ACADEMIC PARTNERSHIPS PROGRAMME QUALITY HANDBOOK 2021-22

HNC Engineering

Contents:

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.

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

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

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	PETR1032 Analytical Methods
Yr 1 Autumn Semester	Core	20	PETR1036 Engineering Science
Yr 1 Autumn Semester	Core	20	PETR1038 Introduction to Engineering Software
Yr 1 Spring Semester	Core	20	PETR1033 Advanced CAD Techniques
Yr 1 Spring Semester	Core	20	PETR1037 Engineering Materials
Yr 1 Spring Semester	Core	20	PETR1040 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	PETR1032 Analytical Methods
Yr 1 Autumn Semester	Core	20	PETR1036 Engineering Science
Yr 1 Spring Semester	Core	20	PETR1037 Engineering Materials
Yr 2 Autumn Semester	Core	20	PETR1038 Introduction to Engineering Software
Yr 2 Spring Semester	Core	20	PETR1033 Advanced CAD Techniques
Yr 2 Spring Semester	Core	20	PETR1040 Level 4 Project

[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.

FHEQ Level: 4 For: \\\ HNC Engineering (Part Time) January Start			
P/T Route Year	Core or Option Module	Credits	Module
Yr 1 Spring Semester	Core	20	PETR1033 Advanced CAD Techniques
Yr 1 Spring Semester	Core	20	PETR1037 Engineering Materials
Yr 2 Autumn Semester	Core	20	PETR1038 Introduction to Engineering Software
Yr 2 Spring Semester	Core	20	PETR1040 Level 4 Project
Yr 3 Autumn Semester	Core	20	PETR1032 Analytical Methods
Yr 3 Autumn Semester	Core	20	PETR1036 Engineering Science

Module Records

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

MODULE CODE:	PETR1032	MODULE TITLE:	Analytical Methods

CREDITS: 20	FHEQ Level: 4	JACS CODE: H600

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]*					
WRITTEN EXAMINATION		COURSEWORK		PRACTICAL	
E1 (Examination)	40%	C1 (Coursework)	60%	P1 (Practical)	0% or Pass/Fail
E2 (Clinical Examination)	0 %	A1 (Generic Assessment)	0 %		
T1 (Test)	0 %				

SUBJECT ASSESSMENT PANEL Group to which module should be linked:

Science & Technology

Professional body minimum pass mark requirement: N/A

MODULE AIMS: Students will be able to:

- 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)

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

1. Apply routine and non-routine mathematical techniques to solve engineering problems.
2. Determine solutions to engineering problems using differential and integral calculus.
3. Solve first and second order ordinary differential equations.
4. Use matrix algebra and complex number theory in practical applications.
5. Analyse engineering data and evaluate information from various sources.

DATE OF APPROVAL:	04/2016	FACULTY/OFFICE:	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2019	SCHOOL/PARTNER:	PETROC
DATE(S) OF APPROVED CHANGE:	01/2019	TERM/SEMESTER:	‘SEMESTER 1’ (AU)

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

Items in this section must e 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: 2021/22	NATIONAL COST CENTRE:119

MODULE LEADER: Irina Spulber	OTHER MODULE STAFF: Robert Combes

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
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 or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Written exam	E1	Formal exam	Total =100%	LO1, LO3
	T1			
Coursework	C1	computer assisted activities to solve problems	Total =100%	LO2, LO4 and LO5
Practical	P_		0%	

Updated by:	Date:	Approved by:	Date:
I. Spuber	09/2021	Stacey Tanton	16/05/2020

Recommended Texts and Sources: (Please use these or more recent editions)

Bird, J. (2014) Higher Engineering Mathematics. 6th edn. Amsterdam: Newnes

Breach, M. (2011) Fundamental Maths for Engineering and Science. Basingstoke: Palgrave Macmillan

Singh, K. (2011) Engineering Mathematics through Applications. 2nd edn. Basingstoke: Palgrave Macmillan

Stroud, K.A. Booth, D. J. (2013) Engineering Mathematics. 7th edn. Palgrave Macmillan

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

MODULE CODE: PETR1033	MODULE TITLE: Advanced CAD Techniques

CREDITS: 20	FHEQ Level: 4	JACS CODE: H130

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]*

WRITTEN EXAMINATION		COURSEWORK		PRACTICAL	
E1 (Examination)	0%	C1 (Coursework)	100%	P1 (Practical)	% or Pass/Fail
E2 (Clinical Examination)	%	A1 (Generic Assessment)	%		
T1 (Test)	%				

SUBJECT ASSESSMENT PANEL Group 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)
At the end of the module the learner will be expected to be able 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.
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.

