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PROGRAMME QUALITY HANDBOOK 2023-24

BSc Integrated Technologies

Welcome and Introduction

Welcome and Introduction to BSc Integrated Technologies Engineering

Welcome to BSc Integrated Technologies Engineering delivered at City College Plymouth.

This programme has been designed to equip you with the skills and knowledge base required to work in your chosen specialism or other graduate opportunities. It is also a platform from which you can undertake additional vocational and academic qualifications.

This Programme Quality handbook contains important information including:

- The approved programme specification
- Module records

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

- Your Programme Institution & University Student Handbook which contains student support based information on issues such as finance and studying at HE

- Your Module, Teaching, Learning and Assessment Guide
  - available on your programme VLE
- Plymouth University's Student Handbook
  - available at: https://www.plymouth.ac.uk/your-university/governance/student-handbook

Programme Specification

Award title: BSc (Hons) Integrated Technologies Engineering
UCAS code: H110
HECOS code: 100184
Date of Approval: 3rd May 2017
Awarding Institution: University of Plymouth
Teaching institutions: City College Plymouth

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 (section 8) 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)[1].

For students arriving from specific prior study or experience in Marine Engineering, Naval Architecture, or Marine Autonomous Vehicles, respectively:

Meeting of specific Programme Intended Learning Outcomes (see section **Error! Reference source not found.**) may provide graduates with a specific exit award title, as follows. These are achieved through option module selection, subject specialism within the Individual Engineering Project, and meeting of specific Programme Intended Learning Outcomes through the Continued Professional Development in Engineering module:

BSc (Hons) Integrated Technologies Engineering (Marine Engineering)
BSc (Hons) Integrated Technologies Engineering (Naval Architecture)
BSc (Hons) Integrated Technologies Engineering (Autonomous Systems)

Distinctive Features

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

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, or 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 engineerin 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 wi 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 strategi 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[2] 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*".

[2] 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 Structure

Stage 1			
Module Code	**Module Title**	**No. of Credits**	**Core / Optional**
CITY3020	Engineering Leadership and Management	20	**Core**
CITY3024	Engineering Project Management	20	**Core**
CITY3032	Integrating Technologies for Contemporary and Future Engineering Sectors	20	**Core**
CITY3117	Individual Engineering Project	40	**Core**
CITY3028	Professional Development in Engineering	20	**Optional**
MARN341	Marine Engineering	20	**Optional**
MARN342	Naval Architecture 2	20	**Optional**
CONT317	Control and Intelligent Systems Design	20	**Optional**

Programme 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 :

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 th global dimensions of engineering, commerce and communication

Programme Intended Learning Outcomes

Knowledge and understanding

PILO: On successful completion graduates should have developed *critical*[3] knowledge and understanding of:	Cross-Referenced to UK Engineering Council's IEng Accreditation[4]
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

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

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

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

Cognitive and intellectual skills

PILO: On successful completion graduates should have developed the cognitive and intellectual skills to *critically*[5] 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.
3. knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering industries	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: ● Define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards

Key and transferable skills

PILO:	Cross-Referenced to UK Engineering Council's IEng Accreditation

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

On successful completion graduates should have developed the key and transferable skills to be *transformative*[6] through how they:	
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 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

Employment related skills

PILO:	Cross-Referenced to UK Engineering Council's IEng Accreditation

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On successful completion graduates should have developed the employment related skills to be *transformative*[7] through how they:	
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
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

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

Admissions Criteria

Entry Requirements for BSc (Hons) Engineering (Top-Up)

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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[8]	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.

Progression criteria for Final and Intermediate Awards

This programme has been designed for the University of Plymouth and partners' involvement with the SWIoT (South West Institute of Technology). The intent is that further level-6 top-up engineering programmes will include and/or share modules from this programme. Should a student, particularly a part-time student, wish to transfer between those programmes then this will be considered by the admissions tutor for the particular site of delivery in line with the contents of the Programme Specifications.

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
- SEEC level descriptors http://www.seec.org.uk/academic-credit/seec-credit-level-descriptors-2010
- 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

[8] Accredited Prior Learning and Accredited Prior Certificated Learning

Module Records

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: CITY3020 **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:
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: City College Plymouth**
	DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

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.

ACADEMIC YEAR: 2022/23 **NATIONAL COST CENTRE: 115**

MODULE LEADER: TBC **OTHER MODULE STAFF:** Lance Chatfield

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%
Practical	Case Study Presentation: synthesis of industrial understanding and academic theory in critical evaluation of an engineering case study.	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. This must be of a different case study to the first attempt at this summative assessment.	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: Dr Tamal Barman Date: July 2022	**Approved by**: Rose McDonald Date: July 2022

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: CITY3024 **MODULE TITLE: Engineering Project Management**
CREDITS: 20 **FHEQ LEVEL: 6** **HECOS CODE: 100812**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: Y**
SHORT MODULE DESCRIPTOR:
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	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,

the engineering sector, and its positioning within wider business considerations.	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: City College Plymouth**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

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.

