ACADEMIC PARTNERSHIPS PROGRAMME QUALITY HANDBOOK 2021-2022

FdSc Production and Manufacture Engineering

Contents

Welcome and Introduction

Welcome to FdSc Production and Manufacture Engineering delivered at North Devon Campus by Petroc.

The distinctiveness of foundation degrees depends upon the integration of the following characteristics:

Many manufacturers across the South West rely either on internal production or receive manufactured products from other manufacturers. Being effective with production facilities or their own or have the knowledge and understanding of the business is a key resource that a production engineer when you decide to produce product internally.

The programme provides sufficient flexibility to select modules that suit manufacturing and production activities contributing to the level 4 Higher Apprenticeship programmes in this field.
The delivery is either full time or part time day release and each module studied is supported by a virtual learning environment with study materials that supplement the class or workshop sessions.

Students are exposed to and are expected to use efficient manufacturing techniques, also students will show adaptability to enhance and increase the productivity of less productive elements of a manufacturing process. Students will embrace emerging technologies, understand and work to timely completion of tasks and projects use creativity to incorporate these into project work in line with manufacturing standards.

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: *this will be updated with the new Moodle page*
- Your University of Plymouth Student Handbook available at: https://www.plymouth.ac.uk/your-university/governance/student-handbook

2. 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:	FdSc Production and Manufacture Engineering
Intermediate Award:	N/A
Programme Title:	FdSc Production and Manufacture Engineering
UCAS Code:	H700
HECOS Code:	**100209**
Benchmarks:	QAA Engineering Subject Benchmark (2015)
Date of Programme Approval:	July 2019

2.1 Programme Delivery

The programme will deliver:

Aim 1 use of knowledge and critical understanding of the established principles including automation and robotics, required by a production engineer along with an understanding of the limits of their knowledge.

Aim 2 use of knowledge of the main methods of enquiry into the drivers for effective production of products and the ability to use established techniques to undertake critical analysis of information in order to propose solutions

Aim 3 ability to evaluate critically the appropriateness of different approaches to solving production problems including the support of robotic systems and to apply these in a work context

Aim 4 ability to apply their knowledge and skills to new situations, including in the production environment.

Aim 5 use effective communication skills in a variety of forms and for a range of situations appropriate to the audience

2.2 Programme Intended Learning Outcomes (ILO)

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

8.1. Knowledge and understanding

On successful completion, graduates should have developed the 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.

8.2. 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.

8.3. 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.

8.4. 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

8.5. 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.

2.3 Progression Route(s)

Students would normally progress to Plymouth University into the **BEng (hons) Mechanical Engineering.** Students will require an interview following an application to progress to the next level. Plymouth University will assess each application in its own right and offer the most appropriate progression in each case.

The College is now offering the BSc Integrated Technologies Engineering which is an ideal opportunity to stay in North Devon and study for a top-up degree either full time or part time

2.4 Admissions Criteria

All applicants must have GCSE (or equivalent) Maths and English at Grade C or above.

Entry Requirements for FdSc Embedded Systems Design	
A-level/AS-level	Normal minimum entry requirements are 56 on new UCAS Tariff at A-level to include Grade D in Maths or Physics
BTEC National Diploma/QCF Extended Diploma	Candidates are interviewed before an offer is made. But an equivalent of 56 UCAS points in an Engineering Subject
Access to Higher Education at level 3	Candidates are interviewed before an offer is made. Pass an Access to HE Diploma in Science with an equivalent of 56 UCAS points
Welsh Baccalaureate	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
Scottish Qualifications Authority	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering

Irish Leaving Certificate	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
International Baccalaureate	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
Progression from Extended Science	Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering
Non-Standard Qualifications with experience	All non-standard applicants are interviewed by the tutor and screened centrally to ensure impartial oversight. APCL and APEL may take place at this time or by prior arrangement
Capability and disability	**The College would advise on the requirements of the programme, prospective students will meet a team member for an interview, where your needs can be discussed.** **In the likelihood for future employment, and active study on this programme requires engagement with various technologies across engineering environments,** **including workshops, laboratories, and a wide variety of engineering industries.**

2.5 Academic Standards and Quality Enhancement

The Programme Leader/Manager (or other descriptor) leads the Programme Committee in the following of Plymouth University's annual programme monitoring process (APM), as titled at the time of approval. APM culminates in the production, maintenance and employment of a programme level Action Plan, which evidences appropriate management of the programme in terms of quality and standards. Any formally agreed change to this process will continue to be followed by the Programme Leader/Manager (or other descriptor) and their Programme Committee.

