UNIVERSITY OF PLYMOUTH

PROGRAMME QUALITY HANDBOOK 2025-26

FdSc Marine Autonomous Vehicles

1. Welcome and Introduction to Fdsc Marine Autonomous Vehicles

Welcome to FdSc Marine Autonomous Vehicles delivered at Kings Road Campus by City College Plymouth.

The focus of the Marine Autonomous Vehicles (MAV) FdSc is to provide future workforce for Blue-Tech industries. With the free thinking and holistic approach provided, students innovate and develop new systems and methods. Designing and building autonomous vessels that can withstand the wind, waves and salt exposure through specialised learning and the development of experience.
This programme gives the student a broad knowledge of marine autonomy, covering essential engineering topics such as mathematics, engineering science and naval architecture, as well as essential build, programming and design methodologies. Students embark on several design projects throughout the course where they will be able to use Computer Aided Design along with other industry-based software to showcase their new found knowledge and skills. A work based element is introduced into the course through the design modules where employed part-time students are able to use incorporated work-based projects set by their employers and Full-time students have both the chance of placements or industry set work-based projects. Throughout the course, many of the module's assessments have been arranged to gain essential knowledge that carry through to other modules. Across all of this a rich range of assessments, including practical based assessments, reports, exams, portfolios and presentations, embed the learning.
Plymouth accounts for 9.16% of England's entire marine industry with marine manufacturing bringing in £408.6m in Gross Value Added (GVA) and with HM Base Devonport (HMNB) being the largest Naval Base in Western Europe (Plymouth City Council, 2017), City College is ideally located to deliver marine engineering related subjects such as the Marine Autonomous Vehicles (MAV) programme. With over 7100 jobs in marine manufacturing alone. This equates to 21% of the UK's marine manufacturing capacity, and with marine autonomy becoming the fastest growing sector of this field, this MAV programme is ideally placed to accommodate the growing workforce required to service this industry.
Now part of the South West Institute of Technology (SWIoT) City College Plymouth have developed a Centre of Marine Excellence to ensure that the facilities required to teach this high-end subject utilise the latest technologies and practices. Both practical and theory based subjects have been designed to ensure that students undertake research and development to enable both innovative and entrepreneurial capacity to the autonomous sector, bringing together cross-curricular modules from various disciplines, not currently related to the marine industry.
Learners receive a broad range of subject knowledge across disciplines such as marine engineering, naval architecture, electrical and electronic engineering, and software development and programming, making this programme unique in itself, and fit for the future of engineering.

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

        - available in your Google Classroom
    - Your Module, Teaching, Learning and Assessment Guide
        - available in your Google Classroom
- University of plymouth's Student Handbook
    - available at:

https://www.plymouth.ac.uk/your-university/governance/student-handbook

1. Programme Specification

Final award title **FdSc Marine Autonomous Vehicles**

Level X Intermediate award title(s) **N/A**

Level X Intermediate award title(s) **N/A**

UCAS code 1003

HECOS code 100544

Awarding Institution: University of Plymouth

Teaching institution(s): City College Plymouth

Accrediting body(ies)

The course is not currently accredited. The intention is to apply for partial accreditation of IEng status through RINA and IMAREst.

Distinctive Features of the Programme and the Student Experience

The focus of the Marine Autonomous Vehicles (MAV) FdSc is to provide future workforce for Blue-Tech industries. With the free thinking and holistic approach provided, students innovate and develop new systems and methods. Designing and building autonomous vessels that can withstand the wind, waves and salt exposure through specialised learning and the development of experience.

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enable both innovative and entrepreneurial capacity to the autonomous sector, bringing together cross-curricular modules from various disciplines, not currently related to the marine industry. Learners receive a broad range of subject knowledge across disciplines such as marine engineering, naval architecture, electrical and electronic engineering, and software development and programming, making this programme unique in itself, and fit for the future of engineering.

Relevant QAA Subject Benchmark Group(s)

The subject benchmark statement for Engineering (2015)1 defines the academic standard expected of graduates with an engineering degree. The Characteristics Statement for Foundation Degrees (September 2015)$_2$ describes the distinctive features of a Foundation Degree delivered in the UK. In conjunction with the two statements listed above, the programme aims and programme intended learning outcomes have been created with the Engineering Council in the UK-SPEC UK standard for professional engineering competence www.engc.co.uk Third edition 3, the QAA Quality Code$_4$ and the SEEC Level Descriptors(2010)$_5$ in mind.

1. http://www.qaa.ac.uk/en/Publications/Documents/SBS-engineering-15.pdf
2. http://www.qaa.ac.uk/en/Publications/Documents/Foundation-Degree-Characteristics-15.pdf
3. http://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf
4. http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx
5. https://www.plymouth.ac.uk/uploads/production/document/path/2/2544/SEEC_Level_Descriptors_2010_0.pdf

Programme Structure

The Programme of study comprises of 240 module credits across level 4 and level 5 with 120 credits per level. The aim of the programme is to develop skills consistent with Engineering Council and Engineering Subject Benchmarks. Due to our strong links with employers in the city and high number of part time learners who are already employed in industry our programme has been developed to provide for the varied roles across the city as Engineers, as well as provide a solid grounding to our full time students wishing to further their study or enter employment.

Programme Structure for the Foundation Degree in Marine Autonomous Vehicles (Part-time) (6253)

2025-26

Year 1				Year 2				Year 3			
Module Code	Module Title	No. of Credits	C / O	Module Code	Module Title	No. of Credits	C / O	Module Code	Module Title	No. of Credits	C / O
CITY 1077	Engineering Mathematics	20	C	CITY 1093	Naval Architecture	20	C	CITY 2081	Industrial Control and Mechatronics	20	C
CITY 1078	Engineering Science 1	20	C	CITY 1095	Applications of Pneumatics and Hydraulics	20	C	CITY 2095	Composite Materials for the Marine Industry	20	C
CITY 1079	Digital and Analogue Devices and Circuits	20	C	CITY 2098	Fluid Mechanics and CFD	20	C	CITY 2108	Software Development	20	C
CITY 1101	Object-Oriented Programming	20	C	CITY 2093	Advanced CAD & FEA	20	C	CITY 2097	Project	20	C

All Modules are delivered All Year unless stated otherwise

Programme Structure for the Foundation Degree in Marine Autonomous Vehicles (full-time)

2025-26

Year 1				Year 2			
Module Code	Module Title	No. of Credits	Core / Optional	Module Code	Module Title	No. of Credits	Core / Optional
CITY1077	Engineering Mathematics	20	Core	CITY2098	Fluid Mechanics and CFD	20	Core
CITY1078	Engineering Science 1	20	Core	CITY2093	Advanced CAD & FEA	20	Core
CITY1079	Digital and Analogue Devices and Circuits	20	Core	CITY2081	Industrial Control and Mechatronics	20	Core
CITY1095	Applications of Pneumatics and Hydraulics	20	Core	CITY2095	Composite Materials for the Marine Industry	20	Core
CITY1093	Naval Architecture	20	Core	CITY2097	Project	20	Core
CITY1101	Object-Oriented Programming	20	Core	CITY2108	Software Development	20	Core

Programme Aims

This programme aims to:

1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of marine autonomous systems.
2. Provide the opportunity to 'learn through design' via practical and project based work, particularly within the context of marine autonomous design.
3. Provide an awareness of the business implications of engineering decisions and a knowledge of the inter-relationship between the market, engineering activities and the management structures
4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.

Programme Intended Learning Outcomes

8.1. Knowledge and understanding

On successful completion graduates should have developed:

1) the scientific, mathematical and statistical principles underpinning the application of current technologies, and their evolution, in marine engineering.
2) product placement, management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors.
3) relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.

8.2. Cognitive and intellectual skills

On successful completion graduates should have developed:

1) information sourced from academic and technical literature and other sources.
2) through identifying, reviewing and selecting techniques, procedures and methods relevant to marine engineering.
3) knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for marine autonomy related Blue-tech industries

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8.3. Key and transferable skills

On successful completion graduates should have developed the ability to:

1) conduct and manage themselves effectively through personal and team programmes of work with the ability to communicate professionally
2) engage with and effectively employ general IT applications and facilities.