DATE OF APPROVAL: 04/2016	FACULTY/OFFICE: Academic Partnerships
DATE OF IMPLEMENTATION: 09/2016	SCHOOL/PARTNER: PETROC
DATE(S) OF APPROVED CHANGE: 06/2016	TERM/SEMESTER: 'SEMESTER 2' (SP)

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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ACADEMIC YEAR: 2021/22	NATIONAL COST CENTRE: 120

MODULE LEADER: Andy Wilson-Rudd	OTHER MODULE STAFF: None

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
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 or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Written exam	E		Total = 0%	
	T		Total = 0%	
Coursework	C1	Portfolio	100% Total = 100%	LO1 - LO4
Practical	P		Total = 0%	

Updated by: I. Spuber	Date:0/2021	Approved by: Stacey Tanton	Date:16/05/2020

Recommended Texts and Sources: (use most current available edition)

Kurowski, P. (2015) *Engineering Analysis with SOLIDWORKS Simulation*.

Planchard, D. (2015) *SOLIDWORKS* 2016 Reference Guide.

Journals

Journals and magazines related to mechanical design: The Engineering; The Engineering Designer; Professional Engineering; Engineering and Technology; Eureka; Develop 3D

Web-based sources

Design Council:	http://www.designcouncil.org.uk/
Design Museum:	http://www.designmuseum.org/
eFunda – online reference for engineers:	http://www.efunda.com
The Institution of Mechanical Engineers, IMechE:	http://www.imeche.org
The Institution of Engineering Designers:	http://www.ied.org.uk/
Patents:	

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

MODULE CODE: PETR1036	MODULE TITLE: Engineering Science

CREDITS: 20	FHEQ Level: 4	JACS CODE: H300

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

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 *Use HESA KIS definitions]*

WRITTEN EXAMINATION		COURSEWORK		PRACTICAL	
E1 (Examination)	50%	C1 (Coursework)	50%	P1 (Practical)	0% or Pass/Fail
E2 (Clinical Examination)	0%	A1 (Generic Assessment)	0%		
T1 (Test)	0%				

SUBJECT ASSESSMENT PANEL Group to which module should be linked:
Science & 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.
- To enable the analysis and evaluate the use of the prismatic bar as a structural element.
- To impart a sound understanding of kinematics, dynamics and energy systems

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

1. Identify the forces and moments on structural elements and determine the major stresses in them.
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.
3. Understand kinematic relationships as applied to mechanisms.
4. Evaluate and predict the behaviour of ideal and actual energy systems.

DATE OF APPROVAL:	04/2016	FACULTY/OFFICE:	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2016	SCHOOL/PARTNER:	PETROC
DATE(S) OF APPROVED CHANGE:	06/2016	TERM/SEMESTER:	'SEMESTER 1' (AU)

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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ACADEMIC YEAR: 2021/22	NATIONAL COST CENTRE: 120

MODULE LEADER: Andy Wilson-Rudd	OTHER MODULE STAFF: Robert Coombes

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 concept of energy conservation to predict system behaviour.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*

Scheduled Activities	Hours	Comments/Additional Information
Lectures	10	
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 or learning; 10 credits = 100 hours)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Written exam	E1	Exam	100% Total = 100%	LO1,3
	T_		Total = 0%	
Coursework	C1	Report	100% Total = 100%	LO2 and LO4
Practical	P_		Total = 0%	