Elements of this process include engaging with stakeholders. For this definitive document it is important to define:

Subject External Examiner(s): All modules are parented by this programme and therefore covered by one External Examiner. The shared Developing Graduate Skills module comes under the auspices of this external Examiner for the students following this programme.

Additional stakeholders specific to this programme:

Students play a significant role in the quality assurance process of the course in a number of ways. At the end of each module students write a review which is taken to the end of year meetings and considered in the light of staff reflection and experience and improvements are made in the light of this process.

Student reps from each year cohort attend programme committee meetings each semester to feedback their experiences and offer ideas on how to improve. These are recorded in minutes and actioned with feedback provided to the students directly.

Students are also invited to bi-annual meetings with the Senior Management Team and the College Principal to report on progress and how they think the course is progressing. Any concerns highlighted are considered seriously and acted upon where relevant to lead to continued improvement,

Local employers are engaged as lecturers and bring into the classroom their real and current working knowledge and practices, enriching the student experience with live case studies and live projects. Employers visit to share their expertise and knowledge such as those working in the Engineering sector, community development and local businesses. Employers are also involved in developing further understanding by inviting them to Engineering Advisory meeting which occurs once a term, where project and visits are discussed. College staff also attend the North Devon Manufacturers Association where discussion takes place regarding both technical items of interest and educational requirements of the industry.

2.6 Programme Structure[1]

Full Time Route

FHEQ Level: 4 for Production and Manufacture			
F/T Route Year[13]	Core or Option Module[14]	Credits[15]	Module[16]
1	Core	20	PETR1152 Organisational Behaviour
1	Core	20	PETR1140 Engineering Graduate Skills
1	Core	20	PETR1092 Analytical Methods
1	Core	20	PETR1093 Engineering Science
1	Core	20	PETR1141 Mechatronics
1	Option	20	PETR1094 Engineering Materials
1	Option	20	PETR1143 Advanced CAD Techniques

FHEQ Level: 5. for Production and Manufacture			
F/T Route Year[17]	Core or Option Module[18]	Credits[19]	Module[20]
2	Core	20	PETR2123 Level 5 Project
2	Core	20	PETR2127 Manufacturing Systems
2	Core	20	PETR2110 Robotics and Automation Systems
2	Core	20	PETR2111 Production Management
2	Core	20	PETR2128 Manufacturing Processes
2	Option	20	PETR2129 Mechanical Principles
2	Option	20	PETR2130 Instrumentation & Control
2	Option	20	PETR2131 Design Processes

[1] 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.

Part Time Route

FHEQ Level: 4 for Production and Manufacture			
P/T Route Year[11]	Core or Option Module[14]	Credits[15]	Module[16]
1	Core	20	PETR1140 Engineering Graduate Skills
1	Core	20	PETR1092 Analytical Methods
1	Core	20	PETR1093 Engineering Science
1	Core	20	PETR1141 Mechatronics

FHEQ Level: 4 for Production and Manufacture			
P/T Route Year[11]	Core or Option Module[14]	Credits[15]	Module[16]
2	Core	20	PETR1090 Organisational Behaviour
2	Option	20	PETR1094 Engineering Materials
2	Option	20	PETR1143 Advanced CAD Techniques
2	Core	20	PETR2127 Manufacturing Systems
2	Option	20	PETR2129 Mechanical Principles

FHEQ Level: 5. for Production and Manufacture			
P/T Route Year[11]	Core or Option Module[18]	Credits[19]	Module[20]
3	Core	20	PETR2123 Level 5 Project
3	Core	20	PETR2110 Robotics and Automation Systems
3	Core	20	PETR2128 Manufacturing Processes
3	Core	20	PETR2111 Production Management
3	Option	20	PETR2130 Instrumentation & Control
3	Option	20	PETR2131 Design Processes
3	Option	20	PETR2129 Mechanical Principles

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: PETR1090 **MODULE TITLE:** Organisational Behaviour

CREDITS: 20 **FHEQ LEVEL:** 4 **HECOS CODE:** 100088

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module considers how organisational behaviour and attitude influences the behaviour of individuals and groups at work. The module will use a range of theories and managerial approaches to analyse and explain human behaviour at work.

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: Business, Health and Education

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

The aim of this module is to provide students with an understanding of the theory of how organisations manage employees to achieve a range of managerial objectives.

The intention being to consider organisational and employee behaviour from a theoretical perspective.