8.4. Employment related skills

On successful completion graduates should have developed:

1) use appropriate codes of practice and industry standards
2) focus and reflect on professional development so as to target their lifelong learning within the working environment.

8.5. Practical skills

On successful completion graduates should have developed:

1) select appropriate equipment and work safely and competently within a workshop or laboratory environment.
2) Work with information that may be incomplete or uncertain to monitor, analyse and evaluate marine autonomy systems in practice.

Admissions Criteria, including APCL, APEL and DAS arrangements

All applicants must have GCSE (or equivalent) Maths and English at Grade C or above or Grade 4 and above on the new grading structure.

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

Welsh Baccalaureate	**Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering**
Scottish Qualifications Authority	**Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering**
Irish Leaving Certificate	**Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering**
International Baccalaureate	**Normal minimum entry requirements are an equivalent of 56 on new UCAS Tariff include Maths, Physics or Engineering**
Non-Standard Qualifications with experience	**All non-standard applicants are interviewed by the tutor and screened centrally to ensure impartial oversight.**
Disability	**The College has a dedicated Learning Support team who support in every aspect of the student journey, including recruitment and admissions. Students who declare they have a disability may be invited to meet the team to discuss support needs relevant to the course and to determine any physical barriers that may be in place. The College is committed to being an inclusive environment and will work to ensure all reasonable adjustments are made.**

Level 5 entry:
Students may enter at level 5 with a relevant HNC and 120 module credits subject to being APCL'd PU Regulations Apply.

9. Progression criteria for Final and Intermediate Awards

Students, who successfully complete the FdSc may progress to:

- City College Plymouth's BSc Integrated Technologies Engineering Stage 3 (with 60% overall)
- University of Plymouth's BEng Marine Technology Stage 2 (subject to a 60% Level 5 aggregate)
- University of Plymouth's BEng (Hons) Marine Technology (Top-up) Level 6

10. Exceptions to Regulations

Through application the college has been granted exception to regulations to allow part time students to APCL 120 level 4 credits and a further 40 credits at level 5 into year 3 of FdSc Marine Autonomous Vehicles if they have passed the HNC and studied a further 40 credits of level 5 modules as a short course during their part time year 2 of study. The two level 5 modules will be :
CITY2098 Fluid Mechanics and CFD and CITY 2093 Advanced CAD and FEA

11. Transitional Arrangements

No transitional arrangements

12. Mapping and Appendices:

12.1. ILO's against Modules Mapping

Please see appendix 13.1

12.2. Assessment against Modules Mapping

Please see appendix 13.2

12.3. Skills against Modules Mapping

Please see appendix 13.3

13.4 Work Based Learning Mapping

Please see appendix 13.4

Appendix 13.1 – Learning Outcomes map

	LEVEL 4			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Students will have demonstrated: Knowledge of the underlying concepts and principles associated with their areas of study; Ability to evaluate and interpret these within the context of that area of study;	A2, Use appropriate scientific, technical or engineering principles. A1, Review and select appropriate techniques, procedures and methods to undertake tasks. B1, Identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions. B2, Identify, organise and use resources effectively to complete tasks, with consideration for cost, quality, safety, security and environmental impact. D1, Use oral, written and electronic methods for	1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering systems. 1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering systems. 2. Provide the opportunity to 'learn through design' via practical and project based work, particularly within the context of marine engineering design. 4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving,	8.1.1) A sound theoretical approach to the application of technology in marine engineering practice. 8.1.2) The ability to identify, review and select techniques, procedures and methods to undertake engineering tasks within the Marine Engineering Sector. 8.2.1) The ability to Identify, review and select techniques, procedures and methods to undertake marine engineering tasks. 8.1.2) The ability to identify, review and select techniques, procedures and methods to undertake engineering tasks within the Marine Engineering Sector. 8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement. 8.2.2) The ability to use results of analysis to solve marine engineering problems, apply technology and implement solutions.	CITY1077, CITY1078, CITY1091, CITY1092, CITY1093, CITY1094. CITY1077, CITY1078, CITY1091, CITY1092, CITY1093, CITY1094.

	LEVEL 4			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Ability to present, evaluate and interpret qualitative and quantitative data;	the communication in English1 of technical and other information.	application and diagnostic skills. 4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.	8.4.2) The ability to liaise with employers through work based design projects. 8.2.2) The ability to use results of analysis to solve marine engineering problems, apply technology and implement solutions. 8.3.1) Communicate ideas and information; through verbal and written forms using appropriate terminology and presentation of data.	CITY1077, CITY1078, CITY1091, CITY1093.
Students will be able to: Evaluate the appropriateness of different approaches to solving problems related to their area of study;	A1, Review and select appropriate techniques, procedures and methods to undertake tasks. A2, Use appropriate scientific, technical or engineering principles. B1, Identify problems and apply appropriate methods to identify causes and achieve satisfactory solutions.	4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.	8.1.2) The ability to identify, review and select techniques, procedures and methods to undertake engineering tasks within the Marine Engineering Sector. 8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement. 8.2.2) The ability to use results of analysis to solve marine engineering problems, apply technology and implement solutions. 8.2.3) The ability to Implement design solutions and contribute to their evaluation through projects	CITY1077, CITY1078, CITY1091, CITY1093.

	LEVEL 4			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
			focused upon the Marine Engineering Industry.	
Communicate the results of their study accurately and reliably and with structured and coherent argument	D1, Use oral, written and electronic methods for the communication in English1 of technical and other information.	4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.	8.3.1) Communicate ideas and information; through verbal and written forms using appropriate terminology and presentation of data. 8.4.2.) The ability to liaise with employers through work based design projects.	CITY1078, CITY1091, CITY1092, CITY1093, CITY1094.
Undertake further training and develop new skills within a structured and managed environment	E4, Carry out and record CPD necessary to maintain and enhance competence in own area of practice including: • Undertake reviews of own development needs • Plan how to meet personal and organisational objectives • Carry out planned (and unplanned) CPD activities • Maintain evidence of competence development • Evaluate CPD outcomes against any plans made • Assist others with their own CPD.	1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering structures. 2. Provide the opportunity to 'learn through design' via practical and project based work, particularly within the context of marine engineering design. 3. Provide an awareness of the business implications of engineering decisions and a knowledge of the inter-relationship between the market, engineering activities and the management structures.	8.4.1) Good student centred learning skills which will promote lifelong learning and a commitment to continuing professional development to achieve flexibility within the work environment.	CITY1077, CITY1078, CITY1091, CITY1092, CITY1093, CITY1094.

	LEVEL 4			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
		4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.		
Students will also have: The qualities and transferable skills necessary for employment requiring the exercise of some personal responsibility	C1, Work reliably and effectively without close supervision, to the appropriate codes of practice. E1, Comply with the Code of Conduct of your institution. E2, Manage and apply safe systems of work.	1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering structures. 3. Provide an awareness of the business implications of engineering decisions and a knowledge of the inter-relationship between the market, engineering activities and the management structures. 4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.	8.4.1) Good student centred learning skills which will promote lifelong learning and a commitment to continuing professional development to achieve flexibility within the work environment. 8.4.2) The ability to liaise with employers through work based design projects.	CITY1077, CITY1078, CITY1091, CITY1092, CITY1093, CITY1094.

