.5 2 – Work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering in practice.

DATE OF APPROVAL: XX/06/2019	**FACULTY/OFFICE:** Academic Partnerships
DATE OF IMPLEMENTATION: XX/09/2019	**SCHOOL/PARTNER:** PETROC
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER:** Semester 2

Notes:

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/information-and-guidance/publication/?PubID=2718#.VW2INtJVikp
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- 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: 2021 - 2022 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Robert Coombes **OTHER MODULE STAFF: Irina Spulber**

Summary of Module Content

Origins and evolution: History and early development, evolution. Practical examples and extent of use. Current operational abilities and anticipated improvements.
Systems characteristics: Design of systems in an integrated way. Sensor and transducer types used. Consideration of component compatibility. Constraints on size and cost. Control device requirements and examples of applications.

Systems specifications: British and/or European standards relevant to application. Sensor types and interfacing. Actuator technology availability and selection. Selection and use of appropriate control software/devices. Consideration of the interaction of system variables. System commissioning parameters.

Operation and functions: Simulation and modelling software functions. System function and operation. Modes of operation simulation, loading and surges. Advantages and disadvantage of software simulation.

Locating and correcting system faults: Component data sheets, systems drawings, flowcharts, wiring and schematic diagrams. Original system correct function and operation. Inspection and testing using methodical fault location techniques and methods, use of control software to aid fault location. Identification, evaluation and verification of faults and their causes, rectification, final system testing and return to service.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	20	Introductory and specific topics based on key learning points
Seminar	10	Discussions based upon blended learning activities below
Guided Independent Study	145	Tutor set work on the VLE blended learning activities
Practical Classes & workshops	25	Workshop activities set up for students to work through and gain an insight into mechatronic components and systems
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Examination	LO1 and LO2 Exam - questioning knowledge, understanding and designs to match given specifications	100%
Coursework	LO3 Report to include evaluation of a system specification including fault identification and correction process	100% Total= 100%
Practical	LO4 pass/fail Practical assessment of the use of simulation tools within CAD software	Pass/fail

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Written exam	Exam LO1 and LO2 Knowledge, understanding and match specifications	100%
Coursework	LO3 Report to include evaluation of a system specification including fault identification and correction process	100% Total= 100%
Practical	LO4 pass/fail Practical assessment of the use of simulation tools within CAD software	Pass/Fail

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 10/2021	**Approved by**: Date: XX/XX/XXXX

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: PETR1142 MODULE TITLE: **Electrical and Electronic Fundamentals**

CREDITS: 20 **FHEQ LEVEL: 4** **HECOS CODE:100163**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module provides an introduction to electrical and electronic engineering including the key underlying theorems and concepts associated with circuits and components. Developing the both direct and alternating current analysis to form a basis for further studies. Basic level of complex analysis and waveforms is also explored**.**

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	50%	**C1** (Coursework)	50%	**P1** (Practical**)**	0%
E2 (Clinical Examination)	0% or ~~Pass/Fail~~	**A1** (Generic assessment)	~~Pass/Fail~~		
T1 (Test)	0%				

SUBJECT ASSESSMENT PANEL to which module should be linked: Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To develop a good fundamental understanding of electrical and electronic components and circuits.
- To provide an understanding of simple and complex waveforms.
- To analyse complex quantities and design methods.

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
	FdSc Embedded Systems Design FdSc Electronics and Communications HNC Electronics
1. Understand and apply basic theory to common components including transient responses	KU8.1 i – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in electrical and electronic engineering
2. Solve problems in single phase circuits and derive responses to driving functions including tuned circuits	CIS 8.2 i - information sourced from academic and technical literature and other sources.

3.	Analyse complex multi-mesh networks.	PS 8.5 i – select appropriate equipment and work safely and competently within a workshop or laboratory environment.
4.	Solve circuit problems involving complex waves.	CIS 8.2 ii - through identifying, reviewing and selecting techniques, procedures and methods relevant to Electrical and electronic engineering.