ACADEMIC YEAR: 2022/23 **NATIONAL COST CENTRE: 115**
MODULE LEADER: TBC **OTHER MODULE STAFF: Lance Chatfield**

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%

Practical	Project Management Presentation: synthesis of learnt project management theory with project management of an actual engineering problem and solution.	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%
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. This must be of a different case study to the first attempt at this summative assessment.	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Tamal Barman Date: July 2022	**Approved by**: Rose McDonald Date: July 2022

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: CITY3028 **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:
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: City College Plymouth**
	DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

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.

ACADEMIC YEAR: 2022/23 **NATIONAL COST CENTRE:115**
MODULE LEADER: Martin Boulter **OTHER MODULE STAFF: Andrew Reed**

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%
Practical	Professional Interview: a professional interview designed to replicate the professional review process of a PSRB.	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%
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%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Tamal Barman Date: July 2022	**Approved by**: Rose McDonald Date: July 2022

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: CITY3032 **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:

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: City College Plymouth**
	DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

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.

ACADEMIC YEAR: 2022/23 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Andrew Reed **OTHER MODULE STAFF: Dave John/Owais Raja**

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%
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: Dr Tamal Barman Date: July 2022	**Approved by**: Rose McDonald Date: July 2022

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: CITY3117 **MODULE TITLE: Individual Engineering Project**
CREDITS: 40 **FHEQ LEVEL: 6** **HECOS CODE: 100184**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: N**

SHORT MODULE DESCRIPTOR:
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: City College Plymouth**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

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.

ACADEMIC YEAR: 2022/23 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Owais Raja **OTHER MODULE STAFF: Martin Boulter, George Audu, Owais Raja**

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%
Coursework	Project report/thesis including professional development reflection appendix.	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%
Coursework	Completion of project report/thesis including professional development reflection appendix.	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Tamal Barman Date: July 2022	**Approved by**: Rose McDonald Date: July 2022

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: MARN341	**MODULE TITLE:** Marine Engineering	
CREDITS: 20	**FHEQ LEVEL:** 6	**HECOS CODE:** 100194
PRE-REQUISITES:	**CO-REQUISITES:**	**COMPENSATABLE:** N

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

The module covers Marine Engineering including marine power plant, transmission, system efficiency and environmental factors, and Marine Systems Engineering exploring the aspects of marine engineering dynamic systems, design and analysis.

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

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

SUBJECT ASSESSMENT PANEL to which module should be linked: MECHA

Professional body minimum pass mark requirement: Average 40% with no less than 30% in any element.

MODULE AIMS:

1. To develop an appreciation of different power plants and the associated support and auxiliary systems.
2. To provide the knowledge and understanding to assess, monitor and improve performance of marine systems taking into account control of transport efficiency, safety and environmental factors in marine transportation.
3. To work effectively in a small group to undertake a design case study in the areas of marine transport efficiency, safety and environmental considerations.
4. To provide knowledge and understanding of modelling and simulation techniques for the design, analysis and control of marine engineering 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. Demonstrate a full understanding of the principal components of marine power plant, and their inter-dependencies, in order to select and design appropriate propulsion and electrical generation systems. 2. Calculate power output, key performance parameters and other relevant criteria in order to determine design features and	BEng/MEng Marine Technology 8.1 SM1m, SM2m, SM3m 8.2 EA1m, EA2, EA3m, EA4m 8.3 D2, D4, D5, D6 8.4 EL1m, EL2, EL3m, EL4, EL5m 8.5 P1, P5, P6, P11 G4

performance characteristics of marine diesel engines and gas turbines. 3. Match an engine to a propeller and design the propeller using open water diagrams. 4. Apply modelling and simulation techniques for the design, analysis and control of marine systems 5. Demonstrate effective team working and project management skills in the context of marine systems design, sustainable development/operation, and regulatory frameworks.	

