PETROC

UNIVERSITY OF PLYMOUTH

ACADEMIC PARTNERSHIPS PROGRAMME QUALITY HANDBOOK 2021-22

BSC (HONOURS) INTEGRATED TECHNOLOGIES ENGINEERING

Contents

Welcome and Introduction

1. Welcome to BSc (Honours) Integrated Technologies Engineering delivered at North Devon Campus by Petroc.

This BSc (Hons) Integrated Technologies Engineering:

- is careful aligned, through its learning outcomes and delivery structure, with the UK Engineering Council's requirements for programmes accredited to Incorporated Engineer (IEng) status. Along with the ability to focus many assessments on real workplace applications, this enables students, particularly for those based in the workplace, to plan for the next stage in their careers and their potential to progress to more senior roles and responsibilities in engineering.
- is a level-6, final-year degree, 'top-up' award for students, particularly those already in the workplace, that arrive with either level-5 (HND, Diploma HE or Foundation Degree) qualifications, significant work experience that evidences suitability for undertaking the final year of this degree, or a mixture of both across mechanical, manufacturing, electrical and electronic, and digital technologies.
- develops critical and transformative graduates with understanding of, and intellect for the parameters of engineering industries, the application of project management, and the ethos and skills for career-long professional development, complete within the context of technical knowledge, skill development and application across mechanical, electrical and electronic engineering and digital technologies.
- provides a scaled-insight into the knowledge, skill development and applications needed to lead and manage innovative and enterprising engineering solutions that integrate mechanical, electrical and electronic engineering and digital technologies. This includes: the breadth of industrial awareness and philosophies needed to lead in technological industries; the processes needed to manage through to achieving engineering solutions; and the development of the individual so as to be critical, transformative, knowledgeable and skilled within a society that will ever continue to require engineering solutions.
- offers an innovative experiential approach to developing and furthering technological knowledge and skills. The novel embedding of professional/commercial-styled technological 'short courses', complete with 'certificates of attendance', within the programme's Professional Development module enables students to reflect on their strategic alignment

with industry and their future careers. This experiential learning process of 'do and review' is thus firmly focused on developing the philosophy and function required to be transformative for engineering as an industry as well as their own careers.

- embraces the words of the UK Engineering Council[1] in that "*Engineering is concerned with the art and practice of changing the world we live in. Driven by the needs of society and business, engineers strive to find solutions to complex challenges. They work to achieve useful and beneficial outcomes that enhance the welfare, health and safety of all whilst paying due regard to the environment.*" Furthermore, this programme aligns with the ethos of Incorporated Engineer (IEng) status in the "*development and attainment of the know-how necessary to apply technology to engineering problems and processes, and to maintain and manage current technology, sometimes within a multidisciplinary engineering environment*".

This Programme Quality handbook contains important information including:

- The approved programme specification
- Module records

Note: The information in this handbook should be read in conjunction with the current edition of:

- Your University Student Institution Handbook which contains student support based information on issues such as finance and studying at HE available at: https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=3059
- Your Module Guide available at: https://my.petroc.ac.uk/moodle/moodle_3/course/view.php?id=3161
- Your University of Plymouth Student Handbook available at: https://www.plymouth.ac.uk/your-university/governance/student-handbook

[1] The Accreditation of High Education Programmes, UK Standard for Professional Engineering Competence, Third Edition, www.engc.org.uk , https://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20Education%20Programmes%20third%20edition%20(1).pdf

Programme Specification

2.0 Programme Specification

BSc (Hons) Integrated Technologies Engineering

Final award title: BSc (Hons) Integrated Technologies Engineering

UCAS code: N/A

HECOS code: 100184

Awarding Institution: University of Plymouth

Teaching institution(s):
- Petroc College

Accrediting body(ies)

This programme exists as a level-6 only Top-Up award. It is unlikely that the programme itself will be accredited due to existing as a single stage of study. However, to assist graduates with their professional development, the Programme Intended Learning Outcomes (for this programme have been illustratively mapped against the Incorporated Engineering (IEng) expectations from the UK Engineering Council's '*The Accreditation of Higher Education Programmes, UK Standard for Professional Engineering Competence Third edition*' guidance for Incorporated Engineer (IEng)[2].

Summary of specific conditions/regulations: N/A

Date of re-accreditation: N/A

[2] https://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20Education%20Programmes%20third%20edition%20(1).pdf

2.1 Programme Delivery and Aims

To provide structured teaching, learning and assessment to enable students' development to be assessed in line with the context of integrating technologies for engineered solutions and their[3]:

Aim 1. use of logical and practical steps within a pragmatic and systematic approach to turn, often complex, concepts into reality

Aim 2. flexible use of their skills, knowledge and understanding to develop strategies for creative and innovative approaches to engineering problem solving and the seeking of sustainable solutions

Aim 3. use of numerical, computational, analytical and technical skills and appropriate tools to both describe and build existing and infer and develop potential engineering solutions

Aim 4. awareness of ethical, social, cultural, environmental, health and safety, and wider professional responsibilities such as engagement with developing technologies, including being risk, cost and value-conscious

Aim 5. familiarity of the nature of business and enterprise in their economic and social value, and appreciation of the global dimensions of engineering, commerce and communication

2.2 Programme Intended Learning Outcomes

All PILOs have been taken directly from the UK Engineering Council's 'The Accreditation of Higher Education Programmes, UK Standard for Professional Engineering Competence Third edition' guidance for Incorporated Engineer (IEng), thus avoiding any confusion in programme positioning.