	LEVEL 5			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Students will have demonstrated: Knowledge and critical understanding of the well-established principles of their area of study and the way in which those principles have developed;	A1, Maintain and extend a sound theoretical approach to the application of technology in engineering practice. B2, Contribute to the design and development of engineering solutions. B3, Implement design solutions and contribute to their evaluation.	1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering systems. 2. Provide the opportunity to 'learn through design' via practical and project based work, particularly within the context of marine engineering design.	8.1.1) A sound theoretical approach to the application of technology in marine engineering practice. 8.1.2) The ability to identify, review and select techniques, procedures and methods to undertake engineering tasks within the Marine Engineering Sector. 8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement.	CITY2092, CITY2093, CITY2094, CITY2095, CITY2096, CITY2097.
Ability to apply underlying concepts and principles outside the context in which they were first studied, including where appropriate, the application of those principles in an employment context;	A2, Use a sound evidence-based approach to problem-solving and contribute to continuous improvement. B1, Identify, review and select techniques, procedures and methods to undertake engineering tasks. B2, Contribute to the design and development of engineering solutions.	1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering systems. 2. Provide the opportunity to 'learn through design' via practical and project based work, particularly within the context of marine engineering design. 4. Provide the opportunity to develop	8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement. 8.2.1) The ability to Identify, review and select techniques, procedures and methods to undertake marine engineering tasks. 8.2.2) The ability to use results of analysis to solve marine engineering problems, apply technology and implement solutions.	CITY2092, CITY2093, CITY2094, CITY2095, CITY2096, CITY2097.

	LEVEL 5			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Knowledge of the main methods of enquiry in the subject relevant to the named award, and ability to evaluate critically the appropriateness of different approaches to solving problems in the field of study;	B3, Implement design solutions and contribute to their evaluation. A1, Maintain and extend a sound theoretical approach to the application of technology in engineering practice. A2, Use a sound evidence-based approach to problem-solving and contribute to continuous improvement. B2, Contribute to the design and development of engineering solutions.	communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills. 1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering systems. 2. Provide the opportunity to 'learn through design' via practical and project based work, particularly within the context of marine engineering design. 4. Provide the opportunity to develop communication, data	8.3.1) Communicate ideas and information; through verbal and written forms using appropriate terminology and presentation of data. 8.4.1) Good student centred learning skills which will promote lifelong learning and a commitment to continuing professional development to achieve flexibility within the work environment. 8.4.2) The ability to liaise with employers through work based design projects. 8.5.1) The ability to select and use appropriate equipment to perform engineering tasks. 8.5.2) The ability to monitor, analyse and evaluate marine engineering systems. 8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement. 8.2.1) The ability to Identify, review and select techniques, procedures and methods to undertake marine engineering tasks. 8.2.2) The ability to use results of analysis to solve marine engineering problems, apply technology and implement solutions.	CITY2092, CITY2093, CITY2094, CITY2095, CITY2096, CITY2097.

	LEVEL 5			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
An understanding of the limits of the knowledge, and how this influences analyses and interpretations based on that knowledge	B3, Implement design solutions and contribute to their evaluation. C1, Plan for effective project implementation. A2, Use a sound evidence-based approach to problem-solving and contribute to continuous improvement.	collection and analysis, ingenuity, problem solving, application and diagnostic skills. 1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering systems. 4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.	8.2.3) The ability to Implement design solutions and contribute to their evaluation through projects focused upon the Marine Engineering Industry. 8.4.2.) The ability to liaise with employers through work based design projects. 8.5.1) The ability to select and use appropriate equipment to perform engineering tasks. 8.5.2) The ability to monitor, analyse and evaluate engineering systems. 8.1.1) A sound theoretical approach to the application of technology in marine engineering practice. 8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement. 8.4.1) Good student centred learning skills which will promote lifelong learning and a commitment to continuing professional development to achieve flexibility within the work environment.	CITY2092, CITY2093, CITY2094, CITY2095, CITY2096, CITY2097.
Students will be able to:				

	LEVEL 5			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis;	A2, Use a sound evidence-based approach to problem-solving and contribute to continuous improvement. B1, Identify, review and select techniques, procedures and methods to undertake engineering tasks. B3, Implement design solutions and contribute to their evaluation.	1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering systems. 4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.	8.1.1) A sound theoretical approach to the application of technology in marine engineering practice. 8.1.2) The ability to identify, review and select techniques, procedures and methods to undertake engineering tasks within the Marine Engineering Sector. 8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement. 8.2.1) The ability to Identify, review and select techniques, procedures and methods to undertake marine engineering tasks. 8.2.2) The ability to use results of analysis to solve marine engineering problems, apply technology and implement solutions. 8.2.3) The ability to Implement design solutions and contribute to their evaluation through projects focused upon the Marine Engineering Industry. 8.5.1) The ability to select and use appropriate equipment to perform engineering tasks. 8.5.2) The ability to monitor, analyse and evaluate engineering systems.	CITY2092, CITY2094, CITY2095, CITY2096.

	LEVEL 5			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Effectively communicate information, arguments and analysis in a variety of forms to specialist and non-specialist audiences, and deploy key techniques of the discipline effectively;	D1, Communicate in English2 with others at all levels. D2, Present and discuss proposals. D3, Demonstrate personal and social skills.	4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.	8.3.1) Communicate ideas and information; through verbal and written forms using appropriate terminology and presentation of data. 8.4.2) The ability to liaise with employers through work based design projects.	CITY2094, CITY2097.
Undertake further training, develop existing skills and acquire new competences that will enable them to assume significant responsibility within organisations.	E4, Carry out and record CPD necessary to maintain and enhance competence in own area of practice.	1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering structures. 2. Provide the opportunity to 'learn through design' via practical and project based work, particularly within the context of marine engineering design.	8.4.1) Good student centred learning skills which will promote lifelong learning and a commitment to continuing professional development to achieve flexibility within the work environment. 8.4.2) The ability to liaise with employers through work based design projects.	CITY2092, CITY2093, CITY2094, CITY2095, CITY2096, CITY2097.
Students will also have: The qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision-making	E4, Carry out and record CPD necessary to maintain and enhance competence in own area of practice. E5, Exercise responsibilities in an ethical manner.	1. Establish broad foundation knowledge on which to develop further skills as technology advances and to enable students to apply engineering principles to the analysis and design of engineering structures. 2. Provide the opportunity to 'learn through	8.1.1) A sound theoretical approach to the application of technology in marine engineering practice. 8.1.2) The ability to identify, review and select techniques, procedures and methods to undertake engineering tasks within the Marine Engineering Sector.	CITY2092, CITY2093, CITY2094, CITY2095, CITY2096, CITY2097.

	LEVEL 5			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
		design' via practical and project based work, particularly within the context of marine engineering design. 3. Provide an awareness of the business implications of engineering decisions and a knowledge of the inter-relationship between the market, engineering activities and the management structures. 4. Provide the opportunity to develop communication, data collection and analysis, ingenuity, problem solving, application and diagnostic skills.	8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement. 8.2.1) The ability to Identify, review and select techniques, procedures and methods to undertake marine engineering tasks. 8.2.2) The ability to use results of analysis to solve marine engineering problems, apply technology and implement solutions. 8.2.3) The ability to Implement design solutions and contribute to their evaluation through projects focused upon the Marine Engineering Industry. 8.3.1) Communicate ideas and information; through verbal and written forms using appropriate terminology and presentation of data. 8.3.2) Work independently or as a member of a team. 8.4.1) Good student centred learning skills which will promote lifelong learning and a commitment to continuing professional development to achieve flexibility within the work environment.	

	LEVEL 5			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
			8.4.2) The ability to liaise with employers through work based design projects. 8.5.1) The ability to select and use appropriate equipment to perform engineering tasks. 8.5.2) The ability to monitor, analyse and evaluate marine engineering systems.	