Updated by: I. Spuber	Date: 09/2021	Approved by: Stacey Tanton	Date: 16/05/20

Recommended Texts and Sources: (use most current available edition)

Bird, J. and Ross, C. (2015) *Mechanical Engineering Principles*. 3rd ed. Routledge

Bolton, W. (2015) *Engineering Science*. 5th ed. Routledge

Journals:
International Journal of Engineering Science
International Journal of Engineering Education

Websites:
Petroc Moodle VLE Engineering Materials (update as new page)

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

MODULE CODE: PETR1037	MODULE TITLE: Engineering Materials

CREDITS: 20	FHEQ Level: 4	JACS CODE: H300

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

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 under take further studies.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

WRITTEN EXAMINATION		COURSEWORK		PRACTICAL	
E1 (Examination)	50%	C1 (Coursework)	50%	P1 (Practical)	0% or Pass/Fail
E2 (Clinical Examination)	0 %	A1 (Generic Assessment)	0 %		
T1 (Test)	0 %				

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

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

1. Describe the types of materials used in engineering manufacture to include physical and mechanical properties
2. Identify and describe the features of a material's structure on a macro and micro basis
3. Explain the effects of processing on the structure and properties of materials
4. Analyse failure modes in materials

DATE OF APPROVAL: 04/2016	FACULTY/OFFICE: Academic Partnerships
DATE OF IMPLEMENTATION: 09/2016	SCHOOL/PARTNER: PETROC
DATE(S) OF APPROVED CHANGE: 06/2016	TERM/SEMESTER: 'SEMESTER 2' (SP)
Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required	

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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ACADEMIC YEAR: 2021/22	NATIONAL COST CENTRE: 120

MODULE LEADER: Andy Wilson-Rudd	OTHER MODULE STAFF: Robert Coombes

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 *[Use HESA KIS definitions]*

Scheduled Activities	Hours	Comments/Additional Information
Lectures	5	
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 or learning; 10 credits = 100 hour)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Written exam	E1_	Exam	Total = 100%	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
	T_		Total = 0%	
Coursework	C1	Report	100% Total = 100%	LO3 and LO4 based on characteristics and testing
Practical	P_		Total =0%	

Updated by: I. Spuber	Date: 09/2021	Approved by: Stacey Tanton	Date: 16/05/2020

Recommended Texts and Sources: (use most current available edition)

Budinski, K. and Budinski, M. (2004) *Engineering Materials: Properties and Selection*. 8th edn. Prentice Hall

Shackelford, J. (2014) *Introduction to Materials Science for Engineers*. 8th edn. Prentice Hall

Journals:
International Journal of Materials Engineering and Technology
International Journal of Materials Science and Engineering

Websites:
Petroc Moodle VLE Engineering Materials (update as new page)

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

MODULE CODE: PETR1038	MODULE TITLE: Introduction to Engineering Software

CREDITS: 20	FHEQ Level: 4	JACS CODE: H110

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]					
WRITTEN EXAMINATION		COURSEWORK		PRACTICAL	
E1 (Examination)	0%	C1 (Coursework)	70%	P1 (Practical)	30%
E2 (Clinical Examination)	0 %	A1 (Generic Assessment)	0 %		
T1 (Test)	0 %				

SUBJECT ASSESSMENT PANEL Group to which module should be linked:
Science & 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)
At the end of the module the learner will be expected to be able to:

1. Apply an engineering software application to solve simple problems.
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.

DATE OF APPROVAL: 09/2016	FACULTY/OFFICE: Academic Partnerships
DATE OF IMPLEMENTATION: 09/2016	SCHOOL/PARTNER: PETROC
DATE(S) OF APPROVED CHANGE:	TERM/SEMESTER: 'SEMESTER 1' (AU)

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

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: 2021/22	NATIONAL COST CENTRE: 120

MODULE LEADER: Irina Spulber	OTHER MODULE STAFF: Robert Coombes

SUMMARY of MODULE CONTENT

- Use a variety of engineering software applications
- graphical user interfaces, and numerous 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
Lectures	5	Underpinning theory and target setting
Group work	15	Practical experience of application programming
Guided Independent Study	140	Project work research and development
Practical Classes & workshops/labs	40	Students work towards own to produce 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 or learning; 10 credits = 100 hours, etc)