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 Events Management FdSc Business Management FdSc Law FdSc in Production and Manufacture Engineering FdSc Embedded Systems Design FdSc Electronics and Communications FdSc Food Manufacturing KU 8.1 2 - product placement, management, professional conduct, risk

1. Identify and explain the advantages/disadvantages of a range of organisational structures. 2. Identify a range of organisational cultures 3. Identify a range of theoretical approaches to human motivation 4. Analyse the significance of group behaviour at work. 5. Demonstrate an understanding of a range of management and leadership styles and explain when each might be most appropriate.	and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors. CU 8.2 1 - information sourced from academic and technical literature and other sources. CU 8.2.3 – knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for organisation. KTS 8.3 1. - conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally. KTS 8.3 2 - engage with and effectively employ general IT applications and facilities. PS 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: 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

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:133**
MODULE LEADER: Craig Litster **OTHER MODULE STAFF: None**

Summary of Module Content

- Organisational Aims, Objectives, Policies, Organisational Structure and Development
- Organisational Culture. Systems of Communication
- Managing Change
- The Impact of Technology. Quality (Operations Management)
- Perception, Group Behaviour, Motivation, Leadership
- Business Ethics

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	45	Guided Learning and teaching
Self Directed	155	Undergraduates will be required to read around the subject using academic books and appropriate journals/texts related to the subject of organisational behaviour, management and leadership. Students will also be expected to research and write the summative assessments for the module which comprise two reports.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Report 1 LO1, 2 and 3, underlying cultures and motivation. Report 2 LO4 and 5 assessment of behaviour at work and management and Leadership styles.	50% 50% Total=100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Report 1 LO1, 2 and 3, essay on underlying cultures and motivation Report 2 LO4 and 5 assessment of behaviour at work, management and leadership styles.	50% 50% Total=100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Robert Coombes Date: XX/05/2020	**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: PETR1140 **MODULE TITLE:** Engineering Graduate Skills

CREDITS: 20 **FHEQ LEVEL:** 5 **HECOS CODE:** 101088

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module is designed to enable students to demonstrate that they have all the qualities and transferable skills necessary for appropriate academic work and employment requiring the exercise of responsibility and decision making, including the ability to relate their professional practice to underlying theory and principles. Students use reflective techniques to inform and evaluate progress.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	0%	**C1** (Coursework)	100%	**P1** (Practical)	0% 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 enable students to develop a portfolio of evidence that supports their career development and practice.
- To enable students to demonstrate an approach to their practice that is informed by up to date and relevant theoretical perspectives.
- To support students in developing as autonomous learners at HE level

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 how relevant theoretical perspectives have informed and enhanced your practical experience and/or knowledge within your subject area. 2 Reference research accurately and appropriately 3. Reflect upon your weaknesses and strengths in relation to your experiential learning and reflect upon fulfilling your plans to reach your potential role within the work place/organisation.	FdSc in Production and Manufacture Engineering FdSc Embedded Systems Design FdSc Electronics and Communications FdSc Mechanical Design & Manufacture ERS 8.4 1 - use appropriate codes of practice and industry standards KTS 8.3 1 - conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally. KU 8.1 2. - 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. CIS 8.2 1 - information sourced from academic and technical literature and other sources. ERS 8.4 2 – focus and reflect on professional development so as to target their lifelong learning within the working environment.

DATE OF APPROVAL: XX/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 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: 2021-22 **NATIONAL COST CENTRE: 119**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF: Robert Coombes**

Summary of Module Content

- Academic literacy and research conventions in their chosen field;
- The requirements of professional practice
- Informed reflection, self-evaluation and personal action planning;
- Relevant ICT competences to support academic and professional practice;
- Information Literacy, including search strategies, identification and critical selection of quality scholarly information.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	20	Guided Learning and teaching
Seminar	35	These are structured to support deeper understanding of research papers and for example the selection of key points.
Guided Independent Study	145	Guided study is structured through a series of online tutorials to support research and referencing, and other study skills with lessons and assignment tasks. Other independent study involves portfolio building regarding self-reflection on study skill development and career planning.
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, 2 and 3 relating to CPD, CV, Employment related Health Safety, Risk assessment, ethics, learning reflection and future self-development	100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Portfolio LO1, 2 and 3 relating to CPD, CV, Employment related Health Safety, Risk assessment, ethics, learning, future self-development	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber **Date:** 20/09/2021	**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	KU 8.1 i – the scientific, mathematical and statistical principles underpinning application

	sources e.g. apply probability or statistics.	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

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: 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: 20/09/2021	**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: PETR1093 **MODULE TITLE:** Engineering Science

CREDITS: 20 **FHEQ LEVEL:4** **HECOS CODE:**100206

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] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	50%	**C1** (Coursework)	50%	**P1** (Practical**)**	0% 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: 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, 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 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. Identify the forces and moments on structural elements and determine the major stresses in them.	FdSc in Production and Manufacture Engineering FdSc & 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.