Appendix 13.2 Assessment against modules Map

Core Modules		Knowledge & understanding				Cognitive & intellectual skills				Key & transferable skills				Employment related skills				Practical skills				Compensation Y/N	Assessment Element(s) and weightings [use KIS definition] E1- exam E2 – clinical exam T1- test C1- coursework A1 – generic assessment P1 - practical
		1	2	3		1	2	3		1	2			1	2			1	2				
Level 4	CITY1077 Engineering Mathematics (Core)	/																	/			Y	E1 (50%), C1 (50%)
	CITY1078 Engineering Science 1 (Core)	/				/																Y	E1 (50%), C1 (50%)
	CITY1095 Applications of Pneumatics and Hydraulics (Core)	/		/			/				/							/	/			Y	E1 (50%), C1 (50%)
	CITY1079 Digital and Analogue Devices and Circuits (Core)	/		/		/		/			/							/	/			Y	E1 (50%), P1 (50%)
	CITY1093 Naval Architecture (Core)		/	/			/	/		/				/				/				Y	T1 (70%), P1 (30%)
	CITY1101 Object Orientated Programming					/					/			/					/			Y	C1 (60%), P1 (40%)

Level 4 LOs		4	1	3		3	2	2		1	3			2	0			3	4				
Level 5	CITY 2098 Fluid Mechanics and CFD (Core)	/																	/			Y	E1 (60%), C1 (40%)
	CITY2093 Advanced CAD and FEA (Core)		/			/	/				/			/								Y	C1 (100%)
	CITY2081 Industrial Control and Mechatronics (Core)	/		/		/	/	/		/	/							/	/			Y	C1 (50%), P1 (50%)
	CITY2095 Composite Materials for the Marine Industry (Core)		/	/			/	/						/				/				Y	P1 (40%), C1 (60%)
	CITY 2108 Software Development (Core)					/					/			/					/			Y	C1 (60%), P1 (40%)
	CITY2097 Project (Core)	/	/	/			/	/		/	/			/	/			/	/			Y	C1 (75%), P1 (25%)
Level 5 LOs		3	3	3		3	4	3		2	4			4	1			3	4				

Appendix 13.4 Work Based Learning Map

FHEQ level: 5				
WBL Activity	**Prog Intended LO**	**Related Modules**	**Assessed LO**	**Range of Assessments**
Work based Design Projects	8.1.1) A sound theoretical approach to the application of technology in marine engineering practice. 8.1.2) The ability to identify, review and select techniques, procedures and methods to undertake engineering tasks within the Marine Engineering Sector. 8.1.3) A sound evidence-based approach to problem-solving and contribute to continuous improvement. 8.2.3) The ability to Implement design solutions and contribute to their evaluation through projects focused upon the Marine Engineering Industry. 8.3.1) Communicate ideas and information; through verbal and written forms using appropriate terminology and presentation of data. 8.3.2) Work independently or as a member of a team.	CITY1092 Cad Techniques and Design CITY2097 Project	**LO2.** Produce rendered and animated visualisations to present to employers **LO3.** Formulate, implement, evaluate and present a work based design project **LO4.** Report to employers on the sustainability and ecology in design and the product life cycle **LO1.** Present and agree specifications and project planning **LO2.** Implement the project within agreed procedures and to specification. **LO3.** Evaluate the project **LO4**. Present a project evaluation.	Portfolio of Evidence Report to employers Portfolio Presentation to Employers

Visit to Teignbridge Propeller Manufacturer And Guest lecture	8.4.2) The ability to liaise with employers through work based design 8.5.2) The ability to monitor, analyse and evaluate marine engineering systems._____ _____ 8.1.1) A sound theoretical approach to the application of technology in marine engineering practice. 8.1.2) The ability to identify, review and select techniques, procedures and methods to undertake engineering tasks within the Marine Engineering Sector. 8.2.3) The ability to Implement design solutions and contribute to their evaluation through projects focused upon the Marine Engineering Industry. 8.3.1) Communicate ideas and information; through verbal and written forms using appropriate terminology and presentation of data. 8.5.2) The ability to monitor, analyse and evaluate marine engineering systems.	CITY2096 Engine Technology and Marine Propulsion Systems	LO3. Assess transmission systems and justify applications to different types of vessels. LO4. Apply Propeller design theory to individual 3d Propeller projects and justify its design to peers through seminars	Assessed Seminar

An explanation of this map: Teaching Learning and Assessment are being aligned to embed Work Based Learning for both Full and Part Time Learners.. All Students in the Project CITY2097 will present their projects to a range of employers during the presentation day.				

2. Module Records

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

MODULE CODE: **CITY1077**	**MODULE TITLE**: **Engineering Mathematics**

CREDITS: **20**	**FHEQ LEVEL**: **4**	**JACS CODE**: **G160**

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

SHORT MODULE DESCRIPTOR:
To develop the student's mathematical ability and to apply principles to the solution of engineering problems and to make use of mathematical computer based packages.

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ELEMENTS OF ASSESSMENT					
WRITTEN EXAMINATION		**COURSEWORK**		**PRACTICE**	
E1 (Formally scheduled)	50%	**C1**	50%	**P1**	
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL: Technology

Professional body minimum pass mark requirement: n/a

MODULE AIMS:

- To gain a solid foundation in algebra, trigonometry, functions and calculus in order to associate and recognise the importance of mathematics in the analysis of engineering problems
- To develop mathematical problem solving simultaneously with other science and engineering modules.

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

LO1. recognise the essential application of mathematical techniques to solve engineering problems
LO2. apply exact mathematical methods to analyse and solve problems of an engineering and scientific nature
LO3. use complex number theory in practical engineering applications
LO4. understand a variety of techniques of differential and integral calculus and their associated applications in engineering

DATE OF APPROVAL: May 2017	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: Sept 2017	**SCHOOL/PARTNER: City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**

Additional notes (for office use only):

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/InformationAndGuidance/Documents/FHEQ08.pdf

- 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 (scroll to pdf link at bottom of page)

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

- QAA Quality Code
  http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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

ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 122**

MODULE LEADER: Owais Raja	**OTHER MODULE STAFF: N/A**

Summary of Module Content

Revision of Algebra and Arithmetic

Basic number and arithmetic operations, algebraic techniques including evaluation of formula, rearranging formula, solving simple equations, laws of logarithms, laws of indices, etc. These skills will be built upon throughout the delivery of each individual topic in this module.

Trigonometric functions and graphs

Simple trigonometric functions of sine, cosine, tangent and hyperbolic functions of $\sinh^{-1}$, $\cosh^{-1}$ and $\tanh^{-1}$. The applications of these functions in engineering including vectors and waveform combination.

Complex numbers

Addition, subtraction, multiplication and division of complex numbers in Polar and Cartesian form. The Argand diagram. The modulus and argument. Applications in engineering.

Differential Calculus

Basic differentiation techniques of polynomial, trigonometric, exponential and logarithmic functions. Further techniques including the product, quotient and chain rules. Engineering applications to optimisation and higher order differentials.

Integral calculus

Basic integration techniques of polynomial, trigonometric and exponential functions. Further techniques including integration by parts and substitution. The methodical applications of definite and indefinite integration with and without engineering scenarios including the interpretation of areas under a curve.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	Comments/Additional Information
Lecture	60	30 x 2 hour lectures
Tutorial	15	Group and individual academic tutorials
Independent Study	125	Guided self-study
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1	End of Module Examination	100%	LO1-4 (Covering topics not assessed in coursework)
	T_			
Coursework	C1	Assignment	100%	LO1-4
Practice	P_		N/A	

Updated by: Owais Raja Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

Recommended Texts and Sources

The recommended texts for the course are:

Kuldeep Singh (2011) Engineering Mathematics Through Applications [Paperback] Palgrave Macmillan; 2nd edition edition

Stroud, K.A. and Booth, D.J. (2013) *Engineering mathematics*. 7th edn. Basingstoke: Palgrave Macmillan.

Stroud, K.A. and Booth, D.J. (2011) *Advanced engineering mathematics*. 5th edn. Basingstoke: Palgrave Macmillan.

Bird, J. (2014) Basic engineering mathematics. 6th edn. London: Routledge.

Bird, J. (2017) Higher engineering mathematics. 7th edn. United Kingdom: Routledge.

Greater Manchester University (no date) Available at: http://www.cse.salford.ac.uk/physics/gsmcdonald/PPLATO.php

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

MODULE CODE: CITY1078	MODULE TITLE: Engineering Science 1

CREDITS: 20	FHEQ LEVEL: 4	JACS CODE: H100

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

SHORT MODULE DESCRIPTOR:

An introduction to mechanical principles, energy transfer and AC electrical theory. Mechanical principles including solid mechanics, statics, dynamics and mechanical vibrations. Modes of heat transfer and energy losses. Electrical principles and single phase AC theory.