Category	Element	Component Name	Component Weighting	Comments include links to learning objectives
Written exam	E1_		Total=0%	
	T_		Total=0%	
Coursework	C1	Report	30% 70% Total =100%	LO 2 LO 1, LO4
Practical	P1_	Assessed programming exercise	100% Total = 100%	LO3

Updated by: I. Spulber	Date: 09/2021	Approved by: Stacey Tanton	Date: May 2020

Recommended Texts and Sources: (Use these or more current editions as available)

Attaway S. (2016), Matlab: A Practical Introduction to Programming and Problem Solving Simulation, 4th ed. Butterworth-Heinemann Ltd

Evans,K (2016) Programming of CNC Machines, Industrial Press Inc.

Nuruzzaman, M. (2015) Solving Electronic Circuits in MATLAB and SIMULINK,

CreateSpace Independent Publishing Platform

Websites:

www.labcenter.com proteus Isis simulator and ares PCB design
www.mitsubishi.com PLC programming
http://www.industry.siemens.com/topics/global/en/cnc4you/tips_and_tricks/Pages/cnc-handbook.aspx

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

MODULE CODE: PETR1040	MODULE TITLE: Level 4 Project

CREDITS: 20	FHEQ Level: 4	JACS CODE: H110

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

SHORT MODULE DESCRIPTOR: (max 425 characters)
This module is an individual investigation 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]					
WRITTEN EXAMINATION		COURSEWORK		PRACTICAL	
E1 (Examination)	0%	C1 (Coursework)	80%	P1 (Practical)	20%
E2 (Clinical Examination)	0 %	A1 (Generic Assessment)	0 %		
T1 (Test)	0 %				

SUBJECT ASSESSMENT PANEL Group to which module should be linked:
Science & 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)
At the end of the module the learner will be expected to be able 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.
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.

DATE OF APPROVAL:	09/2016	FACULTY/OFFICE:	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2016	SCHOOL/PARTNER:	PETROC
DATE(S) OF APPROVED CHANGE:	08/09/2016	TERM/SEMESTER:	'SEMESTER 2' (SP)

Additional notes (for office use only): For delivering institution's HE Operations or Academic Partnerships use if required

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ACADEMIC YEAR: 2020/21	NATIONAL COST CENTRE: 120

MODULE LEADER: Irina Spulber	OTHER MODULE STAFF: Robert Coombes

SUMMARY of MODULE CONTENT

- Identify possible project aims, objectives and outcomes and produce a proposal.
- Prepare a project analysis, to include a planning chart, target dates and sources of information.
- Understand and apply agile scrum as a planning and implementation tool to apply decision making during the project tasks.
- Produce an interim report detailing progress to date.
- Make an oral presentation.
- Produce a final report, to include technical and self-evaluations.

SUMMARY OF TEACHING AND LEARNING [Use HESA KIS definitions]

Scheduled Activities	Hours	Comments/Additional Information
Lectures	5	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	35	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 or learning; 10 credits = 100 hours, etc)

Category	Element	Component Name	Component Weighting	Comments include links to learning objectives
Written exam	E1_		Total= 0%	
	T_		Total = 0%	
Coursework	C1	Technical report	100% Total = 100%	LO1,2,4
Practical	P1	Oral Presentation	100% Total = 100%	LO3

Updated by: I. Spulber	Date: 09/2021	Approved by: Stacey Tanton	Date: May 2020

Recommended Texts and Sources: (Use these or more current editions where available)

Weaver P., 2004, “Success in Your Project, 1st Edition”, Pearson Education Limited, ISBN 0-273678094

Cross, N., 2008. Engineering Design Method. 4th ed. Chichester: Wiley-Blackwell

Lidwell W, et al. 2010. Universal Principles of Design, Revised ed. Rockport

Further Resources:

Project Handbook - Moodle

http://www.booksites.net/download/weaver/download.htm