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, including thermodynamic and hydrostatic systems.	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. 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

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: Andrew 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 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 *[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	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	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%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 20/09/2021	**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: 2021-22 **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: XX/09/2021	**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: PETR1094 **MODULE TITLE:** Engineering Materials

CREDITS: 20 **FHEQ LEVEL:** 4 **HECOS CODE:** 100147

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] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	50%	**C1** (Coursework)	50%	**P1** (Practical**)**	0% or ~~Pass/Fail~~
E2 (Clinical Examination)	0%	**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 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 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. 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	FdSc Production and Manufacture Engineering FdSc & 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

3. Explain the effects of processing on the structure and properties of materials 4. Analyse failure modes in materials	employed within workshop and laboratory practice. 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 Partnerships
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

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ACADEMIC YEAR: 2021 - 2022 **NATIONAL COST CENTRE:**120

MODULE LEADER: Nicola Vandenbrouck Mark Holbourn **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 (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	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
Examination	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: I. Spulber Date: XX/09/2021	**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	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.

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.	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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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ACADEMIC YEAR: 2021-22 **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. SpulberDate: XX/09/2021	**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: PETR2123 **MODULE TITLE:** Level 5 Project

CREDITS: 20 **FHEQ LEVEL: 5** **HECOS CODE: 100184**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module is an individual investigation of a specific problem in any of the engineering disciplines encountered in the programme. It represents a significant amount of work in which the student is proactive in managing their own learning and other resources needed to find a solution to the task which will normally relate to the student's place of work

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	0%	**C1** (Coursework)	80%	**P1** (Practical**)**	20%
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 an understanding of the inter-relationships between various engineering disciplines.
- To develop an ability to integrate engineering topics within the context of a specific project task.
- To broaden experience and develop a sense of responsibility and self-reliance.

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. Design a solution to a problem to be solved, or task to be performed and specify the framework within which the work will be carried out.	FdSc in Production and Manufacture Engineering FdSc Embedded Systems Design FdSc Electronics and Communications FdSc Mechanical Design and Manufacture FdSc Food Manufacturing KU 8.1 1 – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering. KU 8.1 2 – product placement, management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of

2. Evaluate a design for solving the problem or performing the task within the available time. 3. Test the product or solution and reflect upon the process and outcome. 4. Evaluate the information or data and assess whether the project objectives were achieved and what further work may be required. 5. Present findings to an audience to communicate verbally clearly and effectively the project undertaken.	Political, Economic, Social, Technological, Legal and Environmental factors. KU 8.1 3 - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice. PS 8.5 1 select appropriate equipment and work safely and competently within a workshop or laboratory environment. PS 8.5 2– Work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering in practice KTS 8.3 1 – conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally. CIS 8.2.3 – knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering ERS 8.4.1 - use appropriate codes of practice and industry standards

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 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

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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

- Understand the need for and develop documentation including project aims, objectives, and proposals.
- use presentation skills adapt them to a range audience.
- Apply the principles of project analysis, planning, setting targets and develop information into engineering solutions.
- plan an industrial visit relating to a project.
- Understand the importance of interim reports and milestones.
- Understand the attributes of a final report, 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	10	Guided Learning and teaching
Group work	25	Practical experience of project management processes.
Guided Independent Study	140	Worksheets and online learning material
Practical Classes & workshops/labs	25	Students can 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	Report LO1,2,3	100% Tot= 100%
Practical	Presentation LO4 and 5	100% Tot= 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Report LO1,2,3	100% Tot= 100%
Practical	Presentation LO4 and 5	100% Tot= 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 2009/2021	**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: PETR2127 **MODULE TITLE:** Manufacturing Systems

CREDITS: 20 **FHEQ LEVEL: 5** **HECOS CODE:** 100209
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE:** Yes
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module introduces students to the concepts of modern industrial management and control philosophies to manufacturing plant

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*

E1 (Examination)	0%	**C1** (Coursework)	80%	**P1** (Practical)	0% or ~~Pass/Fail~~
E2 (Clinical Examination)	0% or ~~Pass/Fail~~	**A1** (Generic assessment)	~~Pass/Fail~~		
T1 (Test)	20%				

SUBJECT ASSESSMENT PANEL to which module should be linked:
Professional body minimum pass mark requirement:
MODULE AIMS:

- Appreciate the standard tools used by World Class manufacturers to forecast production requirements.
- Evaluate the standard tools used by World Class manufacturers to forecast production.
- Assess the balance required when implementing procedures for forecasting against maximisation of profits.
- Assess the balance required when implementing procedures for scheduling against maximisation of capacity

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 Production and Manufacture Engineering FdSc Mechanical Design and Manufacture
1. Assess the reliance industry puts on forecasting and evaluate some of the methods used to carry out accurate forecasting. 2. Evaluate the need for, and the problems associated with the preparation of schedules and how performance against schedule is monitored.	KU 8.1 i – the scientific, mathematical and statistical principles underpinning application 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

3. Assess the effectiveness of ordering of components is carried out, and demand is balanced against capacity. 4. Analyse the techniques used by operations managers to carry out planning and decision making.	Political, Economic, Social, Technological, Legal and Environmental factors. CIS 8.2 i.-information sourced from academic and technical literature and other sources. KTS 8.3 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/09/2016	**FACULTY/OFFICE:** Academic Partnerships
DATE OF IMPLEMENTATION: XX/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

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: Andrew Wilson-Rudd **OTHER MODULE STAFF: Irina Spulber**

Summary of Module Content

- Use of historical data in methods of forecasting for future demands.
- Identification of the needs and aims of scheduling to reduce problems in production loading
- Recognising that MRP and MRPII are effective methods of controlling the ordering of parts for assembled products
- Determine and balance capacity against demand requirements
- Linear programming to aid planning and decision making for profitability
- Potential benefits and problems of JIT and lean manufacturing philosophies
- FMS and its level of flexibility and commercial implications
- CIM and its current limitations and commercial implications
- Requirements of formal, externally audited quality systems such as ISO9000
- Methodology of quality systems propounded by the major "gurus**"**

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	20	Guided Learning and teaching
Visits and speakers	5	Discussing management systems with local company managers.
Guided Independent Study	135	Online Worksheets and learning materials
Practical Classes & workshops	40	In the form of group work and discussion groups related to interviewing and developing of understanding of company processes.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Test	LO2 Test on scheduling	100%
Coursework	LO1, 3 and 4 Report on Forecasting, demand is balanced against capacity and planning	100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework (in lieu of the original Test)	LO2 Report on scheduling	100%
Coursework	LO1, 3 and 4 Report on Forecasting, demand is balanced against capacity and planning	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: XX/09/2021	**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: PETR2110 **MODULE TITLE:** Robotic and Automation Systems

CREDITS: 20 **FHEQ LEVEL:** 5 **HECOS CODE:**100170

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module extends on mechatronics fundamentals to develop appreciation and the analytical skills to assess the suitability of robots, automation components and systems are fit for purpose, use various methods to assess the appropriate programming and set up for safe operation.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination) 0%		**C1** (Coursework)	50%	**P1** (Practical)	50%
E2 (Clinical Examination) 0%		**A1** (Generic assessment) 0%			
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 develop a good fundamental understanding of the use of robots in manufacturing engineering
- To build familiarity with the definitions, classifications, and terminology associated with robotics and automation
- To build an understanding of the basic design element and the operation of industrial robots
- To provide appreciation of some of the factors to be considered for the suitable application and effective usage of robotic and automation systems as part of a manufacturing process

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 the terminology and definitions associated with industrial robots and automation systems, to	FdSc Production and Manufacture Engineering FdSc Embedded Systems Design FdSc Food Manufacturing KU 8.1 1 - the scientific, mathematical and statistical principles underpinning the

	explain the main elements and principles of operation.	application of current technologies, and their evolution, in robot and automation technologies.
2.	Apply the basic types of control system available, associated programming methods, and compare and evaluate different types of drives.	KU 8.1 1 the scientific, mathematical and statistical principles underpinning the application of current technologies, and their evolution, in engineering. KTS 8.3.2- engage with and effectively employ general IT applications and facilities.
3.	Apply Knowledge and understanding of the type of wrist movement and end effector needed to the particular engineering task	KU 8.1.3 relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice. KU 8.1.1 as above
4.	Assess the suitability of a robot for a particular industrial application the relevant codes of practice and safety standards.	ERS 8.4.1 - use appropriate codes of practice and industry standards ERS 8.4.2 – focus and reflect on professional development so as to target their lifelong learning within the working the ability to relate that learnt off the job to the work place

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:120**
MODULE LEADER: Robert Coombes **OTHER MODULE STAFF: David Davies**