[3] Closely paraphrased from: QAA Subject Benchmark Engineering, February 2015, section 3 'The characteristics of engineering graduates'

PILO 8.1 Knowledge and understanding

PILO: On successful completion graduates should have developed *critical*[4] knowledge and understanding of:	Cross-Referenced to UK Engineering Council's IEng Accreditation[5]
1. the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering.	Science and mathematics Engineering is underpinned by science and mathematics, and other associated disciplines, as defined by the relevant professional engineering institution(s). Graduates will need: • Knowledge and understanding of the scientific principles underpinning relevant current technologies, and their evolution • Knowledge and understanding of mathematics and an awareness of statistical methods necessary to support application of key engineering principles.
2. product placement, management, project-management, professional conduct, risk and legislation, quality and sustainability as appropriate to global industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors.	Economic, legal, social, ethical and environmental context Engineering activity can have impacts on the environment, on commerce, on society and on individuals. Graduates therefore need the skills to manage their activities and to be aware of the various legal and ethical constraints under which they are expected to operate, including: • Knowledge and understanding of the commercial, economic and social context of engineering processes • Knowledge of management techniques that may be used to achieve engineering objectives • Understanding of the requirement for engineering activities to promote sustainable development • Awareness of relevant legal requirements governing engineering activities, including personnel, health & safety, contracts, intellectual property rights, product safety and liability issues • Awareness of risk issues, including health & safety, environmental and commercial risk. Engineering practice This is the practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. This can include: • Awareness of quality issues and their application to continuous improvement
3. relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.	Engineering practice This is the practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. This can include: • Understanding of and ability to use relevant materials, equipment, tools, processes, or products • Knowledge and understanding of workshop and laboratory practice
4. the merging of technologies that form the breadth of global engineering industries and offer future opportunities for engineers, markets and societies alike.	Economic, legal, social, ethical and environmental context Engineering activity can have impacts on the environment, on commerce, on society and on individuals. Graduates therefore need the skills to manage their activities and to be aware of the various legal and ethical constraints under which they are expected to operate, including: • Understanding of the need for a high level of professional and ethical conduct in engineering and a knowledge of professional codes of conduct Engineering practice This is the practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. This can include:

[4] Defensible knowledge and understanding, whether through citation of sources or strength of reasoned argument.

[5] https://www.engc.org.uk/engcdocuments/internet/Website/Accreditation%20of%20Higher%20Education%20Programmes%20third%20edition%20(1).pdf

	• Knowledge of contexts in which engineering knowledge can be applied (eg operations and management, application and development of technology, etc)

PILO 8.2. Cognitive and intellectual skills

PILO: On successful completion graduates should have developed the cognitive and intellectual skills to *critically*[6] analyse, apply and evaluate:	Cross-Referenced to UK Engineering Council's IEng Accreditation
1. information sourced from academic and technical literature and other sources.	Engineering practice This is the practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. This can include: • Ability to use and apply information from technical literature
2. through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering.	Engineering analysis Engineering analysis involves the application of engineering concepts and tools to the solution of engineering problems. Graduates will need: • Ability to monitor, interpret and apply the results of analysis and modelling in order to bring about continuous improvement • Ability to apply quantitative methods in order to understand the performance of systems and components • Ability to use the results of engineering analysis to solve engineering problems and to recommend appropriate action • Ability to apply an integrated or systems approach to engineering problems through know-how of the relevant technologies and their application.

PILO 8.3. Key and transferable skills

PILO: On successful completion graduates should have developed the key and transferable skills to be *transformative*[7] through how they:	Cross-Referenced to UK Engineering Council's IEng Accreditation
1. conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally.	Design Design at this level is the creation and development of an economically viable product, process or system to meet a defined need. It involves technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems. Graduates will need the knowledge, understanding and skills to: • Communicate their work to technical and non-technical audiences. Additional general skills Graduates must have developed transferable skills, additional to those set out in the other learning outcomes, that will be of value in a wide range of situations, including the ability to: • Exercise personal responsibility, which may be as a team member Engineering practice

[6] Defensible evidence of cognition and intellect, i.e. defensible through effective sourcing and use of information, whether from literature or empirical study.

[7] Descriptors for increasing levels of transferable personal skills and attributes:

1. **Adaptive:** ability to fit in, do job competently, avoid questioning established procedures, be effective as rapidly as possible within a given context
2. **Adaptable:** to be able and willing to learn and add to knowledge and skills, use these in the face of change, and interact effectively across working environments.
3. **Transformative:** to involve a level of metacognition in their analysis, critique and synthesis of these transferable skills so as to enable leadership and forward looking work.