.

ELEMENTS OF ASSESSMENT					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)	50%	**C1**	50%	**P1**	
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL: Technology

Professional body minimum pass mark requirement: n/a

MODULE AIMS:

- To investigate the fundamental scientific principles which underpin the design and operation of engineering systems.
- To give a mechanical and electrical overview which will provide the basis for further study in specialist areas of engineering.

ASSESSED LEARNING OUTCOMES: (additional guidance below)

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

LO1. Demonstrate an understanding of basic static and dynamic mechanical systems
LO2. Investigate energy transfer in thermal and fluid systems
LO3. Recognise and recall how DC theory relates to simple electrical machines
LO4. Show knowledge and awareness of the fundamental principles of single phase AC theory

DATE OF APPROVAL: May 2017	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: Sept 2017	**SCHOOL/PARTNER: CCP**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**

Additional notes (for office use only):

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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

ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 114**

MODULE LEADER: Mayowa Adio	**OTHER MODULE STAFF:**

Summary of Module Content

Statics and Dynamics: SF and BM, bending stresses. Torsion . Uniform acceleration linear and angular. Newton's laws of motion, mass moment of inertia, kinetic energy, effects of friction. Vibrations, SHM, forcing and damping. Energy Transfer: Heat transfer: conduction, convection, radiation, thermal conductivity, forced convection, black and grey body radiation. insulated surfaces. Viscosity: boundary layer formation, laminar and turbulent flow, pressure loss in pipes. Energy losses: dynamic viscosity, power loss in bearings. pipe friction losses.
Electrical Principles: Conductors, insulators, voltage and current. Ohm's law, Kirchhoff''s law. Power: Electro-magnetic induction, transformers, Lenz's and Faraday's laws. Generator and motor principles. Single Phase AC theory: Non-resonant circuits: R-C-L circuits; Argand diagrams. Resonant circuits, L-C series and parallel, resonant frequency, Power factor correction, Complex waveforms: graphical analysis, odd and even-harmonics, phase shift, non-linear characteristics.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture / Lab time	60	30 x 2hr sessions
Tutorial	15	30 x 1hr
Independent Study	125	A mixture of guided study and self-study.
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E_	End of Module Examination	100%	LO1, LO2
	T_	In Class Test		
Coursework	C_	Assignment *(Report on in class experiments)*	100%	LO3, LO4
Practice	P_		N/A	

Updated by: Mayowa Adio Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

The recommended texts for the course are:

Bolton, W. (2004) Higher engineering science. 2nd edn. Amsterdam, [Pays-Bas]: Newnes (an imprint of Butterworth-Heinemann Ltd).

Tooley, M.H., Dingle, L., BA, M.T. and Technol.., A. (2012) Engineering science: For foundation degree and higher national. New York: Elsevier Science.

Bacon, D H and Stephens, R C (2000) Mechanical technology, Industrial Press, New York

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

MODULE CODE: CITY 1093	**MODULE TITLE: Naval Architecture**

CREDITS: 20	**FHEQ LEVEL: 4**	**JACS CODE: H500**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
The module introduces the theory of ship stability and the interaction between a vessel, its cargo and counteracting the effects

.

ELEMENTS OF ASSESSMENT ***[Use HESA KIS definitions}***					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)		**C1**		**P1**	30%
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)	70%	**A1**			

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

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To stimulate and widen the student's knowledge of Naval Architecture
- To provide the student with the knowledge and abilities to research the effects of ship stability to safely operate.

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

LO1. Explain and calculate trim and stability at small and large angles of heel.
LO2. Analyse and calculate the effects of flooding on a ships trim and stability including countermeasures
LO3. Explain the principles of dry docking and slipping
LO4. Demonstrate the theory and practical application of a ship inclining experiment

DATE OF APPROVAL: 10 May 2017	**Academic Partnerships**
DATE OF IMPLEMENTATION: September 2017	**City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: All year**

Additional notes (for office use only):

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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

ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 115**

MODULE LEADER: Martin Boulter	**OTHER MODULE STAFF:**

Summary of Module Content

Ship stability terminology, distribution of volume, weight and buoyancy and associated coefficients, the use of data and calculations to identify a ships stability, changes of trim longitudinal and transversely due to loading and unloading. Calculate changes in draft and trim due to bilging and compartment flooding and the effect on a vessels stability
The theory of dry docking and slipping and the standard practices, the theory and practical applications of the inclining experiment and the associated calculations

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

Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	60	30 x 2hr Lectures
Tutorial	15	a mix of group and individual tutorials
Directed Independent Study	35	Research tasks
Self-Study	80	Assignment and reading
Workshop time	10	
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc)**

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1			
	T1	Open book test	100%	LO1; LO2; LO3
Coursework	C1			
Practice	P1	LAB	100%	LO4

Updated by: Martin Boulter Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

Essential Reading List;

Derrett, D R and Barrass, B (2012) *Ship stability for masters and mates*, Elsevier, Oxford, 7th edition
Rawson, K J and Tupper, E C (2001) *Basic ship theory: combined volume*, Elsevier, Oxford
Barrass, B (2001) *Ship stability: notes and examples*, Elsevier, Oxford
Tupper, E C (2013) *Introduction to naval architecture*, Elsevier, Oxford, 5 Edition

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

MODULE CODE: CITY1095	**MODULE TITLE:** Applications of Pneumatics and Hydraulics

CREDITS: 20	**FHEQ LEVEL:4**	**JACS CODE: H141**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
Learners will investigate pneumatic and hydraulic diagrams, examine the characteristics of components and equipment and evaluate the applications of pneumatics and hydraulics.

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ELEMENTS OF ASSESSMENT ***[Use HESA KIS definitions}***					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)	**50 %**	**C1**	**50 %**	**P1**	
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

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

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
The aim of this unit is for the student to develop their knowledge and understanding of fluid power systems, including hydraulics and pneumatics where they will analyse and evaluate circuits, systems and identify specifications for given engineering problems.

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

LO1. Interpret fluid power diagrams
LO2. Analyse the construction and operation of pneumatic and hydraulic components, equipment and plant
LO3. Design pneumatic and hydraulic circuits
LO4. Evaluate industrial applications of pneumatics and hydraulics.

DATE OF APPROVAL: May 2017	**Academic Partnerships**
DATE OF IMPLEMENTATION: September 2017	**City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: All year**

Additional notes (for office use only):

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
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- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 115**

MODULE LEADER: Owais Raja	**OTHER MODULE STAFF:**

Summary of Module Content

- Investigate fluid diagrams and review either fluid power diagrams and report on the design of either a pneumatic or hydraulic multi-actuator sequential operation using a minimum of four actuators or review fluid power diagrams and report on the design of either a pneumatic or hydraulic reversible rotary actuation with speed control in both directions.
- Analyse the construction and operation of pneumatic and hydraulic components, equipment and plant
- Design pneumatic and hydraulic circuits (design and draw a circuit for either a pneumatic or hydraulic multi-actuator sequential operation, including emergency stop functions)
- Evaluate industrial applications of pneumatics and hydraulic.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions}*		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	40	20 x 2hrs lectures
Tutorial	15	A mix of group and individual tutorials
Directed Independent Study	50	Guided self-study
Self-Study	85	Individual self-study
Workshop time	10	5 x 2hrs workshop sessions
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc)**

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1	Exam	100%	LO2, LO4
Coursework	C1	Design assignment	100%	LO1, LO3
Practice				

Updated by: Owais Raja Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

Essential Reading List;

Esposito, A (2000) *Fluid power with applications,* Practice Hall, Indiana.
Parr, A (2011) *Hydraulics and Pneumatics: A technicians and engineers guide*, 3rd ed, Butterworth-Heinemann, Oxford.