Summary of Module Content

- terminology applied to industrial robots
- movements involved in industrial robot
- main elements of industrial robots
- functions of industrial robots
- basic types of robotic control systems
- drive actuation systems used in industrial robots
- need for wrist movements
- differing types of end effector
- usage of industrial robots for differing and specific applications
- requirements and responsibilities for safe practices when working with industrial robots

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	To expand and develop understanding of lecture notes and research by peer feedback and discussion groups.
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 the tutor.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	LO1 and LO2 Written Assessment of robotics and automation for specific area of industry	100%
Practical	LO3 and LO4 Industrial presentation of robotics or automation solution	100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	LO1 and LO2 Written Assessment of robotics and automation for specific area of industry	100%
Coursework (in lieu of the original assessment)	LO3 and LO4 Industrial report of robotics or automation solution	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: XX/09/2021	**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: PETR2111 **MODULE TITLE:** Production Management

CREDITS: 20 **FHEQ LEVEL:** 5 **HECOS CODE:** 100209

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module investigates the functions, structures and inter-relationships of a manufacturing organisation. Learners will apply the skills of costing, financial planning and control associated with manufacturing processes. Learners will explore the principles and applications of business performance improvement using a range of different techniques and methodologies in order to improve value.

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:

The aim of this module is to provide students with an understanding of business management techniques within manufacturing organisations and understand other factors which drive business forward.

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. Produce a total cost model and supply chain map for a product or process and apply the principles of lead-time analysis. 2. Be able to use techniques to reduce cost and/or production lead-times and prepare an	FdSc in Production and Manufacture Engineering FdSc Food Manufacturing KU 8.1. – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering. KU 8.1.2– product placement, management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social,

improved standard operating procedure. 3. Know how to manage work activities to achieve organisational objectives 4. Be able to select and apply costing systems and techniques. 5. Apply project planning and scheduling methods to a project.	Technological, Legal and Environmental factors. KTS 8.4.1- use appropriate codes of practice and industry standards. KTS 8.4 2 -focus and reflect on professional development so as to target their lifelong learning within the working environment. CIS 8.2.2- through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. KU 8.1 (as i above) CIS 8.2.3 - knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering KTS3.2- engage with and effectively employ general IT applications and facilities. ERS 8.4.1. -use appropriate codes of practice and industry standards. ERS 8.4.2. - focus and reflect on professional development so as to target their lifelong learning within the working environment.

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:**120
MODULE LEADER: Robert Coombes **OTHER MODULE STAFF: Andrew Wilson-Rudd**

Summary of Module Content

- Business Management Techniques in a Manufacturing Environment
- Value Management
- Business and Quality improvement techniques
- Project planning, scheduling and control methods

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions]***		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	30	Guided Learning and teaching
Case studies	15	Examples of work related problems with and without solutions
Self Directed	155	Online tutorial questions and tasks
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Report LO1 and 2 operating costs and cost reduction Report LO3, 4 and 5 manage cost and schedule in light of changing resources	50% 50% Total=100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework (in lieu of the original assessment)		0%
Coursework	Report LO1 and 2 operating costs and cost reduction Report LO3, 4 and 5 manage cost and schedule in light of changing resources	50% 50% Total=100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: 09/2021	**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: PETR2128 **MODULE TITLE:** Manufacturing Processes

CREDITS: 20 **FHEQ LEVEL:**5 **HECOS CODE:** 100209
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE:** Yes
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
The module investigates the use of conventional and non-conventional forming and machining techniques used in component manufacture in modern engineering industry.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*

E1 (Examination)	0%	**C1** (Coursework)	80%	**P1** (Practical**)**	0%
E2 (Clinical Examination)	0%l	**A1** (Generic assessment)	0%		
T1 (Test)	20%				

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

- To provide learners with a broad and in-depth knowledge of a range of manufacturing processes
- To understand the methodology of selecting the most suitable manufacturing process for a component

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. Specify suitable conventional machining processes to meet a components specification 2. Specify suitable non-traditional machining methods for a given component.	FdSc in Production and Manufacture Engineering FdSc Mechanical Design and Manufacture FdSc Food Manufacturing KU8.1.1 – the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in manufacturing engineering. KU8.1.3- relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice KU8.1.2 – product placement, management, professional conduct, risk