	This is the practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. This can include: • Awareness of team roles and the ability to work as a member of an engineering team.
2. apply problem-solving skills, including engagement with and effective use of IT applications and facilities.	Design Design at this level is the creation and development of an economically viable product, process or system to meet a defined need. It involves technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems. Graduates will need the knowledge, understanding and skills to: • Apply problem-solving skills, technical knowledge and understanding to create or adapt design solutions that are fit for purpose including operation, maintenance, reliability etc Additional general skills Graduates must have developed transferable skills, additional to those set out in the other learning outcomes, that will be of value in a wide range of situations, including the ability to: • Apply their skills in problem solving, communication, information retrieval, working with others and the effective use of general IT facilities
3. plan and carry out autonomous work.	Additional general skills Graduates must have developed transferable skills, additional to those set out in the other learning outcomes, that will be of value in a wide range of situations, including the ability to: • Plan and carry out a personal programme of work

PILO 8.4. Employment related skills

PILO: On successful completion graduates should have developed the employment related skills to be *transformative*[8] through how they:	Cross-Referenced to UK Engineering Council's IEng Accreditation
1. use appropriate codes of practice and industry standards	Engineering practice This is the practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. This can include: • Ability to use appropriate codes of practice and industry standards
2. synthesise considerations of business, customer and user needs alongside the wider engineering context, public perception and aesthetics	Design Design at this level is the creation and development of an economically viable product, process or system to meet a defined need. It involves technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems. Graduates will need the knowledge, understanding and skills to: • Be aware of business, customer and user needs, including considerations such as the wider engineering context, public perception and aesthetics

[8] Descriptors for increasing levels of transferable personal skills and attributes:

1. **Adaptive:** ability to fit in, do job competently, avoid questioning established procedures, be effective as rapidly as possible within a given context
2. **Adaptable:** to be able and willing to learn and add to knowledge and skills, use these in the face of change, and interact effectively across working environments.
3. **Transformative:** to involve a level of metacognition in their analysis, critique and synthesis of these employment related skills so as to enable leadership and forward looking work.

3. focus and reflect on professional development so as to target their lifelong learning within the working environment.	Additional general skills Graduates must have developed transferable skills, additional to those set out in the other learning outcomes, that will be of value in a wide range of situations, including the ability to: • Plan self-learning and improve performance, as the foundation for lifelong learning/CPD

PILO 8.5. Practical skills

PILO: On successful completion graduates should have developed the practical skills to be *productive* in how they:	Cross-Referenced to UK Engineering Council's IEng Accreditation
1. select appropriate equipment and work safely and competently within a workshop or laboratory environment.	*No directly related IEng accreditation Learning Outcome*
2. work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering related systems in practice.	Design Design at this level is the creation and development of an economically viable product, process or system to meet a defined need. It involves technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems. Graduates will need the knowledge, understanding and skills to: • Work with information that may be incomplete or uncertain and be aware that this may affect the design.
3. create or adapt design and management solutions.	Design Design at this level is the creation and development of an economically viable product, process or system to meet a defined need. It involves technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems. Graduates will need the knowledge, understanding and skills to: • Apply problem-solving skills, technical knowledge and understanding to create or adapt design solutions that are fit for purpose including operation, maintenance, reliability etc • Manage the design process, including cost drivers, and evaluate outcomes

2.3 Progression Route(s)

Relevant programmes within Plymouth University's partnership may seek progression into this programme through formal minor change request. The resultant progression agreement will be held with each Foundation Degree or HND. Careful consideration will follow due process in reviewing the content of each programme.

It may be possible to apply for a MSc in a similar subject area.

2.4 Admission Criteria

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

Entry Requirements for BSc (Hons) Engineering (Top-Up)	
Progression from Level-5 Study	Students may apply from technological level-5 programmes. Either progression will be already defined within the Programme Specification of those level-5 programmes or they will be considered by admissions tutors on individual merit, based on prior technology-focused study to level-5 and its alignment with setting the individual student up for completion to meet the PILOs of this programme.
APEL/APCL[9]	Prior Certificated Learning and Prior Experiential Learning are two broad ways a potential student may wish to present their applicability to join this level-6, final year of a degree, top-up programme. APEL/APCL will be considered as per Plymouth University regulations, which includes the possibility to APL 240 credits against a 360 credit BSc (Hons) degree. For mapping either APCL or APEL the admissions tutor for the relevant college should refer to the learning outcomes of their level-5 programmes that have progression to this top-up agreed. Where that isn't immediately applicable, the admissions tutor may consider L5 programmes from other colleges that deliver this L6 top-up programme.
Capability Requirements, and Disability	Both the context of, and therefore 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. Each institution has dedicated learning support. Applying students who have a disability or have concerns over their capability to undertake any aspects of the programme are encouraged to declare those aspects on application so they can be discussed appropriately and solutions sought in the interest of inclusion onto the programme.

[9] Accredited Prior Learning and Accredited Prior Certificated Learning

2.5 Academic Standards and Quality Enhancement

1. 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.
2. Elements of this process include engaging with stakeholders. For this definitive document it is important to define:
3. 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.
4. Additional stakeholders specific to this programme:
5. 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.
6. 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.
7. 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,
8. 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 Mapping

BSc (Hons) Integrated Technologies Engineering								
Undertaken Full-Time or Part-Time in any arrangement across one or two years, * apart from the Individual Project, which must be undertaken in the final year of part-time study				**Assessment % (or Pass/Fail)**				
Module Code	**Title**	**Credits**	**When/Where**	**E1**	**T1**	**C1**	**P1**	**A1**
PETR3006	Engineering Leadership and Management	20	AY (PC)			50%	50%	
PETR3007	Engineering Project Management	20	AY (PC)			50%	50%	
PETR3008	Professional Development in Engineering	20	AY (PC)			50%	50%	
PETR3009	Integrating Technologies for Contemporary and Future Engineering Sectors	20	AY (PC)				100%	Pass / Fail
PETR3010	Individual Project	40	AY (PC) P/T = Final Year			70%	30%	

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: PETR3006 **MODULE TITLE:** Engineering Leadership and Management
CREDITS: 20 **FHEQ LEVEL:** 6 **HECOS CODE:** 100088
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE:** Y
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module focuses on developing the critical knowledge and understanding of what parameterises and drives the breadth of engineering industries. In this context, students will develop the cognitive and employability skills necessary to be strategically critical and transformative in their future leadership and management of engineering.

