PROGRAMME QUALITY HANDBOOK 2021-2022

FdSc-HNC Electronics & Robotic Control Engineering

Contents

1. Welcome and Introduction to FdSc Electronics & Robotic Control Engineering

Welcome to FdSc Electronics & Robotic Control Engineering delivered at University Centre South Devon.

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

This Programme Quality handbook contains important information including:
The approved programme specification
Module records

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

- Your Institution & University Student Handbook which contains student support based information on issues such as finance and studying at HE
    - Available in University News & Information on Moodle.
- Plymouth University's Student Handbook
    - available at: https://www.plymouth.ac.uk/your-university/governance/student-handbook

1.1. Programme Management

The FdSc-HNC Electrical and Robotic Control Engineering is led and overseen by the Higher Education Engineering Lead for University Centre South Devon, Ben Bryant. The Section Head for this programme is Adrian Bevin. Module leaders for this programme are, Ben Bryant, Rob Smith, Jim Macaulay, Andy Cuffe, Matthew Prowse and Peter Moran.

1.2. Personal Tutor

Personal tutors are designated as a sustained and first point of reference for individual students on personal, domestic or academic matters; detailed information will be available in your teaching, learning and assessment handbooks.

Your personal tutor for HNC Full time and Part time year one is Ben Bryant. Ben has over 10 years of industry experience within the fields of Design, Manufacturing, Production Management and Automotive. Studying an FdSc in Engineering Technologies at University Centre South Devon and then completing a BSc (Hons) in Mechanical Design and Manufacture at Plymouth University. Ben is currently studying a PhD in Mechanical Engineering – Material contamination within Additive Manufacturing.

Your personal tutor for HNC part time year two is Jim Macaulay. Jim has over 30 years experience in various Electrical and Electronic Engineering, such as; Service maintenance, Electronic design, automation and control of live interactive staging equipment. Jim has a HND Electrical, Electronic Engineering from South Devon Technical College

Your personal tutor for FdSc is Rob Smith. Rob has over 28 years of industry experience within the fields of Electronics, Electrical devices and Robotics. Rob has a range of qualifications from the electronics industry and Mathematical backgrounds. Rob has a BA Mathematics and Physics from the Open University.

Further information about personal tutoring at UCSD can be found by following this link to the Student Development policy.

1.3. Module Leaders

Ben Bryant is the module lead for Mechanical and Electrical Concepts, Design and Mechatronics, and Quality & Project Management. Ben has been teaching both FE & HE for over 6 years and teaches a variety of subjects with the Engineering section.

Rob Smith – Rob is the module lead for Engineering Mathematics, Robotics and Mechatronic Industrial control and Robotic / Mechatronic build. Rob delivers Mathematics, Electrical/Electronic theory and Robotics across the range, level 2 to level 5. Rob has worked in main stream secondary education for 6 years prior to joining the college in 2013. My industrial engineering background was in Hi-Tech optoelectronic where I worked as an engineer for 28 years, working in all areas from R & D to manufacturing.

Jim Macaulay – Jim will be delivering Mechanical and Electrical Concepts, Develop, Research and Practice, Analogue and Digital Principles, Computerised Engineering Infrastructure, Fundamentals of Embedded systems and Electrical, Electronics and Digital Principles.

Andrew Cuffe – Andy will be delivering Programming Concepts. Andy is a lecturer from the computing department and has over 10 years' experience within computing software applications.

Matthew Prowse – Is the current module lead for the Marine engineering qualification. He has been teaching in FE and HE for over 7 years and teaches a range of other subjects including Materials, Boatbuilding and Marine Engineering.

1.4. Course Contact List

If you have any questions about the programme or your pastoral needs please contact your personal tutor, Ben Bryant on benbryant@southdevon.ac.uk or 01803 540390.

1.5. Preparing for your programme

At UCSD, we understand that degree level study is a big step up from previous studies. To help prepare you for the degree we recommend engaging with preparatory activities. Each year UCSD organise step up to HE workshops, with a focus on supporting you to develop your research and writing skills, alongside academic techniques. For more information on the workshops and resources available, please visit our website: https://www.ucsd.ac.uk/the-first-year-at-university/.

The Student Support Hub is available throughout the duration of your programme and offers a range of services, acting as a first port of call for academic, study, wellbeing, disability, fees/funding, employability and progression support. When progressing to the next level of study of your higher education, there are also workshops and activities available to support you with progressing your graduate skills.

Preparatory reading is a great way to develop your knowledge and skills to be ready for the next level of study in higher education. Please see below some recommended reading to undertake prior to the start of your course:

Preparatory Reading

Recommended books/ebooks:

Digital Fundamentals, Global Edition Paperback – 5 Jan. 2015, ISBN-10: 1292075988. ISBN-13: 978-1292075983

Electronics: A Systems Approach Paperback – 20 July 2017, ISBN-10: 1292114061. ISBN-13: 978-1292114064

Higher Engineering Mathematics Paperback – 16 Mar. 2017, ISBN-10: 1138673579. ISBN-13: 978-1138673571

Other materials:

https://www.pannam.com/blog/best-resources-for-electrical-engineers/

https://nationalcareers.service.gov.uk/job-profiles/electrical-engineer

https://nationalcareers.service.gov.uk/job-profiles/electronics-engineer

https://nationalcareers.service.gov.uk/job-profiles/robotics-engineer

https://nationalcareers.service.gov.uk/job-profiles/design-and-development-engineer

COVID19 Programme Planning

Covid 19 programme Planning	
General approach being undertaken	We will follow government advice on social distancing and personal safety to ensure a 'Covid secure' working and learning environment. We know that we all may need to adapt if Covid conditions change. We will continue to provide a high-quality learning experience utilising technology solutions as may be required. We will continue to update our dedicated Covid 19 webpage if and when circumstances change. We encourage all new and returning students to review this page to better understand the approach we are taking.
Programme Teaching and Learning changes being undertaken	In the event another COVID outbreak effecting the UCSD. We will continue to deliver content via Microsoft Teams platform as per the usual timetable of modules. Practical elements of the course may be affected and the use of simulated software will be used instead of physical components.
Programme Assessment changes being undertaken	In the event another COVID outbreak affecting the UCSD. There are elements of the programme assessment such as practical's or test elements which may be required to be adapted to suit the COVID conditions.

2. FdSc Programme Specification

2.1. FdSc

Final award title

FdSc Electronics and Robotic Control Engineering

Level 4 Intermediate award title(s)

N/A

UCAS code **68C5**

JACS code

2.2. Awarding Institution: University of Plymouth

Teaching institution(s): South Devon College

2.3. Accrediting body(ies)

Summary of specific conditions/regulations

Date of re-accreditation N/A

2.4. Distinctive Features of the Programme and the Student Experience

Overview:

- Designed to build on the requirements and be a progression route for the L3 Utilities Engineering Technician standard
- Full-time and Apprenticeship students mixed to promote employer engagement and WBL opportunities for FT students.
- Highly practical nature – building skills in programming, system design and electrical / electronic concepts.
- Knowledge then practice approach to delivery for effective scaffolding.

- A well-equipped laboratory and workshop with a growing portfolio of electrical / electronic / robotic equipment and simulation software.
- Highly accessible staff and support services.

Detail:

The FdSc Electronics and Robotic Control Engineering has been designed alongside employers in order to ensure that on successful completion all graduates display knowledge and skills which allow them to enhance and further their practice. Input has been taken from current and past progressing full time learners on engineering courses to ensure that the program has content that will allow learners to study a subject which is becoming a focus of the electronics and industrial sectors. The Section has strong links with a range of employers and continuing employer liaison will be possible through Sector Focus Groups and the Torbay Development Agency (TDA) monthly meetings.