3. Specify suitable plastic and composite manufacturing processes for a given component. 4. Determine solutions in terms of economic issues when specifying a particular manufacturing process	and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors. CIS 8.2.1. - information sourced from academic and technical literature and other sources. CIS 8.2.2. -through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. 8.3 2 engage with and effectively employ general IT applications and facilities. PS 8.5.1– select appropriate equipment and work safely and competently within a workshop or laboratory environment. PS 8.5.2 – 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 Partnerships
DATE OF IMPLEMENTATION: XX/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: 120**
MODULE LEADER: Andrew Wilson-Rudd **OTHER MODULE STAFF: Robert Coombes**

Summary of Module Content

- Conventional machining processes which produce flat or cylindrical geometry
- Single point and multi-tooth cutting, cutting, lubricants
- Work holding devices: chucks, vices, jigs, fixtures. Clamping methods
- Casting, forging, rolling, extrusion
- Forming of flat sheets
- Plastic forming and moulding techniques
- Composite manufacturing techniques
- Tooling
- Sintering of metallic and ceramic materials
- Non-traditional machining techniques (e.g. EDM)
- Economic issues relating to types of processes.
- Metrology

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	45	Guided Learning and teaching
Visits to manufacturing businesses	20	Range of manufacturing systems visited throughout the year.
Seminar	5	Discussion and contextualising of the manufacturing sites vested.
Guided Independent Study	130	Worksheets and online learning material
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Test	Test LO4 Economic Impact on Processes	100% Tot = 100%
Coursework	Assignment LO1,2,3	100% Tot = 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Test	Test LO4 Economic Impact on Processes	100% Tot = 100%
Coursework	Assignment LO1,2,3	100% % 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spuber Date: 09/2021	**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: PETR2129 **MODULE TITLE:** Mechanical Principles

CREDITS: 20 **FHEQ LEVEL: 5** **HECOS CODE:**100147
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE:** Yes
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module introduces the student to an extended range of mechanical principles which underpin the analysis and design of engineering systems.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*

E1 (Examination)	0%	**C1** (Coursework)	50%	**P1** (Practical)	0%
E2 (Clinical Examination)	0%	**A1** (Generic assessment)	0%		
T1 (Test)	50%				

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

- To provide the skills for mechanical engineering design.
- To provide the analysis of engineering systems from a strength of materials and mechanisms perspective.
- To use design, make and test to apply key mechanical principles.

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. Analyse routine and non-routine complex loading systems 2. Determine the mechanical behaviour of loaded structures	FdSc in Production and Manufacture Engineering FdSc Mechanical Design and Manufacture KU 8.1 i – the scientific, mathematical and statistical principles underpinning application 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.

3.	Evaluate power transmission system elements and assess their effectiveness	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
4.	Investigate the dynamics of rotating systems and mechanisms.	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 n 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**

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: 120
MODULE LEADER: Robert Coombes
OTHER MODULE STAFF: Andrew Wilson-Rudd

Summary of Module Content

- Complex loading systems involving two and three dimensions
- Poisson's ratio and elastic constants
- Theory relating to simply supported, cantilever and propped beams which carry point and distributed loads, couples. Slope and deflection, Macaulay's method.
- Thick walled cylinders
- Mechanical power transmission including belt drives, simple and compound gear trains, friction clutches
- Balancing of simple and multi-plane rotating mass systems

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	15	Reflection and peer discussion on results of practical work.
Guided Independent Study	130	Worksheet and online learning
Practical Classes & workshops/labs	40	Load testing and experimentation.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**

Test	LO1,2 Open book test on theory problems	100 Tot =% 100%
Coursework	Report LO3 and LO4	100% Tot = 100%

REFERRAL ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Coursework	Report - LO3,4 on practical investigations	100% Tot= 100%
Coursework (in lieu of Test)	Assignment LO1,2 on theory problems	100% Tot= 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Robert Coombes Date: XX/09/2021	**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: PETR2130 **MODULE TITLE:** Instrumentation and Control

CREDITS: 20 **FHEQ LEVEL: 5** **HECOS CODE:** 100166
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE:** Yes
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module introduces electrical and mechanical engineering students to basic instrumentation in terms of measuring system approach. Develops knowledge understanding sensor technologies in the application and determining the calibration requirements. Solve problems using modern control systems approach. Appreciate the major developments in digital technologies that impact on instrumentation and control.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*					
E1 (Examination)	50%	**C1** (Coursework)	50%	**P1** (Practical)	0% 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: Science & Technology
Professional body minimum pass mark requirement: N/A
MODULE AIMS:

- Introduce instrumentation technology and practices
- Select modern sensors for engineering control systems
- Develop engineering solutions using modern control systems approach
- Integration of digital systems in instrumentation and control 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. Understand and apply the concepts of instrumentation technology including error analysis and the accuracy of sensors for measurement system.	FdSc in Production and Manufacture FdSc Embedded Systems Design FdSc Electronics and Communications KU 8.1 i – the scientific, mathematical and statistical principles underpinning application 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