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

SUBJECT ASSESSMENT PANEL to which module should be linked: **ENGINEERING**
Professional body minimum pass mark requirement: N/A

MODULE AIMS:
To present breadth and depth of the extent of engineering as a collection of industries that produce real, tangible solutions for the needs and desires of society. Outlining and contextualising these. Positioning professional expectations within those parameters. Envisaging the future. Understanding and purposing the leadership of businesses and the industry itself. Understanding and categorising the factors that challenge the development of engineering. Ultimately, developing skills and attributes needed for the regional, national and international future of engineering.

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. Demonstrate critical knowledge and understanding of regional, national and international engineering enterprises in the engineering sector and the challenges they face.	8.1.2: critical knowledge and understanding of 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
2. Defend their cognition and intellect of leadership and enterprise in engineering through sourcing, critically analysing, applying and evaluating information from academic and other industry relevant literature.	8.2.1: critically analyse, apply and evaluate information sourced from academic and technical literature and other sources 8.4.1. employment related skills to be transformative in how they use appropriate codes of practice and industry standards
3. Evidence their ability to balance internal and external factors of engineering enterprises to position those businesses for their immediate, wider and future markets.	8.4.2: synthesise considerations of business, customer and user needs alongside the wider engineering context, public perception and aesthetics
4. Communicate critical knowledge and understanding through both written and verbal communication.	8.3.1: key and transferable skills to be transformative through how they conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally.

DATE OF APPROVAL: 29/09/2020	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 29/09/2020	**SCHOOL/PARTNER: Petroc College**
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/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

Items in this section must be considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Robert Coombes **OTHER MODULE STAFF: Craig Litster**

Summary of Module Content
Industry sources: Analysis of the breadth of regional, national and international engineering industries and sectors. Professional expectations and accreditation. Predictions and insight into the future of engineering.
Academic sources: Leadership styles and models. Biases and other challenges facing the behaviours and personalities of entrepreneurs, leaders and managers. The activities and outputs of leadership.
Combined: Internal and external factors and challenges faced by (engineering) organisations. Internal management of people and resource, goals, strategies, policies, objectives, tactics, regulations and tasks. Analysis of external PESTLE factors.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures and Seminars	40	Combining taught elements with considerable use of seminar discussions to engage conceptual theory with real-world application.
Tutorials	5	Focused on formative assessment in the form of discussion groups
Directed Individual Study	30	Task directed activities, such as specific reading/DLE activities
Self-directed Individual Study	125	Background reading to develop critical understanding of theory, and assessment work
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Coursework	Sectioned Essay/Report: 3000 word (not including tables, figures, in-text references) synthesising industrial understanding and academic theories in line with predictions and insight into the future of a personally chosen engineering sector.	100%
		%
		100%

Practical	Case Study Presentation by powerpoint: synthesis of industrial understanding and academic theory in critical evaluation of an engineering case study.	100% % 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework (in lieu of practical)	Case Study Presentation by video: synthesis of industrial understanding and academic theory in critical evaluation of an engineering case study.	% % 100%
Coursework	Sectioned Essay/Report: 3000 word (not including tables, figures, in-text references) critical discussion of the wider engineering sector in line with relevant enterprise, leadership and management considerations.	% % 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

Reading List

Webpages:
www.prospects.ac.uk
www.engineerjobs.co.uk
UK Engineering Council, 2014, The Accreditation of Higher Education Programmes, www.engc.org.uk Published May 2014

Books:
Cather, H., Morris, R. and Wilkinson, J. (2001) Business Skills for Engineers and Technologists. (1st Ed.) Oxford: Butterworth-Heinemann.

Flumerfelt, S., Kahlen, F-J., Alves, A., Siriban-Manalang, A.B., 2015, Lean engineering education: driving content and competency mastery, American Society of Mechanical Engineers, 144p (https://primo.plymouth.ac.uk/primo-explore/fulldisplay?docid=44PLY_ALMA_DS5161644350001281&context=L&vid=VU_PLY&lang=en_US&search_scope=44PLY_ALL%20PC&adaptor=Local%20Search%20Engine&tab=local&query=any,contains,engineering%20leadership&facet=searchcreationdate,include,2005%7C,%7C2019&facet=searchcreationdate,include,2010%7C,%7C2019&mode=Basic&offset=0)

Gaynor, G.H., Decisions: an engineering and management perspective, Wiley, 300p (https://primo.plymouth.ac.uk/primo-explore/fulldisplay?docid=44PLY_ALMA_DS5165449350001281&context=L&vid=VU_PLY&lang=en_US

&search_scope=44PLY_ALL%20PC&adaptor=Local%20Search%20Engine&tab=local&query=any,contains,engineering%20leadership&facet=searchcreationdate,include,2005%7C,%7C2019&facet=searchcreationdate,include,2010%7C,%7C2019&mode=Basic&offset=0)

Geng, H. (ed.), (2016), Manufacturing engineering handbook. Second edition. New York [New York]; Boston, Massachusetts: McGraw-Hill;

Jack, H., (2013), Engineering design, planning, and management. Amsterdam: Academic Press.

