ACADEMIC PARTNERSHIPS PROGRAMME QUALITY HANDBOOK 2023-24

HNC Engineering

Contents

1. Welcome and Introduction

Welcome to HNC Engineering delivered at North Devon Campus by Petroc.

Mechanical Engineering is vital to all aspects of our everyday lives and is everywhere you look. It involves the design, construction and operation of mechanical systems and has a central role in many professional industries.

The HNC Engineering programme will develop high quality engineers skilled in the measurement and testing of materials, engineering software applications and CAD Cam.

The course is designed to support the needs of local engineering and manufacturing 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 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.

STUDENT EXPERIENCE:
This course is delivered at main site campus in Barnstaple where classes take place in the new Engineering building where specialised mechanical laboratories are designed to provide maximum opportunity for students to gain practical learning experiences relating to design, build and test methodology. It is equipped with beam/load bearing testing devices to develop knowledge and understanding of material strengths through experiential methods of learning. Computer rooms have up to date CAD software such that students can work to industry standard drawings and design work.

ENGAGEMENT WITH INDUSTRY:
Most students are already in the workplace and seminars and peer discussions facilitate the sharing of workplace experiences across the cohort and thus, those not yet in a related employment can gain insights, and those in the workplace can compare and contrast working experiences, skills and ideas.

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 impinging 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.

2. 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=2036
- Your University of Plymouth Student Handbook available at: https://www.plymouth.ac.uk/your-university/governance/student-handbook

3. Programme Specification

Programme Specification

Awarding Institution:	University of Plymouth
Partner Institution and delivery site (s):	Petroc
Accrediting Body:	N/A
Language of Study:	English[1]
Mode of Study:	Part time or Full Time
Final Award:	HNC Engineering
Intermediate Award:	N/A
Programme Title:	Engineering
UCAS Code:	G200
JACS Code:	H300
Benchmarks:	Framework for Higher Education Qualifications (FHEQ) QAA Engineering Subject Benchmark (2015)
Date of Programme Approval:	26th April 2016

Programme Aims

The programme will deliver:

1. Experts in the field of manufacturing and mechanical design to inspire and challenge students to develop the knowledge base needed for a career in a range of Mechanical Design and Manufacture occupations.
2. Experienced lecturers to provide the opportunity for students to apply up to date skills acquired in an academic context, necessary to achieve solutions to current working practices.
3. Support in accessing a wide range of resources to develop an increased awareness of reliable information sources and how this informs industrial practice.
4. Professional and personal to encourage and support students to develop and learn to apply technical and transferable skills that will facilitate life-long learning and continuing professional development
5. Links to the local work place and employers to enrich a curriculum content and develop knowledgeable and skilled personnel able to design, develop and create vocationally related engineered solutions.

[1] Unless otherwise approved through Plymouth University's Academic Development and Partnerships Committee

Programme Intended Learning Outcomes (ILO)

By the end of this programme the student will be able to:

1. demonstrate knowledge and understanding of a range of routine concepts and principles which relate to mechanical, design and manufacturing systems
2. use analysis, evaluation and appropriate methodologies for the interpretation of routine data sets with guidance..
3. design, test and implement, a range of mechanical solutions to engineering routine problems with guidance
4. communicate effectively using written and graphical techniques
5. evaluate their own learning through reflection on their own practice and their contribution to teamwork.

Progression Route(s)

Approved 'progression route(s)' are those where successful achievement in this programme enables direct alignment to join a stage of another programme. This is an approach employed primarily for Foundation Degree students to 'top-up' to complete a Bachelor degree, but may be employed for other award types.

This is in part an automated admissions criterion and therefore progression may be impacted on by availability of a position on the progression award; however progression opportunity, if not available in the first year of application, is guaranteed within 3-years.

Progression arrangements with institutions other than Plymouth University carry an increased element of risk. It is necessary for the delivering partner institution to obtain formal agreement from that institution to guarantee progression for existing students on the programme. For progression to Plymouth University, should there be the need to withdraw the progression route programme(s) then either this will be delayed to provide progression or appropriate solutions will be found. This arrangement is guaranteed for existing students that complete their programme of study with no suspensions or repeat years and who wish to progress immediately to the University.