2. Apply suitable instrumentation to meet the requirements of a system specification. 3. Explain control system design from fundamental using s-plain and z-plain techniques. 4. Evaluate the operation and performance of control systems.	the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors. CIS 8.2 ii - through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice. PS 8.5 i – select appropriate equipment and work safely and competently within a workshop or laboratory environment. ERS 8.4 I - use appropriate codes of practice and industry standards 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 Partnerships
DATE OF IMPLEMENTATION: XX/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: 115**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF: Robert Coombes**

Summary of Module Content

- Instrumentation principles.
- Transducers using resistance, inductance, capacitive changes to measure force, displacement, strain, pressure, velocity, acceleration, flow, temperature, light intensity.
- Transformer, piezo electric, semiconductor, digital devices.
- Operational and power amplifiers.
- System dynamics and modelling.
- Transfer function and block diagram representation.
- Feedback systems.
- Transient behaviour of systems.
- Laplace transform.
- Stability analysis.
- Applications of embedded solutions to instrumentation and control systems

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	20	Guided Learning and teaching
Seminar	20	Student led sessions to reflect in peer groups on outcome and results of practical exercises.
Guided Independent Study	140	Worksheet and online
Practical Classes & workshops	20	Practical application of theory sessions.
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 LO1, LO3 measuring instruments and controls in s and z domains	100% Tot = 100%
Coursework	Report LO2, LO4 instrument and control systems problems and experimentation	100% % 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Written exam	Examination LO1, LO3 measuring instruments and controls in s and z domains	100% % 100%
Coursework	Report LO2, LO4 instrument and control systems problems and experimentation	100% Tot = 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber Date: XX/09/2021	**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: PETR2131 **MODULE TITLE:** Design Processes

CREDITS: 20 **FHEQ LEVEL: 5** **HECOS CODE:** 100160

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module consists of a lecture course including design methodology, information gathering and interpretation, and the design of a range of machine elements. Students work individually or in small groups on design assignments.

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:

This module extends student to a detailed understanding and the application of the design process. To be confident in the use and interpretation of analysis to aid designs process To create product designs that meet lean manufacturing philosophies.

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 Production and Manufacture Engineering FdSc Mechanical Design and Manufacture
1. Follow a structured design process to develop and select appropriate concepts in response to design requirements.	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.
2. Use specific tools to parametrically design, analyse and optimize engineering components.	CIS 8.2 iii – knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for electrical and engineering
3. Select and justify materials, components and lean manufacturing	KTS 8.3 i. - conduct and manage themselves through personal and team programmes of

methods to meet a design requirement. 4. Produce a range of engineering drawings, specifications and lean manufacturing plans to manufacture a product to meet a design requirement.	work with the ability to communicate professionally. KTS 8.3 ii - engage with and effectively employ general IT applications and facilities. KU 8.1 iii - relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.

DATE OF APPROVAL: XX/10/2019	**FACULTY/OFFICE:** Academic Partnerships
DATE OF IMPLEMENTATION: 09/09/2020	**SCHOOL/PARTNER:** PETROC
DATE(S) OF APPROVED CHANGE: 29/09/19	**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

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: Andrew Wilson-Rudd **OTHER MODULE STAFF: Irina Spulber**

Summary of Module Content

- Structured approaches to the generation of design solutions.
- Creative thinking, analysis and evaluation of a design.
- Manufacturing implications and service environment.
- Product design specification (PDS).
- British and International Standards, codes of practice, ergonomics, aesthetics and safety issues.
- Standards for materials and suppliers. Sources of information and data relating to materials and standard components.
- System elements- mechanical power transmission elements, mechanisms and actuators.
- Product costing.
- Design assignments involving calculations, selection of material, design layouts, logical evaluation of solutions generated, re-evaluation of the final design.
- Assemblies and component drawings using a CAD package (AutoCAD or SolidWorks).

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	10	Case studies and design development activities
Group work	20	Students lead the sessions, receiving support from tutor.
Guided Independent Study	130	Online Worksheets and learning materials
Peer discussions	40	Groups feedback their experience and progress to class to receive peer input and develop understanding.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Case Study LO1 and LO2 Designs LO3 and LO4	40% 60% 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Case Study LO1 and LO2 Designs LO3 and LO4	40% 60% 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Robert Coombes Date: XX/09/2021	**Approved by**: Date: XX/XX/XXXX