Robinson, S.et al. (2012) Engineering, Business and Professional Ethics. London: Routledge

Mitch Bott & Bryan Mesmer (2019) An Analysis of Theories Supporting Agile Scrum and the Use of Scrum in Systems Engineering, Engineering Management Journal, DOI: 10.1080/10429247.2019.1659701

Northouse. P.G (2015) Leadership: Theory and Practice (7th Ed). London: SAGE Publications.

Journals:

Almalki, H.M., Rabelo, L., Davis, C., Usmani, H., Hollister, D., Sarmiento, A., 2016, Analyzing the Existing Undergraduate Engineering Leadership Skills, Systemics, Cybernetics and Informatics, 14(6), pp.35-39 (http://www.iiisci.org/Journal/CV$/sci/pdfs/MA302FK16.pdf)

Cox, M.F., Cekic, O., Adams, S.G., 2010, Developing Leadership Skills of Undergraduate Engineering Students: Perspectives from engineering faculty, Journal of STEM Education: Innovations & Research, 11(3/4), pp22-23 (https://web.a.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=15575276&asa=Y&AN=53171861&h=dhh1dhhBE%2b%2b1Uzv%2bT%2bJi8FzceMLvFrfQVB4lYRnhzykqCOT7xgEZus2N%2fmeMDHmA4x8nTgUlrmSFxvKgQ7m%2b2g%3d%3d&crl=c&resultNs=AdminWebAuth&resultLocal=ErrCrlNotAuth&crlhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d15575276%26asa%3dY%26AN%3d53171861)

Graham, R., Crawley, E., Mendelsohn, B.R., 2009, Engineering leadership education: A snapshot review of international good practice, Bernard M. Gordon MIT Engineering Leadership Program, (https://www.rhgraham.org/RHG/Recent_publications_files/ELE%20White%20Paper-102109_1.pdf)

Kumar, S., Hsiao, J.K., 2007, Engineers Learn "Soft Skills the Hard Way": Planting a Seed of Leadership in Engineering Classes, Leadership and Management in Engineering, 7(1), pp.18-23 (https://ascelibrary.org/doi/full/10.1061/%28ASCE%291532-6748%282007%297%3A1%2818%29)

Rottmann, C., Sacks, R., Reeve, D., 2015, Engineering leadership: Grounding leadership theory in engineers' professional identities, Leadership, 11(3), pp.351-373 (https://journals.sagepub.com/doi/pdf/10.1177/1742715014543581?casa_token=Yt1-JmnNPLEAAAAA:Amy1w8pWMWZet9bvXdWiTj4KeDs7--CA574sZZS7h1l9oVwdXVgWFcO2X6cERtEVvZ-S39NsfP239w)

Schuhmann, R.J., 2010, Engineering Leadership Education – The Search for Definition and a Curricular Approach, Journal of STEM Education, 11(3 & 4), pp.61-69 (https://s3.amazonaws.com/academia.edu.documents/43953357/JSTEM_SCHUHMANN_2010.pdf?response-content-

disposition=inline%3B%20filename%3DEngineering_Leadership_Education_The_Sea.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190911%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190911T095444Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=fde5f382cb1dc1edfb39329a64abf3827995a14b2c3c44c89e29219a50bc9289)

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: PETR3007 **MODULE TITLE:** Engineering Project Management
CREDITS: 20 **FHEQ LEVEL:** 6 **HECOS CODE:** 100812
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE:** Y
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module enables students to develop critical knowledge and understanding of and the ability to employ project management theory in engineering context(s).

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

SUBJECT ASSESSMENT PANEL to which module should be linked: **ENGINEERING**

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
To present academic and industrial understanding of project management methodology, techniques and tactics. To offer prescribed problems that enable students to employ engineering project management to present a balanced and synthesised evaluation of that activity. Enable students to employ gained knowledge and skills in the critical evaluation of case studies. Enable the development and evidencing of written and verbal communication skills, through the evaluation of theory to practice.

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. Demonstrate critical knowledge and understanding of project management and specific techniques that are contemporary within the engineering sector, and its positioning within wider business considerations.	8.1.2. product placement, management, project-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.

2. Critically analyse and evaluate their application of project management techniques to implement design solutions	8.2.2. critically analyse, apply and evaluate through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. 8.2.3. critically analyse, apply and evaluate knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering industries
3.. Apply problem solving skills and resources, act appropriately and communicate professionally, in their project management of engineering problems	8.3.1. key and transferable skills to be transformative through how they conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally. 8.3.2. key and transferable skills to be transformative through how they apply problem-solving skills, including engagement with and effective use of IT applications and facilities.
4. Be productive in how they work with information that may be incomplete or uncertain to create project management solutions.	8.5.2. practical skills to be productive in how they work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering related systems in practice. 8.5.3. practical skills to be productive in how they create or adapt design and management solutions.