DATE OF APPROVAL: XX/06/2019	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER: PETROC**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1**

Notes:

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/information-and-guidance/publication/?PubID=2718#.VW2INtJVikp
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- 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: 2021 - 2022 **NATIONAL COST CENTRE:199**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF: Robert Coombes**

Summary of Module Content

- Review passive components and basic theorems applied to d.c. networks and transients.
- Calculate equivalent impedance and admittance of a.c. circuits in both rectangular and polar form.
- Apply sinusoidal voltage and current driving functions in both rectangular and polar form to a.c. circuits and derive appropriate responses.
- Maximum power transfer for complex source and load.
- Mutual inductance, dot notation, transformers, equivalent circuits, resonance.
- Q-factor, bandwidth, selectivity and resonant frequency, universal equation and curves for tuned circuits, mutually-coupled tuned circuits
- Mesh and nodal equations for complex multi-mesh networks, solution of network problems.
- Instantaneous value of a voltage for a complex wave, selective resonance, rms. value of a complex waveform.
- Analyse complex waves, Fourier coefficients.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	15	Guided Learning and teaching
Seminar	10	Solving student centred problems
Guided Independent Study	140	Online worksheets and learning materials
Practical Classes & workshops	35	Support and feedback from tutor.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Written exam	Examination LOs 1 and 2	100% Total = 100%
Coursework	Assignment LOs 3 and 4 Report on lab work	100% Total = 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework (in lieu of the original assessment)	Assignment on LOs 1 and 2	100%
Coursework	Assignment LOs 3 and 4 Report on lab work	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 10/2021	**Approved by**: Date: XX/XX/XXXX

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: PETR1143 **MODULE TITLE:** Advanced CAD Techniques

CREDITS: 20 **FHEQ LEVEL:** 4 **HECOS CODE:** 100160

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module develops both 2D and 3D modelling skills and the use of computer simulation in support of engineering tasks. The principal activity will be developing a portfolio of engineering drawings and designs by working through graded tasks. Students' produce working drawings and designs, where some are used produce animations and analysis.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	0%	**C1** (Coursework)	100%	**P1** (Practical)	0%
E2 (Clinical Examination)	0%	**A1** (Generic assessment)	~~Pass/Fail~~		
T1 (Test)	0%				

SUBJECT ASSESSMENT PANEL to which module should be linked: Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- Evaluate the differences between 2D drawing, wire-frame, surface and solid modelling techniques and their relationship to the manufacturing process
- To develop the skills necessary to produce models in the development of a design brief
- To develop the skills necessary to produce visualisations
- To investigate the use of simulation software

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Understand and apply 2D techniques and standards to engineering problems and self-reflect upon the result. 2. Produce 3D wire-frame, surface and solid models to an acceptable industry standard and justify techniques used.	FdSc Electronics and Communications FdSc Production and Manufacture Engineering FdSc Mechanical Design and manufacture HNC Mechanical Design and Manufacture KU 8.1 i – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering. KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.

3. Apply advanced parametric modelling techniques in the creation of engineering designs including animated visualisations and evaluate own practice. 4. Analyse the performance of systems through simulation software application techniques.	CIS 8.2 ii - through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. CIS 8.2 iii – knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for electrical and electronic engineering KTS 8.3 ii- engage with and effectively employ general IT applications and facilities. ERS 8.4 i.- conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally. ERS 8.4 ii. - engage with and effectively employ general IT applications and facilities. PS 8.5 ii – Work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering in practice.

DATE OF APPROVAL: XX/XX/XXXX	**FACULTY/OFFICE:** Academic Partnerships
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER:** PETROC
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER:** Semester 2

Notes:

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/information-and-guidance/publication/?PubID=2718#.VW2INtJVikp
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- 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

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ACADEMIC YEAR: 2021 - 2022 **NATIONAL COST CENTRE:**120
MODULE LEADER: Andrew Wilson-Rudd **OTHER MODULE STAFF:**

Summary of Module Content

- 3D drawing and editing commands
- Sketching and constraining parameters
- Creating assemblies
- Creating 2D drawings from 3D models
- 3D animations
- Use of design software for simulation purposes
- Use of design software to produce design performance information.
- Direct conversion of 3D models to CAM programs

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions]***		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	15	Guided Learning and teaching
Seminar	10	Solving student centred problems
Guided Independent Study	150	Carrying out investigations, assessment of documentation and collecting data for CAD
Practical Classes & workshops	25	Computer based practical application work with support and feedback from tutor.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Coursework	Portfolio LO1 - LO4	100% Total =100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Portfolio LO1 - LO4	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 10/2021	**Approved by**: Date: XX/XX/XXXX