The programme has a strong practical focus, providing ample opportunity for knowledge gained to be strengthened with practical activity based around the ample Electrical / Electronic laboratory equipment and the growing robotic control equipment.

There are 2 proposed modes of delivery for this programme. Each will involve a degree of contact and blended learning. Primarily there will be 2 options for study, full and part time local delivery. All students regardless of mode of study will have a personal tutor with scheduled and additional time available for tutorial support. The proposed timelines for study for the full-time provision is at two and a half days a week for full-time study and one day a week for part-time study with a duration of two and four years respectively.

Module delivery has been devised to provide students with a “knowledge then practice” style approach to the topic areas allowing in depth investigation and transferability of the subjects. This approach can be seen in stage 1 where Maths, Science and research are followed by the more practical research and laboratory based topics. In stage 2 the structure continues with higher level knowledge is delivered early and followed again by higher level practical research and laboratory based topics culminating in a build project.

All module assessments will be staggered to ensure that the burden of assessment at the end of the year is not too great. Students will attend scheduled lectures,

seminars, workshops and tutorials. Although the delivery will be on one or two days a week all module leaders and their personal tutor will be available throughout the week for drop in sessions via appointment and also contactable by email.

The VLE will be heavily utilised to support learning and include online discussion boards, activities and Wikis. In addition to online course materials, students have access to extensive online tutorial support through email and booked telephone or video conference discussion. Formative tasks are designed to enable students to present initial proposals for assignments submitted electronically and provided with written feedback from module tutors.

For all cohorts work will be assessed throughout the academic year, as indicated in the student handbook. External Examiner verification will take place during the summer term following completion of all assessed work in preparation for the SAP and AAB in late June or early July each academic year. Assessment details are outlined in the student handbook and are also broken down fully within the module guides supporting the module delivery. Assessment dates are subject to change with each academic cycle.

2.5. Relevant QAA Subject Benchmark Group(s)

Foundation Degree Characteristics Statement (FDCS) (2015)
Subject Benchmark Statement (SBS) Engineering (2015)

2.6. Programme Structure

FHEQ Level: 4 For: FdSc Electronics and Robotic Control Engineering Full Time					
F/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			Tutor
		Core or Option Module	Credits	Module	
1	AY	Core	20	SOUD1513 Engineering Mathematics	Rob Smith
1	SP	Core	20	SOUD1455 Mechanical and Electrical Concepts	Ben Bryant (Mech) Jim Macaulay (Elec)
1	AU	Core	20	SOUD1456 Developing Research and Practice	Jim Macaulay
1	AU	Core	20	SOUD1461 Analogue/Digital Principles	Jim Macaulay
1	SP	Optional	20	SOUD1509 Programming Concepts	Andrew Cuffe
1	SP	Optional	20	SOUD1508 Computerised Engineering Infrastructure	Jim Macaulay
1	AY	Core	20	SOUD1459 Design and Mechatronics	Ben Bryant

Students should choose to study either SOUD1508 OR SOUD1509 for a total of 120 credits at Level 4

FHEQ Level: 5 For: FdSc Electronics and Robotic Control Engineering Full Time					
F/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			Tutor
		Core or Option Module	Credits	Module	
2	AU	Core	20	SOUD2425 Electrical and Digital Principles	Jim Macaulay
2	SP	Core	20	SOUD2422 Robotic / Mechatronic build	Rob Smith
2	AU	Core	20	SOUD2420 Robotics and Mechatronic Industrial control	Rob Smith
2	AU	Core	20	SOUD2423 Quality & Project Management	Ben Bryant
2	SP	Core	20	SOUD2424 Independent Research Project	Jim Macaulay
2	AY	Option	20	SOUD2427 Fundamentals of Embedded Systems	Jim Macaulay
2	AY	Option	20	SOUD2428 Application Development for Embedded Operating Systems	Andy Cuffe

Students should choose to study either SOUD2427 OR SOUD2428 for a total of 120 credits at Level 5

FHEQ Level: 4 For: FdSc Electronics and Robotic Control Engineering Part Time					
P/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			Tutor
		Core or Option Module	Credits	Module	
1	AY	Core	20	SOUD1513 Engineering Mathematics	Rob Smith
1	SP	Core	20	SOUD1455 Mechanical and Electrical Concepts	Ben Bryant (Mech) Jim Macaulay (Elec)
1	AU	Core	20	SOUD1456 Developing Research and Practice	Jim Macaulay
2	AU	Core	20	SOUD1461 Analogue/Digital Principles	Jim Macaulay
2	SP	Optional	20	SOUD1509 Programming Concepts	Andrew Cuffe
2	SP	Optional	20	SOUD1508 Computerised Engineering Infrastructure	Jim Macaulay
2	AY	Core	20	SOUD1459 Design and Mechatronics	Ben Bryant

Students should choose to study either SOUD1508 OR SOUD1509 for a total of 120 credits at Level 4

FHEQ Level: 5 For: FdSc Electronics and Robotic Control Engineering Part Time					
P/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			Tutor
		Core or Option Module	Credits	Module	
3	AY	Core	20	SOUD2424 Independent Research Project	Jim Macaulay
3	SP	Core	20	SOUD2422 Robotic / Mechatronic build	Rob Smith
3	AU	Core	20	SOUD2420 Robotics and Mechatronic Industrial control	Rob Smith
4	AY	Core	20	SOUD2423 Quality & Project Management	Ben Bryant
4	AU	Core	20	SOUD2425 Electrical and Digital Principles	Jim Macaulay
4	SP	Option	20	SOUD2427 Fundamentals of Embedded Systems	Jim Macaulay
4	SP	Option	20	SOUD2428 Application Development for Embedded Operating Systems	Jim Macaulay

Students should choose to study either SOUD2427 OR SOUD2428 for a total of 120 credits at Level 5

*Note optional modules are chosen and run at the discretion of the programme team. Students will be notified of the option modules prior to stage 2 commencing.

FHEQ Level: 4 For: HNC Electronics and Robotic Control Engineering Full Time					
F/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			Tutor
		Core or Option Module	Credits	Module	
1	AY	Core	20	SOUD1513 Engineering Mathematics	Rob Smith
1	SP	Core	20	SOUD1455 Mechanical and Electrical Concepts	Ben Bryant (Mech) Jim Macaulay (Elec)
1	AU	Core	20	SOUD1456 Developing Research and Practice	Jim Macaulay
1	AU	Core	20	SOUD1461 Analogue/Digital Principles	Jim Macaulay
1	SP	Optional	20	SOUD1509 Programming Concepts	Andrew Cuffe
1	SP	Optional	20	SOUD1508 Computerised Engineering Infrastructure	Jim Macaulay
1	AY	Core	20	SOUD1459 Design and Mechatronics	Ben Bryant

FHEQ Level: 4 For: HNC Electronics and Robotic Control Engineering Part Time					
F/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			Tutor
		Core or Option Module	Credits	Module	
1	AY	Core	20	SOUD1513 Engineering Mathematics	Rob Smith
1	SP	Core	20	SOUD1455 Mechanical and Electrical Concepts	Ben Bryant (Mech) Jim Macaulay (Elec)
1	AU	Core	20	SOUD1456 Developing Research and Practice	Jim Macaulay
2	AU	Core	20	SOUD1461 Analogue/Digital Principles	Jim Macaulay
2	SP	Optional	20	SOUD1509 Programming Concepts	Andrew Cuffe
2	SP	Optional	20	SOUD1508 Computerised Engineering Infrastructure	Jim Macaulay
2	AY	Core	20	SOUD1459 Design and Mechatronics	Ben Bryant

Programme Aims

1. Students with knowledge and critical understanding of well-established facts, concepts, principles, and theories related to Electronics, Robotic control, and Engineering.
2. Students with a cognitive and intellectual approach directly related to recognising and analysing criteria and specifications appropriate to specific problems, and to be able to plan strategies for their solutions utilising concepts and principles outside the context with which they were taught.
3. Students with key transferable skills including team working, leadership, collaboration, and communication, to identify problems by planning effectively to meet desired outcomes even when situations and priorities change.
4. Students with a wide range of skills for employability and continuous personal development to become effective in the workplace, to benefit themselves, their employer, and the local and wider economy to enhance long-term employment prospects.
5. Students with practical skills where they can operate autonomously in situations of varying complexity and predictability with the ability to specify, design, construct and evaluate reliable, secure, and useable electronic and robotic systems.