DATE OF APPROVAL: XX/XX/XXXX	**FACULTY/OFFICE: Science & Engineering**
DATE OF IMPLEMENTATION: XX/XX/XXXX	**SCHOOL/PARTNER: SECaM**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 2 (Spring)**

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: 2022/23	**NATIONAL COST CENTRE: 120**
MODULE LEADER: Dr Y M Dai	**OTHER MODULE STAFF:** Dr S Sharma, Dr J Wan, Dr K Collins

Summary of Module Content

Marine power plants: Type and classification.
Engine and performance characteristics. Power ratings
Marine diesel engines: Design aspects of marine diesel engines, engine design fundamentals and advanced marine applications.
Marine gas turbines : Thermodynamics and design fundamentals of marine gas turbines
Propeller Design. Engine/Propeller matching.
Marine engineering systems design:
Marine fuels.
Principles of air conditioning. Design of air conditioning plant. Marine refrigeration, heating, ventilation and air conditioning.
Environmental Factors in Transport.
Marine Engineering Design Case Study.
Analysis of marine dynamic systems and system analysis.
Modelling and simulation of marine mechanical, fluid, electrical and thermal systems using MATLAB with Simulink.
Vibration isolation and vibration absorber design.
Hydraulic servo-control systems, controllable pitch propeller systems, Hydraulic power transmission systems.
Modelling of complete marine propulsion system to include power plant, transmission, propulsion and hull. Modelling ship steering system. Electrical, electromechanical and electro-hydraulic systems modelling and simulation.
Methodical marine system design practices and regulatory frameworks
Design project management and effective team working

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

Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	40	
Practical classes	10	
Seminars/Workshops	6	
Tutorials	12	
Guided independent study	142	
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Written exam	E1 - Exam	100%
Coursework	W1 – Marine Engineering Design Case Study	100%

REFERRAL ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Written exam	Exam	100%
Coursework	Report with additional research	100%

To be completed when presented for Minor Change approval and/or annually updated

Updated by: Dr Y Ming Dai Date: Sept 2021	**Approved by**: Lance Chatfield Date: Sept 2021

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: MARN342	**MODULE TITLE:** Naval Architecture 2	
CREDITS: 20	**FHEQ LEVEL:** 6	**HECOS CODE:** 100194
PRE-REQUISITES: None	**CO-REQUISITES:** None	**COMPENSATABLE:** N

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module places engineering principles in the context of a hull and its features. The hull and the structural design concepts that are particularly applicable to marine crafts are developed, applied and analysed. Various types of marine vessels' fitness for purpose are studied for the design drivers used and the operational aspects considered.

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

E1 (Examination)		**C1** (Coursework)	70%	**P1** (Practical**)**	
E2 (Clinical Examination)		**A1** (Generic assessment)			
T1 (Test)	30%				

SUBJECT ASSESSMENT PANEL to which module should be linked: MECHA

Professional body minimum pass mark requirement: Average 40% with no less than 30% in any element.

MODULE AIMS:
To develop an understanding of the factors and the regulations which influence the design of a marine vessel from both the engineering and the operational aspects.

To develop analytical and computational skills on hull design and performance analysis.

To assist students to enhance numeracy and analytical skills through hull structural strength calculation.

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 student will be expected to be able to:

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Analyse and appraise the general arrangement requirements of a variety of vessel types in order to develop outline arrangement drawings for a vessel to fulfil a given purpose. 2. Explain, and apply, the principles associated with the analysis of the structural strength of the hull of a marine vessel. 3. Assess the implications of various operational and regulatory aspects on the design of a vessel and carry out a hull survey and preliminary structural analysis. 4. Use commercial software to assess the performance and behaviour of a vessel at the design stage and in a seaway.	BEng/MEng Marine Technology 8.1 SM3m, SM5m 8.2 EA2, EA3m, EA4m 8.3 D1, D2, D3m, D4 8.4 EL5m 8.5 P7 G1 BSc (Hons) Integrated Technologies (Naval Architecture) 8.1.1.b, 8.2.2.b, 8.2.3.b, 8.3.3, 8.5.3

DATE OF APPROVAL: XX/XX/XXXX	**FACULTY/OFFICE: SciEng**
DATE OF IMPLEMENTATION: XX/XX/XXXX	**SCHOOL/PARTNER: SECaM**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 (Autumn)**

Notes:
Cannot be compensated according to EAB accreditation regulations (see Programme Specification section 11)

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: 2022/23	**NATIONAL COST CENTRE:** 120
MODULE LEADER: Dr Jahir Rizvi	**OTHER MODULE STAFF:** Dr Jasper Graham-Jones
Summary of Module Content **Hull Design:** Evolution and trends in modern hull design. Evaluation of risk and selection of design factors and margins. Cargo access and containment systems design. Regulatory considerations in hull design; superstructure construction, corrosion and its prevention, hull fire and safety, general arrangement drawings of a given vessel type. Use of software to evaluate vessel's performance in terms of intact stability, damage stability, motions and resistance.	

Structural Design & Analysis: Origin and calculation of loads on hull structures. Combined axial and lateral loading on beams and columns. Bending, shear and torsion of ship hull girders; bending of stiffened plates and panels. In-plane and combined loading of stiffened plates and panels. Regulatory considerations in hull structural design for both the intact and the damaged conditions. Use of software to evaluate vessel's structural strength.