Upon successful completion of the HNC Engineering programme students can progress to the following programmes:

- Level 5 of FdSc Mechanical Design and Manufacture or FdSc Production & Manufacturing at Petroc
- BEng Mechanical Programmes Suite Level 5 (UoP) – Providing that 60% of what has already been achieved is in numerical subjects.
- BSc (Hons) Mechanical Design and Manufacture Level 5 (Plymouth University)

The contribution of marks from prior levels of study to the progression award is governed by University regulations.

Admissions Criteria

Qualification(s) Required for Entry to this Programme:	Details:
Level 2: 1. Key Skills requirement / Higher Level Diploma: and/or 2. GCSEs required at Grade C or above:	N/A Maths and English Grade C or above
Level 3: at least one of the following: 3. AS/A Levels 4. Advanced Level Diploma: 5. BTEC National Certificate/Diploma: 6. VDA: AGNVQ, AVCE, AVS: 7. Access to HE or Year 0 provision: 8. International Baccalaureate: 9. Irish / Scottish Highers / Advanced Highers:	80 UCAS points Maths, Physics, Design Technology, Engineering MMP or MM
Work Experience:	Plymouth University Regulations apply
Other HE qualifications / non-standard awards or experiences:	Plymouth University Regulations apply
APEL / APCL[2] possibilities:	Plymouth University Regulations apply, considered on application.
Interview / Portfolio requirements:	ALL applicants are to be interviewed

[2] Accredited Prior Experiential Learning and Accredited Prior Certificated Learning

4. Programme Structure[3]

The following structure diagram(s) provides the current structure for this programme:

FHEQ Level: 4 For: \\\ HNC Engineering (Full Time)			
F/T Route Year[13]	Core or Option Module[14]	Credits[15]	Module[16]
Yr 1 Autumn Semester	Core	20	PETR1092 Analytical Methods
Yr 1 Autumn Semester	Core	20	PETR1093 Engineering Science
Yr 1 Autumn Semester	Core	20	PETR1095 Introduction to Engineering Software
Yr 1 Spring Semester	Core	20	PETR1143 Advanced CAD Techniques
Yr 1 Spring Semester	Core	20	PETR1094 Engineering Materials
Yr 1 Spring Semester	Core	20	PETR1097 Level 4 Project

FHEQ Level: 4 For: \\\ HNC Engineering (Part Time) September Start			
P/T Route Year	Core or Option Module	Credits	Module
Yr 1 Autumn Semester	Core	20	PETR1092 Analytical Methods
Yr 1 Autumn Semester	Core	20	PETR1093 Engineering Science
Yr 1 Spring Semester	Core	20	PETR1095 Introduction to Engineering Software
Yr 2 Autumn Semester	Core	20	PETR1143 Advanced CAD Techniques
Yr 2 Spring Semester	Core	20	PETR1094 Engineering Materials
Yr 2 Spring Semester	Core	20	PETR1097 Level 4 Project
FHEQ Level: 4 For: \\\ HNC Engineering (Part Time) January Start			

[3] The provided table includes only a single line. This should be multiplied by copying and pasting to produce the correct number of modules for the level of the programme. For ease of consideration and clarity, please include a separate table for each level by again copying and pasting this table. Colour coding/ shading may be used to differentiate between new modules and existing approved modules shared with other programmes.

P/T Route Year	Core or Option Module	Credits	Module
Yr 1 Spring Semester	Core	20	PETR1143 Advanced CAD Techniques
Yr 1 Spring Semester	Core	20	PETR1094 Engineering Materials
Yr 2 Autumn Semester	Core	20	PETR1095 Introduction to Engineering Software
Yr 2 Spring Semester	Core	20	PETR1097 Level 4 Project
Yr 3 Autumn Semester	Core	20	PETR1092 Analytical Methods
Yr 3 Autumn Semester	Core	20	PETR1093 Engineering Science

5. 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: PETR1092 **MODULE TITLE: Analytical Methods**
CREDITS: 20 **FHEQ LEVEL: 4** **HECOS CODE(S) [max 3]:100400**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: N**

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 – *see Definitions of Elements and Components of Assessment*					
E1 (Examination)	40%	**C1** (Coursework)	60%	**P1** (Practical)	

SUBJECT ASSESSMENT PANEL to which module should be linked: Science and 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 Programme Intended Learning Outcomes.