DATE OF APPROVAL: 29/09/2020	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 29/09/2020	**SCHOOL/PARTNER: Petroc College**
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/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

Items in this section must be considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF: Robert Coombes**

Summary of Module Content:
Project management principles and the varying foci, benefits and disadvantages, and timeline of the development of different project management models, systems and techniques. Illustrative examples: Total Quality Management, Waterfall, PRINCE2, Scrum. Lean manufacturing and the development to and rise of Agile as a philosophical base for project management. Industry perspectives on project management to reach engineered solutions. Critical analysis of case studies using theory and evidence based literature. Engagement with project management methodologies within a Lean/Agile philosophy and approach to present a project management outline for a given scenario.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	20	Covering project management as employed across scales and foci of engineering industries, as well as theories, models and methods for project management.
Tutorials	25	In-class development of individual or group project management, and including formative assessment in the form of discussion groups
Seminars	4	Guest speakers from industry.
Directed Individual Study	26	Task directed activities, such as specific reading/DLE activities
Self-directed Individual Study	125	Background reading to develop critical understanding of theory, and assessment work
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Coursework	Sectioned Essay/Report: 2000 word (not including tables, figures, in-text references) synthesising project-management theory and industrially recognised methodologies in line with a personally chosen engineering application case study.	100%
		%
		100%

Practical	Project Management Presentation: synthesis of learnt project management theory with project management of an actual engineering problem and solution.	100% % 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework (in lieu of practical)	Case Studies Presentation by video: A presentation comparing project management case studies with the needs of engineering industries.	100% % 100%
Coursework	Sectioned Essay/Report: 2000 word (not including tables, figures, in-text references) synthesising project-management theory and industrially recognised methodologies in line with a given engineering application case study.	100% % 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

Reading List

Websites:
Association for Project Management, The Chartered Body for the Project Profession: (https://www.apm.org.uk/resources/find-a-resource/agile-project-management/)

Books:
Gonçalves, M. and Heda, R. (2010), Fundamentals of agile project management: an overview. New York: ASME Press.

Hannagan, T., (2005), Management: concepts & practices /. 4th edn. Harlow: Financial Times Prentice Hall.

Jack, H., (2013), Engineering design, planning, and management. Amsterdam: Academic Press.

Nicholas, J.M. and Steyn, H. (2017) Project Management for Engineering, Business and Technology. (5th ed.) Oxon: Routledge.

Obelnder, G.B. (2014) Project Management for Engineering and Construction. (3rd ed.) London: McGraw-Hill Education

Pyzdek, T. and Keller, P. (2018) The Six Sigma handbook, 5E. (5th ed.) London: McGraw-Hill Education.

Winch, G. M., (2014), Three domains of project organising. International Journal of Project Management, 32(5), 721–731.

Journals:

Crawford, L., 2005, Senior management perceptions of project management competence, International Journal of Project Management, 23, pp:7-16

Mir, F.A., Pinnington, A.H., 2014, Exploring the value of project management: Linking Project Management Performance and Project Success, International Journal of Project Management, 32, pp:202-217
https://www.sciencedirect.com/science/article/pii/S0263786313000884

Spalek, S., 2013, Improving Industrial Engineering Performance through a Successful Project Management Office, Inzinerine Ekonomika-Engineering Economics, 24(2), pp:88-98
https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2581494

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: PETR3008 **MODULE TITLE:** Professional Development in Engineering
CREDITS: 20 **FHEQ LEVEL:** 6 **HECOS CODE:** 100184
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE:** Y
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
Undertaking a collection of short courses within this module enables students to track, document, synthesise, reflect on and evaluate their professional development in line with their learning in higher education. This professionally extends their development of their engineering knowledge and skills whilst assessing students' ability to be critically transformative in respect to their career development.

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

SUBJECT ASSESSMENT PANEL to which module should be linked: ENGINEERING

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
To present techniques and skills for documenting professional development. Provide commercially styled professional development short courses in a range of relevant industrial and technical engineering areas that provide institutional certificates of attendance for documenting within professional development planning (PDP) portfolios. To embed the philosophy of critical reflection and transformative alignment with career development. To simulate the presentation of professional development for professional body recognition.

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. Evidence critical understanding of professional development and alignment with the needs of industry and the wider value of engineering.	8.1.4.critical knowledge and understanding of the merging of technologies that form the breadth of engineering industries and offer future opportunities for engineers, markets and societies alike.

2. Safely engage with the technical application of knowledge and skills in workshop or laboratory environments.	8.5.1. select appropriate equipment and work safely and competently within a workshop or laboratory environment.
3. Reflect on own experiences and education in line with key employment skills and attributes.	8.2.1. critically analyse, apply and evaluate information sourced from academic and technical literature and other sources 8.3.3. key and transferable skills to be transformative through how they plan and carry out autonomous work. 8.4.1. employment related skills to be transformative in how they use appropriate codes of practice and industry standards
4. Strategically plan for their future career(s), including aspects of lifelong learning and professional development.	8.4.3. employment related skills to be transformative through how they focus and reflect on professional development so as to target their lifelong learning within the working environment
5. Communicate verbally professional goals, well aligned with their experience and education	8.3.1. conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally.