Daines, J.R. (2012) *Fluid Power: Hydraulics and Pneumatics*, Goodheart-Willcox,

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

MODULE CODE: CITY1079	MODULE TITLE: Digital and Analogue Devices and Circuits

CREDITS: 20	FHEQ LEVEL: 4	JACS CODE: H651

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

SHORT MODULE DESCRIPTOR:

This module provides learners with a practical understanding of a range of digital and analogue devices and circuits in common use within Electrical/Electronic Engineering Systems. Students will analyse the operational principles associated with a number of fundamental electronic building blocks and will consolidate their learning through the practical build, testing and presentation of real circuits.

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ELEMENTS OF ASSESSMENT					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)	50%	**C1**		**P1**	50%
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL : Technology

Professional body minimum pass mark requirement: n/a

MODULE AIMS:

- To give the learner a sound knowledge of the operational principles of a range of digital and analogue devices and circuits
- To develop the skills necessary to design construct and test common analogue and digital circuits.

ASSESSED LEARNING OUTCOMES: (additional guidance below)

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

LO1. Describe the operation and characteristics of arrange of analogue devices and circuits
LO2. Describe the operation and use of a range of logic devices
LO3. Design and test, using computer simulation and/or practical build an analogue circuit to a given specification
LO4. Design and test, using computer simulation and/or practical build a digital circuit to a given specification

DATE OF APPROVAL: June 2017	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: Sept 2017	**SCHOOL/PARTNER: CCP**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**
Additional notes (for office use only):	

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Dr George Audu	**OTHER MODULE STAFF: Andrew Reed**

Summary of Module Content
Devices – dc and small signal operation of diodes and transistors, DC power supplies – operation, design and test of linear and switched mode power supplies.
Operational amplifiers – ideal and practical op-amps, operation, design and test of common operational amplifier circuits, use of simulation software.
Digital electronic circuits – logic devices and elements, combinational logic design, sequential logic circuit design, use of simulation software.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	44	22 x 2hr sessions
Lab Work	16	8 x 2hr lab sessions
Tutorial	15	Academic Support (Contact and VLE)
Independent Study	125	
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1	End of Module Examination	100%	LO1, LO2
Practice	P1	Presentation of digital circuit design and operation	100% 50% - presentation 50% - Supporting documentation (e.g. poster/handout)	LO3, LO4

The recommended texts for the course are:

Floyd, T.L. (2014) *Digital fundamentals*. 11th edn. Boston, MA, United States: Prentice Hall.

Learn about electronics - home page (2016) Available at: http://www.learnabout-electronics.org/ (Accessed: 21 November 2016).

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

MODULE CODE: **CITY1101**	**MODULE TITLE** **Object Oriented Programming**

CREDITS: 20	**FHEQ LEVEL:4**	**JACS CODE: I322**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
The object oriented programming paradigm requires a programmer to *design* code by considering what *objects* may exist in some system, how these are related to each other and how these may interact with each other. It is a proven method for developing reliable modular programs and encourages reuse which shortens development time. This module provides an introduction to the object-oriented programming paradigm using Java.

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ELEMENTS OF ASSESSMENT ***[Use HESA KIS definitions}***

WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)		**C1**	**60%**	**P1**	40%
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL Group to which module should be linked:

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
The module aims to provide learners with the fundamentals of object-oriented programming. It introduces concepts such as classes and objects, inheritance, abstract classes, interfaces and polymorphism in order that the learner may apply these correctly to Java programs. It will introduce the benefits of using an object oriented approach to software development, such as shorter development cycles, adaptable code, and ability to interact with differing systems using common platforms.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
LO1 Demonstrate an understanding of the principles of object oriented programming
LO2 Apply good programming practice by producing and object oriented structured design as a programming solution
LO3 Implement object oriented programming solution of moderate size and complexity
LO4 Test, verify and document the resulting object oriented software

DATE OF APPROVAL: 9/3/2018	**Academic Partnerships**
DATE OF IMPLEMENTATION: September 2018	**City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: Autumn/ Spring/ Summer**

Additional notes (for office use only):

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 121**

MODULE LEADER: Dr Christopher Ford	**OTHER MODULE STAFF: Dr Andrew Watson**

Summary of Module Content

- Classes, Abstract Classes, Interfaces
- Constructors/destructors
- Encapsulation and public, private and protected scope
- Inheritance
- Association
- Composition
- Aggregation
- Polymorphism, Method Overloading, Method Overriding
- Libraries
- Design principles
    - coherence and (de-)coupling between the classes
    - identification of dependencies, aggregation, inheritances, data and file structures
    - class diagrams, sequence diagrams
- IDE - source code editor, compiler, interpreter, build automation tools, debugger
- Error and exception handling
- Testing, Verifying,Validating, Documentation

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions}***		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	15	Combined lecture/lab sessions
Lab	45	Combined lecture/lab sessions
Self-study	140	Self-study to include reflection, revision and assessment preparation. Significant additional content will be provided in the form of documents, tools and videos.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc)**

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Coursework	C_		100%	

Updated by: Tomek Bergier Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

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

MODULE CODE: CITY2098	**MODULE TITLE: Fluid mechanics and CFD**

CREDITS: 20	**FHEQ LEVEL: 5**	**JACS CODE: H141**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module introduces the fundamental concepts of fluid static, continuity, viscosity and flow and provides working principle of hydraulic system and machinery.

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ELEMENTS OF ASSESSMENT ***[Use HESA KIS definitions}***					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)	60%	**C1**	40%	**P1**	
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

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

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

To introduce the fundamental concepts and equations of fluid mechanics to understand behaviour of a body under fluid, flow of fluid and their application. To provide knowledge of working principle of hydraulic system.

ASSESSED LEARNING OUTCOMES: (additional guidance below)

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

LO1. Investigate properties of fluid and solve problems on pressure and fluid static

LO2. Analyse fluid continuity system

LO3. Study and analyse fluid Viscosity and pipe flow

LO4. Analyse hydraulic system

DATE OF APPROVAL: July 2017	**Academic Partnerships**
DATE OF IMPLEMENTATION: September 2017	**City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM:** Autumn

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

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

ACADEMIC YEAR: 2025-26	NATIONAL COST CENTRE: 115

MODULE LEADER: Owais Raja	OTHER MODULE STAFF:

Summary of Module Content

LO1: Investigate properties of fluid and solve problems on pressure and fluid static

Pressure, density, relative density, atmospheric pressure, absolute pressure, gauge pressure, manometer, barometer, Pascal's principle, Archimedes principle, Buoyancy and stability, Floatation, Centre of pressure, immersed surface, rectangular, circular immersed surface, inclined surface, thrust on immersed surfaces,

LO2: Analyse fluid continuity system

Mass and volume flow rate, equation of continuity, Bernoulli's equation, Application of Bernoulli's equation, Pressure and head loss, Darcy's formula, potential, velocity and pressure head.

LO3: Study and analyse fluid Viscosity and pipe flow

Shear stress in fluid, strain rate and velocity gradient, Newton's law of viscosity, Dynamic viscosity, kinematic viscosity, Newtonian and not Newtonian flow, real and ideal flow, steady and unsteady flow, Laminar and turbulent flow, Wetted perimeter and hydraulic radius, Reynolds number, critical velocity, Dimensional analysis, moody diagram.

LO4: Analyse hydraulic system

Hydraulic lift and press, hydraulic machines, fluid jets, Impact and power of a jet, turbo machines, Pelton wheel, Kaplan turbine, Reciprocating and centrifugal pump, Power and efficiency of pumps.

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions}***		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	60	30 x 2hr lectures
Tutorial	30	A mix of group and individual tutorial time
Directed Independent Study	55	Identified independent study prior to seminars
Self-Study	55	Coursework and individual reading
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc)**

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1	**Exam**	100%	LO3, LO4
	T1			
Coursework	C1	**Assignment**	100%	LO1, LO2
Practice	P1			

Updated by: Owais Raja Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

Essential Reading List;

Yunus A. Cengel, John M. Cimbala (2013), *Fluid Mechanics Fundamentals and Applications,* Mc graw Hill, 3rd edition.