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

Assessed Module Learning Outcomes (ALOs)	**Programme Intended Learning Outcomes (PILOs) contributed to**

	FdSc in Production and Manufacture Engineering FdSc Embedded Systems Design FdSc Electronics and Communications HNC Electronics HNC Mechanical Design and Manufacture (now HNC Engineering) FD 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: 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**
MODE OF DELIVERY: campus taught/blended learning/distance learning (please specify)	**Blended**

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

- Office for Students, Sector-recognised Standards
- Office for Students, Quality and Standards Conditions of Registration
- Subject benchmark statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)

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 published on the website as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2023/2024 **NATIONAL COST CENTRE: 119**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF:**

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		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
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 & associated ALO	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: Irina Spulber Date: 26/04/2023	**Approved by**: Irina Spulber Date: 26/04/2023

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(S) [max 3]: 100160**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: Y**
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 – *see Definitions of Elements and Components of Assessment*					
E1 (Examination)		**C1** (Coursework)	100%	**P1** (Practical)	

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 Programme Intended Learning Outcomes.

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

Assessed Module Learning Outcomes (ALOs)	**Programme Intended Learning Outcomes (PILOs) contributed to**
	FdSc Electronics and Communications FdSc Production and Manufacture Engineering FdSc Mechanical Design and manufacture

1. Understand and apply 2D techniques and standards to engineering problems and self-reflect upon the result.	HNC Mechanical Design and Manufacture (now HNC Engineering) KU 8.1 i – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering.
2.Produce 3D wire-frame, surface and solid models to an acceptable industry standard and justify techniques used	KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice. 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
3.Apply advanced parametric modelling techniques in the creation of engineering designs including animated visualisations and evaluate own practice.	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.
4. Analyse the performance of systems through simulation software application techniques.	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: 04/2016	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER:Petroc**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 2**
MODE OF DELIVERY: campus taught/blended learning/distance learning (please specify)	**Campus taught**

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

- Office for Students, Sector-recognised Standards
- Office for Students, Quality and Standards Conditions of Registration
- Subject benchmark statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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ACADEMIC YEAR: 2023/24
MODULE LEADER: Jacqueline Theakston-Thomas

NATIONAL COST CENTRE: 120
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		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	5	
Seminar	10	
Guided Independent Study	150	Carrying out investigations, assessment of documentation and collecting data for CAD
Practical Classes & workshops	35	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 & associated ALO	Component Weighting
Coursework	Portfolio	% % 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Portfolio	% % 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Irina Spulber Date: 27/04/2023	**Approved by**: Irina Spulber Date: 27/04/2023

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: PETR1093 **MODULE TITLE: Engineering Science**
CREDITS: 20 **FHEQ LEVEL:4** **HECOS CODE(S) [max 3]:100206**
PRE-REQUISITES: **CO-REQUISITES:** **COMPENSATABLE: Y**
SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module provides an introduction to solid mechanics and energy systems so that students will have a firm base from which to work when they under take further studies.

ELEMENTS OF ASSESSMENT – *see Definitions of Elements and Components of Assessment*					
E1 (Examination)	50%	**C1** (Coursework)	50%	**P1** (Practical**)**	

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

Professional body minimum pass mark requirement: n/a

MODULE AIMS:

- To impart a sound understanding of the effects of forces and moments on the design of machine or structural elements.
- To provide an understanding the fundamentals of stress, strain, and linear elasticity, extending to the analysis and evaluate the use of the prismatic bar as a structural element.
- To impart a sound understanding of kinematics including momentum, dynamics, heat and transfer, when considering energy and power systems
- To provide an understanding the fundamentals thermodynamics and Hydrostatics.

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

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

Assessed Module Learning Outcomes (ALOs)	**Programme Intended Learning Outcomes (PILOs) contributed to**

	FdSc in Production and Manufacture Engineering FdSc & HNC Mechanical Design and Manufacture (now HNC Engineering)
1.Identify the forces and moments on structural elements and determine the major stresses in them.	KU 8.1 i – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering.
2.Explain the need for stress analysis of components from both a structural integrity standpoint but also in terms of the penalties for excess weight.	KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.
3.Understand kinematic relationships as applied to mechanisms.	CIS 8.2 ii - through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering.
4.Evaluate and predict the behaviour of ideal and actual energy systems, including thermodynamic and hydrostatic systems.	PS 8.5 i – select appropriate equipment and work safely and competently within a workshop or laboratory environment.