Programme Intended Learning Outcomes

Knowledge and understanding

On successful completion graduates should have developed:

1) the ability to apply general engineering and specialist Electronic and Robotic Control theory and technology with a systems approach to problems of moderate complexity.
2) flexible strategies for being creative, innovative and overcoming difficulties to achieve sustainable solutions to problems of varying complexity
3) the ability to conduct statistically sound appraisal of data

Cognitive and intellectual skills

On successful completion graduates should have developed:

1) An awareness of the complexity of ethical principles and issues, and demonstrate and apply this in relation to personal study, particularly with regard to the research project
2) The ability to evaluate critically the appropriateness of different approaches to solving problems and to apply these in a work context

3) An awareness of the importance of identifying, organising and using resources effectively to contribute to design of engineering solutions

Key and transferable skills

On successful completion graduates should have developed the ability to:

1) Present and discuss proposals and offer and justify a well informed and insightful point of view
2) Demonstrate a personal commitment to professional standards, recognising obligations to society, the profession and the environment
3) Demonstrate a personal commitment to independently plan, manage and evaluate the acquisition of new knowledge and skills as part of a lifelong learning strategy.

Employment related skills

On successful completion graduates should have developed:

1) Effective communication skills in a variety of forms and for a range of audiences.
2) Considerable critical insight and confidence in leading and working collaboratively with others
3) The ability to collaborate and plan as part of a team, to carry out roles allocated by the team and take the lead where appropriate, and to fulfil agreed responsibilities.

Practical skills

On successful completion graduates should have developed:

1) Be able to act autonomously with limited supervision or direction within agreed guidelines in both practice and academic study.
2) The ability to articulate their own approaches to learning and organise an effective work pattern including working to deadlines.
3) The ability to implement design solutions taking into account constraints and to react to problems to identify corrective actions during implementation

3. Admissions Criteria, including APCL, APEL and DAS arrangements

NB The following table is a draft exemplar for an undergraduate programme

All applicants must have GCSE (or equivalent) Maths and English at Level 4 or above.

Entry Requirements for FdSc Electronics and Robotic Control Engineering	
A-level	Normal minimum entry requirements are 48 UCAS Points, to include Mathematics or a science based subject.
BTEC National Diploma/QCF Extended Diploma	Diploma/Certificate in a related subject area. 48 UCAS points minimum. To include Mathematics or related module
Access to Higher Education at level 3	48 UCAS points
International Baccalaureate	24 Points. Mathematics must be included
Irish/Scottish Highers/Advanced Highers	48 points minimum from Higher Certificate
Work Experience	N/A
Other non-standard awards or experiences	Candidates are encouraged to apply if they feel they can benefit from the programme. Candidates with non standard entry qualifications will be considered on the basis of relevant work experience and attainment of skills, which demonstrate an ability to study at this level. Students with non-standard qualifications may be asked to complete a written piece of work on a relevant subject and/or learning needs assessment.
APEL/APCL possibilities	Given the wide experience of potential applicants to this course, applications for Accreditation of Prior Learning (APL) and Accreditation of Prior Experiential Learning (APEL) are welcomed in accordance with University of Plymouth Admissions Policy – www.plymouth.ac.uk.

3.1. Progression criteria for Final and Intermediate Awards

Students who successfully complete the FdSc Electronics and Robotic Control Engineering may progress to stage 2 (Level 5) of the BSc (Hons) Robotics at Plymouth University.

3.2. Exceptions to Regulations

N/A

3.3. Transitional Arrangements

- The HNC/FdSc Engineering Technologies programme will not recruit any additional students for Sept 2017. All new students will be enrolled onto the HNC Electronics and Robotic Control Engineering.
- It is not intended that this programme should immediately replace any existing programs – therefore students on the existing HNC Engineering Technologies will remain on their nominated program. However, should students wish to transfer, the following statements will apply:
    - Full-time students who have completed the HNC / FdSc Stage 1 Engineering Technologies wishing to transfer to the FdSc stage 2 Electronics and Robotic Control Engineering should be studying the "Electrical Electronic" pathway and will be required to demonstrate a knowledge of programming concepts.
    - Part time students who have completed the HNC / FdSc Stage 1 Engineering Technologies wishing to transfer to the FdSc Stage 2 Electronics and Robotic Control Engineering should be studying the "Electrical Electronic" pathway and will be required to demonstrate a knowledge of programming concepts.

3.4. Mapping and Appendices:

3.5. ILO's against Modules Mapping (Template attached)

3.6. Assessment against Modules Mapping

3.7. Skills against Modules Mapping

3.8. Appendices

Appendix – 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; Ability to present, evaluate and interpret qualitative and quantitative data;	Foundation Degree Characteristics Statement (FDCS) (2015) Subject Benchmark Statement (SBS) Engineering (2015)	1	8.1:- 1, 2	SOUD1513 SOUD1455 SOUD1459 SOUD1509 SOUD1461
Students will be able to: Evaluate the appropriateness of different approaches to solving problems related to their area of study; Communicate the results of their study accurately and reliably and with structured and coherent argument Undertake further training and develop new skills within a structured and managed environment	Foundation Degree Characteristics Statement (FDCS) (2015) Subject Benchmark Statement (SBS) Engineering (2015)	2, 3	8.2:- 1, 2 8.3:- 2, 3	SOUD1456 SOUD1459 SOUD1456

	LEVEL 4			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Students will also have: The qualities and transferable skills necessary for employment requiring the exercise of some personal responsibility	Foundation Degree Characteristics Statement (FDCS) (2015) Subject Benchmark Statement (SBS) Engineering (2015)	4, 5	8.4:- 1, 3 8.5:- 1, 2	SOUD1456 SOUD1459 SOUD1509

	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; 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; 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; An understanding of the limits of the knowledge, and how this influences analyses and interpretations based on that knowledge	Foundation Degree Characteristics Statement (FDCS) (2015) Subject Benchmark Statement (SBS) Engineering (2015)	1	8.1:- 1, 2, 3	SOUD2420 SOUD2423 SOUD2425

	LEVEL 5			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Students will be able to: Use a range of established techniques to initiate and undertake critical analysis of information, and to propose solutions to problems arising from that analysis; 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; Undertake further training, develop existing skills and acquire new competences that will enable them to assume significant responsibility within organisations.	Foundation Degree Characteristics Statement (FDCS) (2015) Subject Benchmark Statement (SBS) Engineering (2015)	2, 3	8.2:- 1, 2, 3 8.3:- 1, 2, 3	SOUD2422 SOUD2424
Students will also have: The qualities and transferable skills necessary for employment requiring the exercise of personal responsibility and decision-making	Foundation Degree Characteristics Statement (FDCS) (2015) Subject Benchmark Statement (SBS)	4, 5	8.4:- 1, 2, 3 8.5:- 1, 2, 3	SOUD2422 SOUD2424

	LEVEL 5			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
	Engineering (2015)			

4. Module Records

UNIVERSITY OF PLYMOUTH MODULE RECORD

SECTION A: DEFINITIVE MODULE RECORD.