DATE OF APPROVAL: 29/09/2020	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 29/09/2020	**SCHOOL/PARTNER: Petroc College**
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/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

Items in this section must be considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE:** 115
MODULE LEADER: Robert Coombes **OTHER MODULE STAFF:** Irina Spulber

Summary of Module Content

Continuing Professional Development principles and the maintenance of Professional Development Planning portfolios. UK Engineering Council standards for accreditation. Professional body institutions membership and registration. Parameterisation of theoretical knowledge, analytical skills, application, responsibility, transferable skills, ethics and values relevant to professional accreditation standards. Commercially styled professional short courses across technical and industrial areas of engineering.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	10	Covering CPD and the areas of foci within UK Engineering Council accreditation
Tutorials	20	Including guidance with portfolios, professional body presentations and formative feedback.
Short Course	100	Collection of individual short courses with certificates of attendance.
Directed Individual Study	35	Directed reading & VLE activity around each short course
Self-directed Individual Study	35	Background reading to develop critical understanding. Preparation of assessment work.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Personal Development Planning (PDP) Portfolio: to include detailed professional analysis of personal career and studies to date and planned CPD that aligns with career aspirations, as well as collating certificates of short-course attendance and therefore evidencing the meeting of ALO#2.	100 % 100%
Practical	Professional Interview: a professional interview designed to replicate the professional review process of a PSRB.	100 % 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Practical	Professional Interview: a professional interview designed to replicate the professional review process of a PSRB.	100% % 100%
Coursework	Personal Development Planning (PDP) Portfolio: to include detailed professional analysis of personal career and studies to date and planned CPD that aligns with career aspirations, as well as collating certificates of short-course attendance and therefore evidencing the meeting of ALO#2.	100% % 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: I. Spulber20/09/2021	**Approved by**: Date: XX/XX/XXXX

Reading List

Websites:
IMECHE Events https://www.imeche.org/events
IET Events https://events.theiet.org
UK Eng Council Accreditation of Graduates: https://www.engc.org.uk/education-skills/accreditation-of-higher-education-programmes/information-on-accreditation-for-higher-education-students-and-graduates/
Professional Engineering Institutions: https://www.engc.org.uk/about-us/our-partners/professional-engineering-institutions/
UK Eng Council Standards: https://www.engc.org.uk/standards-guidance/standards/
UK Standard for Professional Engineering Competence (UK Spec): https://www.engc.org.uk/standards-guidance/standards/uk-spec/
UK Engineering Spec: https://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf

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: PETR3009 **MODULE TITLE:** Integrating Technologies for Contemporary and Future Engineering Sectors

CREDITS: 20 **FHEQ LEVEL:** 6 **HECOS CODE:** 100184

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module focuses on the integrating of mechanical, electrical and electronic, and computing technologies in the solutions that contemporary and future engineering sectors provide. Knowledge and understanding, as well as the abilities to synthesise technologies, employ through group work and showcase their engineered solutions will be addressed through this module.

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

SUBJECT ASSESSMENT PANEL to which module should be linked: **ENGINEERING**
Professional body minimum pass mark requirement: N/A

MODULE AIMS:

This module aims to develop students' knowledge and understanding and the ability to synthesise and apply, through group work, the integrating of technologies to solve engineering problems.

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. Demonstrate critical knowledge and understanding of the relevant mix of key principles, materials and processes factors that enable integrated technologies to be employed for solving engineering problems across industries.	8.1.3. critical knowledge and understanding of the relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice. 8.1.4. critical knowledge and understanding of the merging of technologies that form the breadth of engineering industries and offer future opportunities for engineers, markets and societies alike.

2. Evidence their ability to critically analyse and evaluate integrated technologies as they are applied through project based design solutions for engineering problems.	8.2.2. critically analyse, apply and evaluate through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. 8.2.3. critically analyse, apply and evaluate knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering industries
3. Engage with determining and employing relevant and available resources, including IT, engineering facilities and equipment, in their design and management problem solving.	8.3.2. key and transferable skills to be transformative through how they apply problem-solving skills, including engagement with and effective use of IT applications and facilities. 8.5.1. practical skills to be productive in how they select appropriate equipment and work safely and competently within a workshop or laboratory environment. 8.5.3. practical skills to be productive in how they create or adapt design and management solutions.
4. Act with awareness of appropriate codes of practice and industry standards in the development and implementation of engineering solutions.	8.4.1. employment related skills to be transformative through how they use appropriate codes of practice and industry standards

DATE OF APPROVAL: 29/09/2020	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 29/09/2020	**SCHOOL/PARTNER: Petroc College**
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/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

Items in this section must be considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE:** 115
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF:** Robert Coombes

Summary of Module Content

- Parameterisation of the key principles, materials and processing factors that enable mechanical, electrical and electronic and computing technologies to be integrated to form engineering solutions.
- Coverage of engineering standards and expansion on the aspects contained within the UK Engineering Council's Codes of Conduct
- Extensive workshop and laboratory activity across those integrated technologies.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	20	
Seminars	30	Timetabled sessions for groups to prepare their assessment task with guidance and advice available from the tutor. Plus timetabled sessions to prepare the tradeshow itself.
Workshops	30	Enabling groups to prepare their assessment product, whilst engaging with the range of technologies in practice and undertaking their competency assessment.
Directed Individual Study	20	Directed to engage with their groups to refine and complete the assessment task.
Self-directed Individual Study	100	Recommended engagement with mechanical, electrical and electronic, and computing technologies, through reading and, if appropriate, practice, so as to inform future engagement with these technologies throughout their careers.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Practical	Group trade show stand and poster defence, plus engineering solution pitch	100% 100%
Assessment	Pass/Fail competency assessment: safe and appropriate use of equipment within timetabled lab and workshop time.	Pass/Fail

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework (in lieu of practical)	Case Study Presentation by video: synthesis of theory in critical evaluation of an integrated engineering case study with their own recommendations for design and managed solutions related to the case study.	% % 100%
Assessment	Pass/Fail competency assessment: safe and appropriate use of equipment within workshop and/or lab environments.	Pass/Fail

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

Reading List

Books:

Breyfogle, F,W., (2015), Integrated Enterprise Excellence, Vol 1: The Basics: Golfing Buddies Go Beyond Lean Six Sigma and the Balanced Scorecard, Wiley.