DATE OF APPROVAL: XX/09/2016	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER:Petroc**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1**
MODE OF DELIVERY: campus taught/blended learning/distance learning (please specify)	**Blended**

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

- Office for Students, Sector-recognised Standards
- Office for Students, Quality and Standards Conditions of Registration
- Subject benchmark statements

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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ACADEMIC YEAR: 2023/24 **NATIONAL COST CENTRE:120**
MODULE LEADER: Robert Coombes **OTHER MODULE STAFF:**

Summary of Module Content

- Systems and modelling- mathematical and computational. International standards, symbols & data bases.
- Forces and moments- vector representation, components and equilibrium.
- Free body diagrams and force analysis of pin-jointed structures.
- Elements in bending- section properties (I,Z), SF and BM diagrams, critical section, bending stresses, factors of safety.
- Circular elements in torsion- section properties (J), angle of twist, shear stresses.
- Thin walled pressure vessels.
- Combined stresses- Mohr's circle.
- Kinematic relationships between displacement, velocity and acceleration- relative velocity diagrams.
- Newton's laws of motion, and dynamics of rigid bodies. Balancing of non-coplanar rotating masses.
- Use of the concept of energy conservation to predict system behaviour.
- Use heat, energy and power transfer fundamentals, to a solve systems problems.

- Relate properties of gas, vapours and liquids in thermodynamics.
- Use the fundamentals of hydrostatics to determine pressure, forces and moments.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	10	Guided Learning and teaching
Seminar	10	Discussion sessions where students discuss research and relate to work place and practical sessions.
Guided Independent Study	155	Online worksheets and learning materials
Practical Classes & workshops	25	Use of technical resources and 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 & associated ALO	Component Weighting
Written exam	Exam LO1, 3	100% Total = 100%
Coursework	Report LO2 and LO4	100% Total = 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Written exam	Exam LO1, 3	100% Total = 100%
Coursework	Report LO2 and LO4 based upon labwork	100% Total = 100%
Online Open Book Assessment		100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Irina Spulber Date: 26/04/2023	**Approved by**: Irina Spulber Date: 26/04/2023

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: PETR1094 **MODULE TITLE: Engineering Materials**
CREDITS: 20 **FHEQ LEVEL:4** **HECOS CODE(S) [max 3]:100147**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: Y**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module provides an introduction to material characteristic and classification. Develop knowledge and understanding of the relationship between observation and materials testing technique. To take account of the requirements of destructive and non-destructive testing. Students will have a firm base from which to work when they undertake further studies.

ELEMENTS OF ASSESSMENT – *see Definitions of Elements and Components of Assessment*					
E1 (Examination)	50%	**C1** (Coursework)	50%	**P1** (Practical**)**	

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: n/a

MODULE AIMS:

- To develop an appreciation of different types of material
- To show what effect the processing method will have on the properties and service life of a material
- To provide an understanding of the basic structure of materials and how this relates to mechanical properties.
- To show how the properties of a material can be controlled.

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

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

Assessed Module Learning Outcomes (ALOs)	**Programme Intended Learning Outcomes (PILOs) contributed to**
	FdSc Production and Manufacture Engineering

	FdSc Mechanical Design and Manufacture HNC Mechanical Design and Manufacture (now HNC Engineering)
1. Describe the types of materials used in engineering manufacture to include physical and mechanical properties	KU 8.1 i – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering.
2. Identify and describe the features of a material's structure on a macro and micro basis	KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.
3. Explain the effects of processing on the structure and properties of materials	PS 8.5 i – select appropriate equipment and work safely and competently within a workshop or laboratory environment.
4. Analyse failure modes in materials	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 Partnerships**
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER: Petroc**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 and Semester 2**
MODE OF DELIVERY: campus taught/blended learning/distance learning (please specify)	**Blended**

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

- Office for Students, Sector-recognised Standards
- Office for Students, Quality and Standards Conditions of Registration
- Subject benchmark statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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ACADEMIC YEAR: 2023/24 **NATIONAL COST CENTRE: 120**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF:**

Summary of Module Content

- Classification of materials: metals, polymers, composites
- Mechanical and physical properties and their link to microstructure
- Materials testing: destructive and NDT
- Manufacturability and joining of materials
- Polymer composite materials and their processing
- Failure modes: ductile and brittle fracture, creep and fatigue, stress concentrations, introduction to fracture mechanics.
- Corrosion: simple and galvanic
- Designing for enhanced life in service