MODULE CODE: SOUD1508	**MODULE TITLE: Computerised Engineering Infrastructure**	
CREDITS: 20	**FHEQ LEVEL: 4**	**HECOS CODE: 100160 Computer Aided Engineering**
PRE-REQUISITES: None	**CO-REQUISITES: None**	**COMPENSATABLE: N**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module introduces the students to the fundamentals of computerised engineering infrastructure. Students will explore contemporary engineering systems and the common core architecture and digital logic that enables automated activities. Finally, students will progress onto the use of Microcontrollers / Industrial Computing across different Engineering systems.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*			
P1 (Practical**)**	50%	**T1** (Test)	50%

SUBJECT ASSESSMENT PANEL to which module should be linked: FdSc/HNC Electronics and Robotics Control
Professional body minimum pass mark requirement: NA
MODULE AIMS:
To develop an understanding of how computer data is stored, represented and transmitted.
To provide an understanding of the operation, interaction and control of the hardware components of computerised engineering systems
To develop confidence in managing engineering systems for complex engineering requirements.
ASSESSED LEARNING OUTCOMES:

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Explain the principle components, and the operations of a computerised Engineering system 2. Apply digital inputs and output logic to solve engineering problems 3. Create programs to control computerised engineering hardware for a given requirement 4. Demonstrate the use of commands to manipulate engineering systems.	K1, C2, K1, E1, & P1

DATE OF APPROVAL: 16/09/2019	**FACULTY/OFFICE: Academic Partnership**
DATE OF IMPLEMENTATION: 23/09/2019	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 2**

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21 **NATIONAL COST CENTRE:121**
MODULE LEADER: Jim Macaulay **OTHER MODULE STAFF: Rob Smith, Andy Cuffe**

Summary of Module Content
Principle components and operations of an Engineering system examining areas to include; An understanding of how computers can be manipulated into controlling Hardware and Software for Engineering requirements.

Digital logic including areas such as; logic gates e.g. AND, OR, NOT, XOR etc.; Boolean-circuits and Boolean algebra, flip-flops, registers, memory and counter implementation.
Low level programs to control software and hardware for engineering requirements, areas to include Microcontrollers such as Arduino, M Bed, and Raspberry Pi, and there integration with mechanical and electrical engineering systems.

Use commands to manipulate engineering systems including areas such as; Advanced command statements, task management, script writing, Ladder logic, FBD, structured text.

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Scheduled activities, Workshops and tutorials	60	Examples such as traditional lectures, group tasks, peer learning, practical session and one to one support
Guided independent Study	140	Learner centred support, recommended reading, extension tasks
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Test	In class test on the principle components - 2 hour exam LO1 – Explain the principle components, and the operations of a computerised Engineering system	100%

Practical	Series of practical skills assessment – 1 hour time limit. LO2, LO3, LO4 – Collection of in class practical time bound tests.	100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Test	In class test on the principle components - 2 hour exam LO1 – Explain the principle components, and the operations of a computerised Engineering system	100%
Practical	Series of practical skills assessment – 1 hour time limit. LO2, LO3, LO4 – Collection of in class practical time bound tests.	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Ben Bryant Date: 07/07/2021	**Approved by**: Adrian Bevin Date: 08/07/2021

UNIVERSITY OF PLYMOUTH MODULE RECORD

SECTION A: DEFINITIVE MODULE RECORD.

MODULE CODE: SOUD1509 **MODULE TITLE: Programming Concepts**

CREDITS: 20 **FHEQ LEVEL: 4** **HECOS CODE: 100956 Programming**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module is intended to introduce students to programming concepts across different programming paradigms, whilst looking to embed good software engineering practice in the design, implementation and testing of moderately complex software applications

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*			
C1 (Coursework)	70%	**P1** (Practical**)**	30%

SUBJECT ASSESSMENT PANEL to which module should be linked: FdSc/HNC Manufacturing & Mechatronics

Professional body minimum pass mark requirement: NA

MODULE AIMS:

To consolidate the students initial experiences of the use of various programming paradigms.
To introduce the learner to the use of programming concepts within identified paradigms.
To develop competence within an integrated development environment as a vehicle for the implementation of a software application

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Apply fundamental programming structures in the implementation of simple software applications 2. Design a software application, following security design principles, conforming to specified requirements 3. Implement a moderately complex software application that meets specified requirements 4. Utilise test strategies in the testing of a software application	K1, C2, K1, E1, & P1

DATE OF APPROVAL: 16/01/2019	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 23/01/2019	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 2**

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2020/2021 **NATIONAL COST CENTRE:121**
MODULE LEADER: Andy Cuffe **OTHER MODULE STAFF: None**

Summary of Module Content

Fundamentals of programming languages **such as**; Variables e.g. variable assignment , variable scope, data-types; Control structures e.g. Ifs, Switches, Loops Functions/Methods; Data Structures e.g. Arrays, Lists; Simple applications e.g. console/CLI based applications

Use of design tools **such as;** wireframes, object/variable dictionaries, test plans, flowcharts, pseudo-code
Implementation of an advanced software application **such as;** use of visual paradigms e.g. VB.NET; use of advanced tools e.g. User Interface development tools, use of UI objects/classes, external APIs/frameworks

Test strategies **such as**; implementation of test plans; test logging and documentation; static/dynamic testing; black/white box testing.

Good programming practice **such as**; use of comments; effective use of whitespace and indentation; sensibly named variables including use of variable notation conventions e.g. camel Case;

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Scheduled activities, Workshops and tutorials	60	Examples such as traditional lectures, group tasks, peer learning, practical session and one to one support
Guided independent Study	140	Learner centred support, recommended reading, extension tasks
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Coursework	Report (2800 words) on the creation of an application. LO2,3&4	100%

Practical	2 programming practical skills assessments (Lab tests). LO1	100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Report (2800 words) on the creation of an application. LO2,3&4	100%
Practical	2 programming practical skills assessments (Lab tests). LO1	50% 50% Total: 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Ben Bryant Date: 07/07/2021	**Approved by**: Adrian Bevin Date: 08/07/2021

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

MODULE CODE:	**SOUD1461**	**MODULE TITLE:**	**Analogue / Digital Principles**

CREDITS: 20	**FHEQ Level: 4**	**JACS CODE: H600**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module provides the basic understanding students require for further study in the field of Electrical Engineering and Digital Electronics. Focussing on the requirements of circuit design for transistor amplifiers, operational amplifiers, filter circuits, power electronics and the design and simplification of combinational and sequential digital logic circuits using discrete logic components

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK		PRACTICAL	
C1 (Coursework)	70%	**P1** (Practical)	**30%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics & Robotic Control

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To provide an introduction to the specification and characteristics of amplifier circuits and to provide students with the knowledge required to allow confident measurement of amplifier and filter performance.
- The characteristics, specifications and design of discrete digital logic circuits, and to provide students with the knowledge required to allow confident simulation and testing of discrete logic functionality and performance.

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

1. Understand the design and operation of transistor and operational amplifier circuits.
2. Apply Boolean algebra for simplification of given expressions and design efficient logic circuits from functional descriptions.
3. Test and verify given filter and logic circuits.

DATE OF APPROVAL:	05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	NA	**TERM/SEMESTER:**	Autumn

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Jim Macaulay	**OTHER MODULE STAFF: Rob Smith**

SUMMARY of MODULE CONTENT

- Analogue electrical devices, transistor amplifiers, operational amplifiers
- Amplifier circuit layouts, characteristics of amplifier circuits
- Filter circuit layouts, characteristics of filter circuits
- Simulation software and application for design and test
- Boolean algebra and switching theory. Manipulation and minimization of Boolean functions. Combinational circuit analysis and design, multiplexers, decoders, adders. Sequential circuit analysis and design, basic flip-flops, clocking, and edge-triggering, registers, counters, timing sequences, state assignment and reduction techniques. Logic Simulation. Analogue-to-Digital and Digital-to-Analogue conversion.