Stewart, R. W., Barlee, K. W., (2015), Software Defined Radio using MATLAB & Simulink and the RTL-SDR, Strathclyde Academic Media.

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: PETR3010 **MODULE TITLE:** Individual Engineering Project
CREDITS: 40 **FHEQ LEVEL:** 6 **HECOS CODE:** 100184
PRE-REQUISITES: None **CO-REQUISITES:** None **COMPENSATABLE:** N
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
Work-based, industry-focused or academic independent critical inquiry of an engineering problem. A critical review of extant knowledge allows the student to identify a focus for their inquiry that may relate to either integrated technologies or mechanical, electrical and electronic or digital technologies as appropriate to their degree choice. The student is guided by an academic supervisor in seeking their work to be defensible by the evidence their review of extant knowledge and own empirical work provides.

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

SUBJECT ASSESSMENT PANEL to which module should be linked: ENGINEERING
Professional body minimum pass mark requirement: N/A

MODULE AIMS:
This module aims to develop students' in-depth knowledge and understanding of a specific topic through academic research, study of industry or industrial research and development, providing opportunity to engage with research methodologies, integrate findings/conclusions within the context of the current state of the art of engineering knowledge and communicate their findings appropriately for their chosen project topic.

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. Demonstrate critical knowledge and understanding of specialist engineering/disciplinary topics and the fundamental principles of science, mathematics, statistics, resources and processes specifically relevant to enabling them to be investigated.	8.1.1 critical knowledge and understanding of the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering. 8.1.3. critical knowledge and understanding of relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.

2. Critically defend their project-based inquiry of engineering problems through analysis, application and evaluation of extant information and techniques, procedures and methods relevant to the chosen topic.	8.2.1. critically analyse, apply and evaluate information sourced from academic and technical literature and other sources. 8.2.2. critically analyse, apply and evaluate through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. 8.5.1. practical skills to be productive in how they select appropriate equipment and work safely and competently within a workshop or laboratory environment. 8.5.2. practical skills to be productive in how they work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering related systems in practice.
3. Create and/or adapt engineering solution(s) and synthesis them in line with the project purpose and its findings within the context of business, customer or user needs and the wider engineering context.	8.4.2. employment related skills to be transformative through how they synthesise considerations of business, customer and user needs alongside the wider engineering context, public perception and aesthetics 8.5.3. practical skills to be productive in how they create or adapt design and management solutions.
4. Communicate professionally through project reporting of an engineering problem and their empirical investigation of it, and personal reflection of their professional development through their undertaking of it.	8.3.1. key and transferable skills to be transformative through how they conduct and manage themselves through personal ~~and team~~ programmes of work with the ability to communicate professionally. 8.3.3. key and transferable skills to be transformative through how they plan and carry out autonomous work. 8.4.3. employment related skills to be transformative through how they focus and reflect on professional development so as to target their lifelong learning within the working environment.

DATE OF APPROVAL: 29/09/2020	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 29/09/2020	**SCHOOL/PARTNER: Petroc College**
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/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

Items in this section must be considered annually and amended as appropriate, in conjunction with the Module Review Process. Some parts of this page may be used in the KIS return and published on the extranet as a guide for prospective students. Further details for current students should be provided in module guidance notes.

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE:** 115
MODULE LEADER: Irina Spulber **OTHER MODULE STAFF:** Robert Combes

Summary of Module Content

- Develop or refine the research problem or question
- State aims and objectives
- Conduct in-depth search of literature relating to the project topic.
- Identify, design and undertake an investigative study of the subject matter.
- Analyse data and interpret research findings.
- Produce a written report, to include application of engineering knowledge.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	10	Final year project research skills and guidance
Computer workshop	1	Workshop on finding information using library resources
Project supervision	24	Meetings with project supervisor
Independent study	365	Self-study
Total	**400**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Practical	Mid-year project outline viva-voce, including review of extant information on the topic and research methodology outline.	100% % 100%
Coursework	Project report/thesis including professional development reflection appendix.	100% % 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework in lieu of practical	Written project-initiation outline as an exercise in effective project management	100% % 100%
Coursework	Completion of project report/thesis including professional development reflection appendix.	100% % 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

Reading:

Books:

Cross, N. (2008) Engineering Design Method. 4rd ed. Chichester: Wiley

Lidwell, et Al. (2010). Universal Principles of Design. Revised ed. Singapore: Rockport

Weaver. P. (2004) "Success in Your Project, 1st Edition". Pearson Education Limited ISBN 0-273678094

Journals:

Winch, G. M. (2014). Three domains of project organising. International Journal of Project Management, 32(5), 721–731.

Further Resources:
PETROC Engineering Project Handbook (updated for 2020 – 2021)