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	5	Guided Learning and teaching
Seminar	10	Students' reflection and discussion sessions on outcome of practical experimentation in workshops/labs.
Guided Independent Study	155	Online Worksheets and learning materials
Practical Classes & workshops/labs	30	Problem solving and material testing experiments carried out in workshops/labs
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name & associated ALO	Component Weighting
Written exam	Exam LO1 and LO2 to test knowledge and understanding of the types of materials used in engineering manufacture to include physical and mechanical properties and features of a material's structure on a macro and micro basis	100% Total = 100%
Coursework	Report LO3 and LO4 based on characteristics and testing	100% Total = 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Written exam	Exam LO1 and LO2 to test knowledge and understanding of the types of materials used in engineering manufacture to include physical and mechanical properties and features of a material's structure on a macro and micro basis	100% Total = 100%
Coursework	Report LO3 and LO4 based on characteristics and testing	100% Total = 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Irina Spulber Date: 26/04/2023	**Approved by**: Irina Spulber Date: 26/04/2023

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(S) [max 3]:100162**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: Y**

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 – *see Definitions of Elements and Components of Assessment*					
E1 (Examination)	%	**C1** (Coursework)	70%	**P1** (Practical)	30%

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

Professional body minimum pass mark requirement: n/a

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 Programme Intended Learning Outcomes.

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

Assessed Module Learning Outcomes (ALOs)	**Programme Intended Learning Outcomes (PILOs) contributed to**
	HNC Electronics HNC Mechanical Design & Manufacture (now HNC Engineering)

1. Apply an engineering software application to solve simple problems.	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.
2. Produce documentation to commercial standards.	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.
3. Develop and apply testing strategies to meet specifications.	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.
4. Justify the use of the code in routine operations.	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: 01/07/2020	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER: Petroc**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1**
MODE OF DELIVERY: blended	

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

- Office for Students, Sector-recognised Standards
- Office for Students, Quality and Standards Conditions of Registration
- Subject benchmark statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)

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 published on the website as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2023/24 **NATIONAL COST CENTRE:115**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF:**

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

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 & associated ALO	Component Weighting

Coursework	Report LO2 Report LO1, 4	
Practical	Assessed programming exercise LO3	100%

REFERRAL ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Coursework	Report LO2 Report LO1, LO4	50% 50% Total=1
Practical	Assessed programming exercise LO3	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Date: Irina Spulber 26/04/2023	**Approved by**: Irina Spulber Date: 26/04/2023

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(S) [max 3]:100182**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: Y**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module is an individual investigation of an engineering problems through the application of agile scrum management philosophy. Students 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 – *see Definitions of Elements and Components of Assessment*					
E1 (Examination)		**C1** (Coursework)	80%	**P1** (Practical)	20%

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

Professional body minimum pass mark requirement: n/a

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 Programme Intended Learning Outcomes.

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

Assessed Module Learning Outcomes (ALOs)	**Programme Intended Learning Outcomes (PILOs) contributed to**
	HNC Electronics HNC Mechanical Design and Manufacture (now HNC Engineering)
1. Complete a design solution to an existing problem, and to carry out a	KU 8.1 i – the scientific, mathematical and statistical principles underpinning

project specify the framework within which the work will be carried out.	application of current technologies, and their evolution, in engineering.
2. Apply agile scrum as a planning and implementation tool to apply decision making during the project tasks	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.
3. Make and test the product or solutions and reflect upon the process and outcomes.	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
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.	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: 01/07/2020	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER: Petroc**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 and Semester 2**
MODE OF DELIVERY: campus taught/blended learning/distance learning (please specify)	**Blended**

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

- Office for Students, Sector-recognised Standards
- Office for Students, Quality and Standards Conditions of Registration
- Subject benchmark statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)

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 published on the website as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2023/24 **NATIONAL COST CENTRE:120**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF:**

Summary of Module Content

- possible project aims, objectives and outcomes and proposals.
- project analysis, to include a planning chart, 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		
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 & associated ALO	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: Date: Irina Spulber 26/04/2023	**Approved by**: Irina Spulber Date: 26/04/2023