Fox, Robert W. McDonald, Alan T. Pritchard, Philip J, (2011), *Introduction to Fluid* Mechanics John Wiley & Sons, 8th edition.

Dixon S.L, (2014), *Fluid Mechanics and Thermodynamics of Turbomachinery*, Elsevier, 7th edition.

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

MODULE CODE: CITY2081	**MODULE TITLE: Industrial Control and Mechatronics**

CREDITS: 20	**FHEQ LEVEL: 5**	**JACS CODE: H730**

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

SHORT MODULE DESCRIPTOR:
This module will introduce a multidisciplinary view of typical mechatronic systems integrating a number of engineering disciplines.
Learners will analyse individual elements before identifying the interface and control methods used to combine those elements into a complete system.
Learners will then apply formal design methodologies to implement and test a simple mechatronic system.

ELEMENTS OF ASSESSMENT					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)		**C1**	50%	**P1**	50%
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

SUBJECT ASSESSMENT PANEL: Technology

Professional body minimum pass mark requirement: n/a

MODULE AIMS:
- To introduce mathematical modelling of mechatronic systems
- To develop an understanding of the components in a typical mechatronic system
- To develop an understanding of programming techniques used in mechatronic systems
- To design and evaluate a simple mechatronic system

ASSESSED LEARNING OUTCOMES: (additional guidance below)

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

LO1. Understand electro-mechanical models of components in mechatronic systems
LO2. Understand the use and operation of a range of mechatronic system components
LO3. Apply programming techniques to mechatronic systems
LO4. Design, implement and test an industrial control system to a given specification

DATE OF APPROVAL: July 2017	**FACULTY/OFFICE: Academic Partnerships**

DATE OF IMPLEMENTATION: September 2018	**SCHOOL/PARTNER: CCP**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**

Additional notes (for office use only):

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Andrew Reed	**OTHER MODULE STAFF: Martin Boulter**

Summary of Module Content

Derive mathematical models for electrical and mechanical systems: 1st and 2nd order systems; differential equations; characteristics; responses to inputs; comparisons with real systems
Selection of suitable components for mechatronic systems: Central processor selection, e.g. PIC, AVR, PLC, embedded system; sensor technologies, e.g. resistive, capacitive, inductive, optical, and ultrasonic; actuator technologies, e.g. motors, stepper motors and solenoid valves; Interfacing methods.
Programming techniques: Assembly language; High level languages, e.g. C, Flowcharts, Ladder logic
System design to a given specification: Formal design techniques to meet appropriate standards and regulations; selection of appropriate system components.
Implement technologies within an autonomous system utilising existing hardware to achieve an operational autonomous system.
Investigate the use of ROS, Ardupilot and github systems to enhance workflow and productivity.

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	40	20 x 2 hours delivery
Practical	20	10 x 2 hours design, build and test
Tutorial	30	Individual and group tutorial
Independent Study	110	Guided self-study
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E_	N/A		
	T_	N/A		
Coursework	C1	2 x assignments *i. Report on mechatronic theory* *ii. Report on in class experiments*	50%	

Practice	P1	*Implementation of Industrial Control System*	50%	

Updated by: Andrew Reed Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

The recommended texts for the course are:

Bolton, W. (2015) *Mechatronics: Electronic control systems in mechanical and electrical engineering*. Harlow, United Kingdom: Pearson Education.

Bolton, W. (2015) *Programmable logic controllers*. Oxford, United Kingdom: Newnes (an imprint of Butterworth-Heinemann Ltd.)

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

MODULE CODE: CITY2093	MODULE TITLE: Advanced CAD & FEA

CREDITS: 20	FHEQ LEVEL: 5	JACS CODE: H130

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
The development of 3D modelling techniques, Surface and Solid modelling within a dedicated 3D modelling package. Creating 3D visualisation and animations to communicate design concepts. Produce full sets of drawings, BOM's and manufacturing information. Analyse the stresses and strains on structures using FEA techniques to achieve an optimised design solution.

ELEMENTS OF ASSESSMENT ***[Use HESA KIS definitions}***

WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)		**C1**	100%	**P1**	
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

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

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
To provide the knowledge and understanding of the use of 3d modelling software in the use of design and analyse materials and structures for design.

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

LO5. Use computer software to produce complex 3D models of engineering components.
LO6. Analyse structures, stress strain and deflections using FEA techniques.
LO7. Produce engineering drawings, BOMs and Manufacturing information to international standards.
LO8. Apply tolerances; surface finish, dimensional and geometrical to engineering components.

DATE OF APPROVAL: May 2017	Academic Partnerships
DATE OF IMPLEMENTATION: September 2017	City College Plymouth
DATE(S) OF APPROVED CHANGE:	TERM: All Year

Additional notes (for office use only):

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 143**

MODULE LEADER: Martin Boulter	**OTHER MODULE STAFF:**

Summary of Module Content

Design a solution to an engineering problem; produce a 3D Solid model using the appropriate software, and perform structural analysis using FEA techniques.
Produce to international standards Drawings, BOM's and Manufacturing information.
Produce a report detailing all design considerations, the design process and outcomes.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions}*		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	20	10 x 2hr lectures
Guided Study	40	20 x 2hr sessions hands on Inventor time in CAD lab
Tutorial	15	A mix of group and individual tutorial time
Self-Study	125	Project work and individual reading
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc)**

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1			
	T1			
Coursework	C1	Portfolio	100%	LO13, LO14, LO15, LO16
Practice	P1			

Updated by: Martin Boulter Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

Essential Reading List;

Recommended Reference Literature

Waguespack, Curtis et al (2008) *Mastering Autodesk Inventor 2013 and Autodesk Inventor LT2013*, Indianapolis, Wiley Publishing.

Additional Learning Resources

For **FREE** Autodesk programmes to download to your own PC go to:
http://students.autodesk.com/

FREE Student Autodesk Software, go to:
http://students.autodesk.com/
or
http://students.autodesk.com/?nd=download_center

AUTODESK INVENTOR ESSENTIALS VIDEOS
http://wikihelp.autodesk.com/Inventor/enu/2013/Help/0107-Essentia107#Topics_in_this_section

CAD FILE MANAGEMENT - CREATE A PROJECT FOLDER
http://wikihelp.autodesk.com/Inventor/enu/2013/Help/3877-CAD_Mana3877/3890-Configur3890

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: CITY2108	**MODULE TITLE: Software Development**	
CREDITS: 20	**FHEQ LEVEL: 5**	**JACS CODE: I300**
PRE-REQUISITES: None	**CO-REQUISITES: None**	**COMPENSATABLE: Yes**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module explores the principles and techniques of software development. The learners will acquire an understanding of analysis, design, software construction and testing both in independent and collaborative development. Various design patterns and software architectures and frameworks are explored and professional skills such as UML and Agile are developed.

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

E1 (Examination)		**C1** (Coursework)	60 %	**P1** (Practical)	40%
E2 (Clinical Examination)		**A1** (Generic assessment)			
T1 (Test)					

SUBJECT ASSESSMENT PANEL to which module should be linked: Computing

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
The aims of this module are to develop an understanding of the analysis, design, software construction and testing processes and consolidate the learners' initial experiences of programming and the resulting development of software. The focus is the development of skills such as design patterns and UML and introducing development methodologies such as Agile and the Unified Development Process. In addition it aims to extend their understanding of more complex ideas in software development such as collaborative design and integration.

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
LO1 Understand the differences, advantages and disadvantages of software development methodologies	8.1.2, 8.1.3, 8.2.1, 8.2.2, 8.3.1, 8.3.2, 8.3.3, 8.4.1, 8.4.3, 8.5.1, 8.5.2, 8.5.3
LO2 Demonstrate the ability to capture and validate software requirements,	
LO3 applying relevant design diagrams to validated software requirements	
LO4 Implement and test architecture and designs in software.	