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities Practical Classes and workshops External Guest Speakers Industry Visit	60	Delivery of theory and design methods Consolidation of theory and methods
Guided independent study	140	Design project work
Total	**200**	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C1	Portfolio of work	**Total = 100%**	Portfolio based on a practical digital and practical analogue circuit design and build LO1 & LO2
Practical	P1	Laboratory Assessment	**Total = 100%**	Controlled practical assessment - LO3

Updated by: Ben Bryant	**Date:** 07/07/2021	**Approved by:** Adrian Bevin	**Date:** 08/07/2021

Recommended Texts and Sources:
Core

- Hughes, E. (2009) Electrical and Electronic Technology. (10th edition), [online] Pearson Education. Available at: http://lib.myilibrary.com?ID=235045
- Robertson, C. (2008) Further electrical and electronic principles. (3rd edition), Oxford: Newnes.

Recommended

- Bird, J. (2012) Electrical circuit theory and technology. (3rd edition), Oxford: Newnes.

Others

- http://www.eejournal.com/design/analog
- http://www.adrpublications.com/Journal-of-Advanced-Research-in-Electronics-Engineering-and-Technology.html
- http://www.allaboutcircuits.com/
- http://www.ti.com/lsds/ti/analog/aaj-articles/aaj-articles.page
- http://www.analog.com/en/index.html/

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

MODULE CODE:	**SOUD2425**	**MODULE TITLE:**	**Electrical and Digital Principles**

CREDITS: 20	**FHEQ Level**: 5	**JACS CODE: H600**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module is built on previous learning of circuit and amplifier theory and expands to include combinational and sequential Logic theory. By analysing complex practical applications including micro controller and electro-mechanical systems students will gain a thorough understanding of the subject.

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK	
C1 (Coursework)	100%

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics & Robotic Control

Professional body minimum pass mark requirement: NA

MODULE AIMS:

- To develop circuit theories through the analysis of advanced applications
- To develop understanding of amplifier types and classes through analysis and design
- To introduce Logic devices and theory through analysis of practical applications

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

1. Apply complex notation and circuit theorems to the analysis of practical circuits.
2. Design and simulate logic circuits to a given specification.
3. Analyse an engineering problem and produce a resolution specification based on given hardware / software constraints.

DATE OF APPROVAL:	05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	NA	**TERM/SEMESTER:**	AUTUMN

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Jim Macaulay	**OTHER MODULE STAFF: Rob Smith**

SUMMARY of MODULE CONTENT

- Frequency response, Q-Factor, effects of component values, application of circuit theorems such as Norton, Thevenin, Kirchhoff
- Transistor amplifiers, amplifier classes, classical amplifier circuits, amplifier circuit specification, circuit response simulation
- Logic families, circuit integration, application to electro-mechanical systems, truth table simplification, logic circuit simulation
- Logic in devices – application of logic in programmable devices, programming methods

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

Scheduled Activities	**Hours**	**Comments/Additional Information**
Scheduled activities including practical classes	45	30 weeks of classroom sessions with guided learning activities Laboratory sessions with guided learning activities
Scheduled Independent practical & workshop Guided Independent Study	90 65	Access to research and development laboratory with lecturer in attendance Visits to industrial environments / events Directed weekly reading, moodle based tasks, and assessment development/revision
Total	**200**	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C1	Technical Report 1 Technical Report 2	60% 40% **Total = 100%**	Technical Report LO1 & LO2 Technical Report LO3

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	07/07/2021	Adrian Bevin	08/07/2021

Recommended Texts and Sources:

Core

- Hughes, E. (2009) Electrical and Electronic Technology. (10th edition), [online] Pearson Education. Available at: http://lib.myilibrary.com?ID=235045 .
- Bird, J. (2012) Electrical circuit theory and technology. (3rd edition), Oxford: Newnes.

Recommended

- Robertson, C. (2008) Further electrical and electronic principles. (3rd edition), Oxford: Newnes.

Others

- http://www.allaboutcircuits.com/
- http://www.ti.com/lsds/ti/analog/aaj-articles/aaj-articles.page
- http://www.analog.com/en/index.html/

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

MODULE CODE:	**SOUD2427**	**MODULE TITLE:**	**Fundamentals of Embedded Systems**
CREDITS:	**20**	**FHEQ Level:**	**Level 5**
JACS CODE:	**I100**		

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module introduces the fundamentals of embedded systems, including the use of embedded systems to practically explore the implementation of open and closed loop control systems. The investigation into, and use of associated control system hardware, components and software constructs will ultimately allow the student to develop a control system of moderate complexity

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK		PRACTICAL	
C1 (Coursework)	70%	**P1** (Practical)	**30%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics and Robotic Control

Professional body minimum pass mark requirement: NA

MODULE AIMS:

- To introduce learners to programming constructs required to develop programs for embedded systems
- To develop an understanding of the role of embedded systems in the development of open and closed loop systems
- To appreciate the role of design and test documentation to support the development of embedded solutions

ASSESSED LEARNING OUTCOMES: (additional guidance below)

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

1. Create an open loop control system using programming constructs on an embedded device
2. Analyse specified requirements to design an embedded solution
3. Construct a closed loop solution of moderate complexity using an embedded system with a combination of hardware and software
4. Critically Evaluate an embedded solution

DATE OF APPROVAL:	05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	NA	**TERM/SEMESTER:**	All Year

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE: 121**

MODULE LEADER: Jim Macaulay	**OTHER MODULE STAFF: Rob Smith, Andy Cuffe**

SUMMARY of MODULE CONTENT

Programming constructs on an embedded device e.g. sequence, selection, iteration, Digital/Analogue/PWM In/Out; programming languages; e.g C, C++ for mBed and Arduino, Python for Raspberry Pis etc.
Open loop control systems e.g. Control of on board and external LEDs, motor control to introduce hardware control interfaces.
Design documentation e.g. test plans, circuit diagrams, components lists, program pseudocode and/or flowcharts
Embedded solution of moderate complexity eg. feedback through use of sensors/switches to control the input
Testing and evaluation; implementation of test plan to produce truthful and accurate test documentation; self-peer and module leader feedback leading to critical evaluation of the embedded solution; future suggestions and improvements.

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities, workshops, tutorial	45	9 weeks of 1.5hours sessions traditional lectures, group tasks, peer learning, Practical session and one to one support One to one tutorials Group tutorials
Learner Centred Support Guided independent study	155	Learner centred support Recommended reading, extension tasks
Total	**200**	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C**1**	Analysis and implementation report	**Total = 100%**	LO2, LO4
Practical	P**1**	practical skills assessment	**Total = 100%**	LO1 , LO3

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	07/07/2021	Adrian Bevin	08/07/2021

Recommended Texts and Sources:

Core

- Make an Arduino-Controlled Robot (Make: Projects)
- Programming the Raspberry Pi: Getting Started with Python
- Mechatronics: Electronic Control Systems in Mechanical and Electrical Engineering.ISBN-13: 978-0582357051

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

MODULE CODE:	**SOUD2428**	**MODULE TITLE:**	**Application development for embedded operating systems**

CREDITS: 20	**FHEQ Level: 5**	**JACS CODE: I320**

PRE-REQUISITES: **SOUD1509 Programming Concepts**	**CO-REQUISITES: N/A**	**COMPENSATABLE: YES**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module focuses on the understanding of the role of embedded operating systems in a range of devices. Students will use this understanding to investigate embedded operating system development environments and frameworks, resulting in the design, implementation, testing and presentation of an application for an embedded operating system for specified requirements.