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions]***		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	42	Standard lectures
Computer Lab	8	To support lectures (design software)
Hull Survey	6	To support assignment
In-class Test	2	
Self-Study	142	
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Test	In-class Test	100%
Coursework	Report	100%

REFERRAL ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Written exam		
Coursework (in lieu of the original assessment)	Written Report (in lieu of in-class test)	100%
Coursework	Report	100%
To be completed when presented for Minor Change approval and/or annually updated		
Updated by: Dr Jahir Rizvi Date: Sept 2021	**Approved by**: Lance Chatfield Date: Sept 2021	

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: CONT317	**MODULE TITLE:** Control and Intelligent Systems Design	
CREDITS: 20	**FHEQ LEVEL:** 6	**HECOS CODE:** 100190

PRE-REQUISITES:	CO-REQUISITES:	COMPENSATABLE: N

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module explores the application of control engineering and artificial intelligence techniques in the design of engineering control systems.

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

E1 (Examination)	70%	**C1** (Coursework)	30%	**P1** (Practical**)**	
E2 (Clinical Examination)		**A1** (Generic assessment)			
T1 (Test)					

SUBJECT ASSESSMENT PANEL to which module should be linked: MECHA

Professional body minimum pass mark requirement: Average 40% with no less than 30% in any element.

MODULE AIMS:

1. To introduce students to the analysis of mechanical, electrical and electronic engineering control configurations, and applications.
2. To develop control system designs based on digital, state space and artificial intelligence approaches.
3. To apply appropriate mathematic techniques to the evaluation of intelligent control systems design.

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 student will be expected to be able to:

Assessed Module Learning Outcomes	Award/ Programme Learning Outcomes contributed to
1. Analyze digital systems in terms stability, apply difference equations and their significance in digital control system design 2. Transform systems into their state space formats, understand the state transition equation in both its analogue and digital form Calculate the Eigen values and vectors for a system 3. Undertake control system design using the pole placement approach 4. Apply artificial techniques in control system design.	BEng/MEng Mechanical Engineering BEng/MEng Marine Technology 8.1 SM4m 8.2 EA1m, EA2, EA3m, EA4m, EA5m, EA6m 8.5 P1 BEng Mechanical Engineering with Composites (Level 6 Top-Up) 8.2 EA1b, EA2, EA3b, EA4b 8.5 P1 BEng Manufacturing Engineering (Degree Apprenticeship) 8.2 EA1b, EA2, EA3b, EA4b 8.5 P1 BSc (Hons) Integrated Technologies (Autonomous Engineering) 8.1.1.c. 8.2.2.c, 8.2.3.c, 8.3.3, 8.5.3

DATE OF APPROVAL: XX/XX/XXXX	**FACULTY/OFFICE: SciEng**
DATE OF IMPLEMENTATION: XX/XX/XXXX	**SCHOOL; SECaM**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 2 (Spring)**

Notes:
Cannot be compensated according to EAB accreditation regulations (see Programme Specification section 11)

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: 2022/23	**NATIONAL COST CENTRE:** 120
MODULE LEADER: Dr Asiya Khan	**OTHER MODULE STAFF:** Dr Sanjay Sharma, Dr Jian Wan
Summary of Module Content Describe digital control systems; examine methods of sampling, conversion from Laplace Transforms to z Transform and vice versa using a number of methods. Introduction to zero order hold and ability to find its transfer function. Determine the closed loop pulse transfer function using block diagram algebra and Mason's rule. Describe the mapping from s-plane to z-plane and analyze digital systems in terms of stability using the Jury stability criteria. Represent a system in state space format; convert a transfer function to state space and vice versa. Understand and convert into the phase variable form, apply similarity transformation, design a state variable feedback control system using pole placement technique. Find the time response of state space both in continuous and digital form. Find the controllability and observability of the time linear invariant systems. Calculate the Eigen values and eigenvectors of a control system. Understand genetic algorithms, fuzzy logic and neural networks and apply these techniques in control design. Calculate the fuzzy implication, composition and defuzzification. Describe and analyse the	

multi-layer perceptron model in neural networks.

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions]***		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lecture	40	2 hour lectures in appropriate weeks
Tutorial	16	1 hour tutorial in appropriate weeks
Independent study	144	
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Written exam	E1 - Examination	100%
Coursework	C1 - Report	100%

REFERRAL ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Written exam	E1 - Examination	100%
Coursework	C1 - Report	100%
To be completed when presented for Minor Change approval and/or annually updated		
Updated by: Dr Asiya Khan Date: Sept 2021	**Approved by**: Lance Chatfield Date: Sept 2021	