DATE OF APPROVAL: 09/03/2018	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2018	**SCHOOL/PARTNER: City College Plymouth**

DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	SEMESTER: Semester 1
Notes:	

Additional Guidance for Learning Outcomes:

To ensure that the module is pitched at the right level check your intended learning outcomes against the following nationally agreed standards

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/publications/information-and-guidance/publication/?PubID=2718#.VW2INtJVikp
- Subject benchmark statements http://www.qaa.ac.uk/ASSURINGSTANDARDSANDQUALITY/SUBJECT-GUIDANCE/Pages/Subject-benchmark-statements.aspx
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 121**
MODULE LEADER: Tomek Bergier	**OTHER MODULE STAFF:**

Summary of Module Content

- Modeling Language and the Unified Development Process
  - Domain Models
  - Use Cases
  - Design Patterns
  - Class Diagrams
  - Interaction Diagrams
  - Sequence Diagrams
  - State Diagrams
  - Package, deployment and component diagrams
- Software Development Methodologies
  - Values and principles
  - Iteration, increments and evolution
  - Communication and quality
  - Adaptive, predictive, iterative vs waterfall, code vs documentation
  - Development practices
  - Pitfalls
- Implementation in Object Oriented Programming Language
- Collaborative design and Integration testing
- Creating test cases, analysis of test cases

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	15	Combined lecture/lab sessions
Directed Study	45	Combined lecture/lab sessions
Student Self Study	140	Google classroom is the starting point for guidance in directed study with direction from module leader.
Total	200	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Report on methodologies, requirements and design documentation	LO1, LO2, LO3 100%
Practical	Demonstration of Practical work	LO4 100%

REFERRAL ASSESSMENT (Same)

Element Category	Component Name	Component Weighting
Coursework	Report on methodologies, requirements and design documentation (New/different)	LO1, LO2, LO3 100%
Practical	Demonstration of Practical work (New/different)	LO4 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Tomek Bergier Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

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

MODULE CODE: CITY2095	**MODULE TITLE: Composites Materials for the Marine Industry**

CREDITS: 20	**FHEQ LEVEL: 5**	**JACS CODE: J610**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
The module introduces the practical and theory of composites used in the marine industry and analyse the different manufacturing processes and the impact of these on the strength of the material

.

ELEMENTS OF ASSESSMENT ***[Use HESA KIS definitions}***					
WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)		**C1**	60%	**P1**	40%
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

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

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To stimulate and widen the students knowledge of composites used within the marine industry
- Provide the student with the knowledge of polymer composites and an appreciation of how they can provide engineering solutions within the marine industry

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

LO9. Analyse the different manufacturing processes and materials used within the marine industry.
LO10. Calculate the mechanical and physical properties of a polymer matrix.
LO11. Demonstrate the practical applications of composites used within the marine industry.
LO12. Analyse the quality assurance processes and the destructive and non-destructive testing of polymer composites.

DATE OF APPROVAL: May 2017	**Academic Partnerships**
DATE OF IMPLEMENTATION: September 2017	**City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: All year**

Additional notes (for office use only):

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

- **SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT**

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

ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 117**

MODULE LEADER: Martin Boulter	**OTHER MODULE STAFF:**

Summary of Module Content
Analyse manufacturing methods, processes and materials
Calculate void contents, resin contents, resin fibre ratios and strength of laminate
Testing processes visual, crucible, shearography, x-ray and other associated testing methods
Practical applications associated with production, prototypes, renewable and military

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions}***		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	60	30 x 2hr Lectures
Academic Support	15	A mix of Group and Individual Tutorials
Directed Independent Study	30	Guided reading and homework
Self-Study	85	Suggested reading and assignments
Workshop time	10	5 x 2hr Practical sessions
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc)**

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E1			
	T1			
Coursework	C1	Written Report	100%	LO17; LO18; LO20
Practice	P1	Practical	100%	LO19

Updated by: Martin Boulter Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025

Essential Reading List;

Jones, R (2015) *Mechanics of composite materials*, CRC Press, Florida 2nd Edition
Barbero, E J (2010) *Introduction to composite materials design*, CRC Press, Florida 2nd Edition
Strong, A B (2007) *Fundamentals of Composites Manufacturing: Materials, Methods, and Applications*, Society Manufacturing Engineers, Michigan 2nd Edition
Bhagwan, D A and Broutman L J and Chandrashekhara, K (2017) *Analysis and Performance of Fiber Composites*, Wiley-Blackwell, New Jersey 4th Edition

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

MODULE CODE: CITY 2097	**MODULE TITLE: Project**

CREDITS: 20	**FHEQ LEVEL: 5**	**JACS CODE: H700**

PRE-REQUISITES: **None**	**CO-REQUISITES:** **None**	**COMPENSATABLE:** **No**

SHORT MODULE DESCRIPTOR:
An integration of the skills and knowledge developed in other modules of the course within a major piece of work that allows the student to develop the ability to work individually; and with others, within a defined timescale and given constraints, to produce an acceptable and viable solution to an agreed brief.

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ELEMENTS OF ASSESSMENT ***[Use HESA KIS definitions}***

WRITTEN EXAMINATION		COURSEWORK		PRACTICE	
E1 (Formally scheduled)		**C1**	75%	**P1**	25%
E2 (OSCE)		**C2**		**P3**	
T1 (in-class test)		**A1**			

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

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
This module develops students' ability to use the knowledge and skills they develop on an engineering program to complete a realistic work project.
It is designed to bring small groups of students together into a multi-disciplinary team, coordinating their individual skills and abilities. This allows them to work, within a defined timescale and given constraints, to produce an acceptable and viable solution to an agreed brief. The module aims to integrate the skills and knowledge developed in other modules of the course within a major piece of work that reflects the type of performance expected in a modern engineering environment.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
LO1. Present and agree specifications and project planning
LO2. Implement the project within agreed procedures and to specification.
LO3. Evaluate the project
LO4. Present a project evaluation.

DATE OF APPROVAL: May 2017	**Academic Partnerships**
DATE OF IMPLEMENTATION:September 2017	**City College Plymouth**
DATE(S) OF APPROVED CHANGE:	**TERM: All Year**

Additional notes (for office use only):

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/InformationAndGuidance/Documents/FHEQ08.pdf
- 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 (scroll to pdf link at bottom of page)
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code http://www.qaa.ac.uk/AssuringStandardsAndQuality/quality-code/Pages/default.aspx

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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ACADEMIC YEAR: 2025-26	**NATIONAL COST CENTRE: 115**

MODULE LEADER: **Martin Boulter**	**OTHER MODULE STAFF:**

Summary of Module Content

Identify requirements relevant to project type – plant layout, installation, product design, etc. Formulate plan of action, allocate responsibilities (for group projects), initiate a project log-book. Implementation: decision-making methods, quality and resource requirements, fitness for purpose, costs, brainstorming, mind mapping, log-book entries.

Evaluate critical analysis of the specification, Gantt charts, sequencing, scheduling, critical path methods, networking and application of Project Evaluation and Review Techniques (PERT).

Present a project evaluation, including a written report, log-book record of all events and an oral presentation. The presentation should be made to known audiences (peer groups, tutors) and unknown audience (actual or simulated, customer or client).

SUMMARY OF TEACHING AND LEARNING		
Scheduled Activities	**Hours**	**Comments/Additional Information**
Lecture	10	5 x 2hr lectures
Formative assessments	4	4x1hr gateway reviews
Practical workshop sessions	40	20 x 2hr practical workshop and development time
Competition	3	3hr end of module competition
Formal Presentation	1	1 hr dragons den presentation of project
Independent Study	120	Individual and Group Research for Project related problem solving.
Tutorial	22	A mixture of group and individual tutorials
Total	**200**	

Category	***Element***	***Component Name***	***Component weighting***	***Comments*** *Include links to learning objectives*
Written exam	E_			
	T_			
Coursework	C1	Portfolio	100%	LO1, LO2, LO3.
Practice	P1	Formal Presentation	100%	LO4

Updated by: Martin Boulter Date: August 2025	**Approved by**: Hollie Galpin-Mitchell Date: August 2025