ELEMENTS OF ASSESSMENT [*Use HESA KIS definitions]*

COURSEWORK		Practical	
C1 (Coursework)	80%	P1 (Practical)	20%

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics and Robotic Control

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To practically investigate the roles and functions of embedded operating systems
- To understand the fundamental concepts needed when developing an embedded operating systems application
- To apply and acknowledge the importance of design and test frameworks, strategies and conventions, in the implementation of an application for an embedded operating system.

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

1. Analyse given requirements to design an application for an embedded operating system
2. Implement an application for an embedded operating system using a prepared design
3. Critically evaluate an embedded operating system application
4. Present an application for an embedded operating system to an audience

DATE OF APPROVAL:	05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2017.	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	NA	**TERM/SEMESTER:**	All Year

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE: 121**
MODULE LEADER: ANDY CUFFE	**OTHER MODULE STAFF:**

SUMMARY of MODULE CONTENT

Embedded operating system platforms and frameworks such as; low-level embedded platforms e.g. Arduino, mBed; embedded operating systems and supporting frameworks such as; Android, iOS, Windows Mobile, embedded operating system platforms e.g. mobiles, tablets, smart TVs, wearables.

Design of applications including; use of supporting design tools, e.g. wireframes, object/data dictionaries, class diagrams, test plans; use of UI prototyping tools e.g. Draw.IO, Pencil, Fluid UI; use of design frameworks and conventions e.g. Android / iOS native design guidelines

Implementation of application including development of an application to meet given requirements, specifying target and minimum specified platforms, adhering to responsive and flexible UI design, considering concepts of usability, learnability, accessibility etc.; implementation of external APIs to add functionality,

Test and review of application including; implementation of test plans and role of test driven development, use of empirical testing methods, testing across different platforms and framework versions, usability testing, user, client and peer feedback

Presentation of application including; installation and demonstration of working applications to potential clients and specialists; proposed gains and benefits of applications to client; identification of future versions and further work/improvements; reflection on strengths and weaknesses;

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities, workshops, tutorial	45	9 weeks of 1.5hours sessions traditional lectures, group tasks, peer learning, Practical session and one to one support One to one tutorials Group tutorials
Learner Centred Support Guided independent study	155	Learner centred support Recommended reading, extension tasks
Total	**200**	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C1	Development report	Total = 100%	LO1, LO2, LO3 Report on the design, implementation and evaluation of an application for an embedded operating system
Practical	P1	Oral Presentation	Total = 100%	LO4 Presentation of an application to a specified audience

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	07/07/2021	Adrian Bevin	08/07/2021

Recommended Texts and Sources:

Core

- Big Nerd Ranch (2015) Android Programming The Big Nerd Ranch Guide
- O'Reilly (2016) better Android: Higher Quality Apps from Design to Development

Other

- http://developer.android.com/index.html

5. FdSc Common Module Records

UNIVERSITY OF PLYMOUTH MODULE RECORD

SECTION A: DEFINITIVE MODULE RECORD.

MODULE CODE: SOUD1513	**MODULE TITLE: Engineering Mathematics**	
CREDITS: 20	**FHEQ LEVEL: 4**	**HECOS CODE: 101028 Engineering & Industrial Mathematics**
PRE-REQUISITES: None	**CO-REQUISITES: None**	**COMPENSATABLE: N**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module is designed to provide an introduction to mathematical principles that underpin the knowledge and skills required for an engineering environment. A focus will be made on applying mathematics to practical engineering scenarios, demonstrating an effective problem solving methodology.

ELEMENTS OF ASSESSMENT *[Use HESA KIS definitions] – see Definitions of Elements and Components of Assessment*	
C1 (Coursework)	30%
T1 (Test)	70%

SUBJECT ASSESSMENT PANEL to which module should be linked:

Professional body minimum pass mark requirement: NA

MODULE AIMS:
To provide a stable base of analytical knowledge and technique required to complete a range of design scenarios and to prepare for further studies in Engineering.

ASSESSED LEARNING OUTCOMES: (additional guidance below; please refer to the Programme Specification for relevant award/ programme Learning Outcomes.

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Analyse and provide solutions for a range of mathematical engineering problems, involving algebraic systems, trigonometrical methods, calculus and engineering statistical methods. 2. Demonstrate the ability to solve a range of technical calculations involving algebraic methods and engineering statistics 3. Demonstrate the ability to solve a range of technical calculations involving Engineering Calculus and trigonometrical methods.	K1, C2, K1, E1, & P1

DATE OF APPROVAL: 16/01/2019	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: 23-09-2019	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21 **NATIONAL COST CENTRE:121**
MODULE LEADER: Rob Smith **OTHER MODULE STAFF: Jim Macaulay**

Summary of Module Content

Polynomial Division, Number sequences and series, Linear equation systems. Sinusoidal functions and co-ordinate systems, waveform properties and synthesis. Theory and application of the calculus with relevant subject examples. Methods to collect, analyse and display engineering data

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions]***		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Scheduled activities, Workshops and tutorials	60	Examples such as traditional lectures, group tasks, peer learning, practical session and one to one support
Guided independent Study	140	Learner centred support, recommended reading, extension tasks
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Test	LO2 - Demonstrate the ability to solve a range of technical calculations involving algebraic methods and engineering statistics – (2 hour test) LO3 - Demonstrate the ability to solve a range of technical calculations involving Engineering Calculus and trigonometrical methods. – (2 hour test)	50% 50% Total: 100%
Coursework	LO1 - Analyse and provide solutions for a range of mathematical engineering problems, involving algebraic systems, trigonometrical methods, calculus and engineering statistical methods. (2000 word effort).	100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting
Test	LO2 - Demonstrate the ability to solve a range of technical calculations involving algebraic methods and engineering statistics – (2 hour test) LO3 - Demonstrate the ability to solve a range of technical calculations involving Engineering Calculus and trigonometrical methods. – (2 hour test)	50% 50% Total: 100%
Coursework	LO1 - Analyse and provide solutions for a range of mathematical engineering problems, involving algebraic systems, trigonometrical methods, calculus and engineering statistical methods. (2000 word effort).	100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Ben Bryant Date: 07/08/2021	**Approved by**: Adrian Bevin Date: 08/07/2021

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

MODULE CODE:	SOUD1455	**MODULE TITLE:**	Mechanical and Electrical Concepts

CREDITS: 20	**FHEQ Level**: 4	**JACS CODE:** H300

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
An introduction to Mechanical and Electrical principles that are central to the design of Engineering systems which will also provide a broad knowledge for Mechanical and Electrical professionals. DC and AC circuit theory will sit alongside static and dynamic mechanical theory to give a full introduction for further modules fundamental to the safe and efficient design and production of engineering systems.

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK		TEST	
C1 (Coursework)	**60%**	**T1** (Test)	**40%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics and Robotic Control

Professional body minimum pass mark requirement: NA

MODULE AIMS:

- To provide a knowledge base of mechanical and electrical concepts as an introduction to further modules fundamental to the safe and efficient design and production of vessels and marine engineering systems.

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

1. Apply circuit theory to solve simple AC/DC passive circuits for resistance, current and power dissipation.
2. Apply static & dynamic theory to simple mechanical applications.
3. Demonstrate the ability to solve mechanical and electrical calculations for given scenarios

DATE OF APPROVAL:	23/05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	17/09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	N/A	**TERM/SEMESTER:**	Spring

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE:** 115

MODULE LEADER: Ben Bryant	**OTHER MODULE STAFF:** Rob Smith; Jim Macaulay

SUMMARY of MODULE CONTENT

An introduction to circuit theorems, passive components, series and parallel circuits, C-R circuits. Waveforms, R-L-C and combination circuits, filters, power, resonance, transformer losses. Vectors, forces and moments, Shear force and Bending moments, sectional properties, columns, Torsion. Linear and angular motion, energy systems and energy transfer, simple oscillating systems

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities Scheduled Practical / Lab sessions Scheduled Tutorials	60	Weekly classroom and practical sessions with guided learning activities Individual/small group discussion and progress tracking
Guided Independent Study	140	Directed weekly reading, moodle based tasks, and assessment development/revision
Total	200	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	**C1**	Technical Calculation Report	Total = 100%	LO1, LO2.
Test	**T1**	In Class Test	Total = 100%	LO3.

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	07/07/2021	Adrian Bevin	08/07/2021

Recommended Texts and Sources:

Core

- Tooley, M. and Dingle, L., (2004) *Higher National Engineering*. (2nd edition), Oxford: Newnes.
- Tooley, M. and Dingle, L., (2012) *Engineering Science : For Foundation Degree And Higher National*. (1st edition), Oxford: Routledge.

Recommended

http://www.springer.com/engineering/mechanical+engineering/journal/12206
http://www.ieee.org/publications_standards/publications/journmag/journals_magazines.html

Others

http://www.electronics-tutorials.ws/
http://www.allaboutcircuits.com/
http://www.theiet.org/
http://www.animations.physics.unsw.edu.au/
http://www.science-animations.com/

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

MODULE CODE:	SOUD1456	**MODULE TITLE:**	Developing Research and Practice
CREDITS: 20		**FHEQ Level:** 4	**JACS CODE:** X220

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module is designed to enable students to demonstrate that they have all the qualities and transferable skill necessary for relevant employment requiring the exercise of responsibility and decision making, including the ability to relate their professional practice to underlying theory and principles.

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK		PRACTICAL	
C1 (Coursework)	**80%**	**P1** (Practical)	**20%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics and Robotic Control

Professional body minimum pass mark requirement: NA

MODULE AIMS:

- To enable students to develop a comprehensive portfolio of evidence that supports their career development and practice by carrying out work related research.
- To enable students to demonstrate an approach to their practice that is informed by up to date and relevant theoretical perspectives.
- To enable students to undertaking work based learning project to enhance their employability.
- To support students in developing as autonomous students at HE level. Be able to evaluate the results of a work related research project and present the project outcomes.

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

1. Demonstrate the ability to research, identify and collate information relevant to the programmes area(s) of study and relate this to how theoretical perspectives have informed and enhanced examples from own practice.
2. Demonstrate the ability to work independently in a manner that meets professional requirements and the ability to communicate in styles appropriate for a variety of professional purposes and audiences.
3. Reflectively examine own practice for strengths and weaknesses and apply this to the development of a continuing Personal Development Plan (PDP).
4. Complete a work related research project and implement within agreed procedures and specification

DATE OF APPROVAL:	25/05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	17/09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	N/A.	**TERM/SEMESTER:**	Autumn

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE:** 115

MODULE LEADER: Jim Macaulay	**OTHER MODULE STAFF:** Ben Bryant

SUMMARY of MODULE CONTENT

Academic and industry literacy and research conventions in their chosen field; The requirements of professional practice; Informed reflection, self-evaluation and personal action planning; Relevant ICT competences to support academic and professional practice; structured approaches to the generation of design or system solutions.

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities/supervision	60	Taught classroom sessions
Guided Research	140	Guided research and support Directed weekly reading and assessment development
Total	200	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C1	Professional Development Portfolio	Total = 100%	LO1,LO4,LO3
Practical	P1	Presentation on work related research	Total = 100%	LO2

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	07/07/2021	Adrian Bevin	08/07/2021

Recommended Texts and Sources:

Core

- Bedford, D. and Wilson, E. (2013) *Study skills for Foundation Degrees*. 2nd edn. Abingdon: Routledge
- Cottrell, S. (2008) *The study skills handbook*. 3rd edn. Basingstoke: Palgrave Macmillan.

Recommended

- Fairbairn, G.J. and Winch, C. (1996) Reading writing and reasoning. 2nd edn. Milton Keynes: Open University Press.

Others

- Greetham, B. (2008) How to write better essays. New York: Palgrave Macmillan.
- Northedge, A. (2005) The good study guide. 2nd edn. Milton Keynes: Open University Press.

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

MODULE CODE:	**SOUD1459**	**MODULE TITLE:**	**Design and Mechatronics**

CREDITS: 20	**FHEQ Level: 4**	**JACS CODE: H131**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module introduces students to the frameworks and structures that modern design principles required in industry utilising mechatronic system theory. Students will explore the importance of engineers working as the link between theory and the needs of customers.

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK		PRACTICAL	
C1 (Coursework)	**25%**	**P1** (Practical)	**75%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics and Robotic Control

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- Create or improve the design of a mechatronic system, with respect to the stated requirements of a technical brief.
- Manage the risk of failure of the design of components / systems, with consideration to conflicting requirements, such as those of function, material and component selection, manufacturing methods and costs.
- To develop an understanding of structured design methodologies and approaches
- To provide experience of planning and implementing design tasks as individuals and small collaborative groups.

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

1. Examine the design and operational characteristics of a mechatronic system.
2. Design and mathematically model a mechatronic system for a given technical brief
3. Implement a mechatronic design
4. Present an individual outcome in a professional manner.

DATE OF APPROVAL:	05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	N/A	**TERM/SEMESTER:**	All

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE: 119**
MODULE LEADER: Ben Bryant	**OTHER MODULE STAFF: Rob Smith**

SUMMARY of MODULE CONTENT

Design Specifications – Needs, constraints, functions, and timescales.
Design Processes – Stages and methods such as: development, analysis, concepts, selection, prototyping, testing, evaluation, documenting, mathematical modelling.
Design Practice – Scheduling, risk management, conceptual design, design calculation tools, manufacturing processes and technologies, material and component selection.
Design realisation – build, prototyping, verification.
Communication and documentation of technical information.

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities Scheduled Practical / Lab sessions Scheduled Tutorials	60	Delivery of theory and design methods Consolidation of theory and methods
Guided independent study	140	Research and assessment development
Total	**200**	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C**1**	System analysis report and system design.	**Total = 100%**	LO1, LO2 – written report encompassing system analysis, mathematical modelling and design/scheduling management.
Practical	P1	Implementation of a mechatronic design illustrated through an Academic Poster	**Total = 100%**	LO3, LO4 – System realisation, build and Poster presentation.

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	07/07/2021	Adrian Bevin	08/07/2021

Recommended Texts and Sources:

Core

- DYM, C.L., LITTLE, P. and ORWIN, E. (2014) *Engineering Design: a Project Based Introduction*. 4th Ed. Wiley.

Recommended

- DUL, J. and WEERDMEESTER, B. (2008) *Ergonomics for beginners*. 3rd Ed. Boca Raton: CRC Press.
- GRIFFITHS, B. (2003) *Engineering Drawing for Manufacture*. Kogan Page Science.

Others

- REDDY, K.V. (2008) *Textbook of Engineering Drawing*. 2nd Ed. Hyderabad: BS Publications.

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

MODULE CODE:	**SOUD2420**	**MODULE TITLE:**	**Robotics and Mechatronic Industrial control**

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

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module introduces the student to the systems implemented in industry to control processing tasks. The module will cover awareness of industrial systems from input (sensors) through processing(embedded, compact, modular and rack controllers) to output (actuators and drives)

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK		PRACTICAL	
C1 (Coursework)	**70%**	**P1** (Practical)	**30%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics & Robotic Control

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To provide an understanding of components used in industrial control applications, to enable students to specify and justify component selection and to introduce students to key programming techniques.

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

1. Compare control systems for a given industrial application to show understanding of operation.
2. Apply programming techniques to a range of simple tasks
3. Design and produce solutions for a complex industrial scenario
4. Compare and contrast communication methods implemented in industrial applications

DATE OF APPROVAL:	05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	NA	**TERM/SEMESTER:**	AUTUMN

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Rob Smith	**OTHER MODULE STAFF: None**

SUMMARY of MODULE CONTENT

- Sensors, actuators, programmable devices, network topologies, communication layers, interfaces.
- Programming language, programming structures.
- Testing and debugging, simulation, validation, and legislation.

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities Scheduled practical classes and workshop Trips/Visits to industry	45	Weekly classroom and practical sessions with guided learning activities Individual/small group discussion and progress tracking Guided visits to manufacturing companies
Guided independent study	155	Directed weekly reading, Moodle-based tasks and assessment development and revision.
Total	200	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C1	Scenario based report 1	**Total = 100%**	Individual written assignment comprising of technical explanations, calculations and practical project LO1, LO4.
Practical	P1	Practical Assessment	**Total = 100%**	LO2, LO3. – Series of milestone checks on module based project.

Updated by:	**Date:**	**Approved by:**	**Date:**
Rob Smith	07/07/2021	Ben Bryant	08/07/2021

Recommended Texts and Sources:

Core

- Bolton, W. (2006). *Programmable logic controllers*. 1st ed. Amsterdam: Elsevier/Newnes.

Others

- http://www.schneider-electric.co.uk/en/
- http://w3.siemens.com/mcms/programmable-logic-controller/en/pages/default.aspx
- http://ab.rockwellautomation.com/

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

MODULE CODE:	**SOUD2422**	**MODULE TITLE:**	**Robotic / Mechatronic Build**

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

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
An introduction to theory, practice and the application of Robotic and Mechatronic systems will be explored within this module focussing on the design, build construction and simulation. The module will also focus on practical skills within a Robotic and Mechatronic environment

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK		PRACTICAL	
C1 (Coursework)	**30%**	**P1** (Practical)	**70%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics & Robotic Control

Professional body minimum pass mark requirement: NA

MODULE AIMS:

- The module aims to provide awareness of Robotic control and mechatronics systems, and improve student's practical skills through a guided design and build exercise.
- An ability to work collaboratively in small groups to design and build a system of medium complexity.
- An ability to document theoretical and practical data.

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

1. Demonstrate knowledge and awareness of a range of topics relevant for mobile robotics or mechatronic systems through practical engagement with the subject topic.
2. Demonstrate the ability to design and build a simple autonomous mobile robot or mechatronic system under the guidance of technicians and lecturers.
3. Produce and arrange documentation of the theoretical content and practical activities of the workshops in the form of reports and a well organised and presented portfolio.

DATE OF APPROVAL:	05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	NA	**TERM/SEMESTER:**	Spring

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: **2020/21**	NATIONAL COST CENTRE: **119**

MODULE LEADER: **Rob Smith**	OTHER MODULE STAFF: **Ben Bryant**

SUMMARY of MODULE CONTENT

Introduction to a mechatronics system problem including the elements of assessment. System design process and cycle, Project development, Practical problems with real systems – robustness and sustainability etc., The choice of parts including motors, gears etc. Mechatronics system "build and test"

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities Scheduled practical classes and workshop Trips/Visits to industry	45	Automation in industry Visiting guest lecturers
Guided independent study	155	Build project work
Total	**200**	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C1	Scenario based report 1	**Total = 100%**	Individual written assignment comprising of technical explanations, calculations. LO3.
Practical	P1	Practical Assessment	**Total = 100%**	LO1, LO2. – Series of milestone checks on module based project.

Updated by:	**Date:**	**Approved by:**	**Date:**
Rob Smith	07/07/2021	Ben Bryant	08/07/2021

Recommended Texts and Sources:

Core

Bolton, W. (2015) *Mechatronics: Electronic Control Systems in Mechanical and Electronic Engineering.* (1st edition), Oxford: Pearson.

Bolton, W. (2002). *Control systems*. 1st ed. Oxford: Newnes.

Recommended

Reinertsen, D. (2009). *The principles of product development flow*. 1st ed. Redondo Beach, Calif.: Celeritas.

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

MODULE CODE:	**SOUD2423**	**MODULE TITLE:**	**Quality and Project Management**

CREDITS: 20	**FHEQ Level: 5**	**JACS CODE: H100**
PRE-REQUISITES: None	**CO-REQUISITES: None**	**COMPENSATABLE: Yes**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module provides students with an understanding of how businesses operate within the engineering sector. From Total Quality Management within engineering organisations such as Six Sigma techniques, resource management and lean manufacturing to the twelve disciplines of successful Project Management

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK	
C1 (Coursework)	**100%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics & Robotic Control

Professional body minimum pass mark requirement: N/A

MODULE AIMS:
To provide students with an understanding of the role of management within an engineering organisation and the effects of decisions made within the management layer.

ASSESSED LEARNING OUTCOMES: (additional guidance below)
At the end of the module the learner will be expected to be able to:
1. Evaluate the move towards total quality management and the methods involved.
2. Apply suitable statistical and mathematical techniques to a given Quality Management scenario
3. Apply suitable Project Management techniques to a given scenario.
4. Critically analyse aspects of project management utilising the twelve disciplines.

DATE OF APPROVAL:	05/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	NA	**TERM/SEMESTER:**	Autumn

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE: 115**
MODULE LEADER: Ben Bryant	**OTHER MODULE STAFF:**

SUMMARY of MODULE CONTENT

- Forecasting, strategic planning, inventory planning, KANBAN, SMED, JIT, Key Performance Indicators, scheduling, cost modelling
- Six Sigma, TQM, rolled throughput yield, hidden factory, SPC, lean manufacturing
- Project context, governance, scope, scheduling, financial management
- Project risks, quality, ethics and contracts

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities Scheduled Tutorials	45	Weekly classroom and practical sessions with guided learning activities Individual/small group discussion and progress tracking
Guided Independent Study	155	Directed weekly reading, moodle based tasks, and assessment development/revision
Total	**200**	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C1	Essay Technical Report	50% 50% Total = 100%	Essay LO1, LO4 Written Report with technical calculations (eg cost modelling, statistics, scheduling) LO2, LO3

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	07/07/2021	Adrian Bevin	08/07/2021

Recommended Texts and Sources:

- Chelsom, J., Payne, A. and Reavill, L. (2004) *Management* for Engineers, Scientists and Technologists. (2nd edition), Chichester: John Wiley & Sons.
- MSC study guide APMP - the APM Project Management Qualification. (2014). 1st ed. Management Skills Centre.

Other

- George, M. (2005). *The lean Six Sigma pocket toolbook*. 1st ed. New York: McGraw-Hill.
- Project Management Intsitute, (2013). *A guide to the project management body of knowledge (PMBOK® guide)*. 5th ed. ANSI.
- Association for project management. (2012). *APM body of knowledge* 6th ed.

Other

- Dingle, L. and Tooley, M. (2004) Higher National Engineering. (2nd edition), Oxford: Newnes

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

MODULE CODE:	SOUD2424	**MODULE TITLE:**	Independent Research Project

CREDITS: 20	**FHEQ Level:** 5	**JACS CODE:** X220
PRE-REQUISITES: None	**CO-REQUISITES:** None	**COMPENSATABLE:** Yes

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module provides students the opportunity to plan, research, produce and reflect upon the findings of a research project relevant to the Engineering Industry.

ELEMENTS OF ASSESSMENT ***Use HESA KIS definitions]***

COURSEWORK	
C1 (Coursework)	100%

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Electronics and Robotic Control

Professional body minimum pass mark requirement: NA

MODULE AIMS:

- To further develop research skills through the planning of and the completion of an independent research project. To critically analyse and evaluate suitable research methods for the project. To effectively disseminate research findings from the project

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

1. Apply appropriate principles and concepts to the development of a project including evidencing appropriate risk management and ethical data collection considerations.
2. Propose appropriate solutions and recommendations within ethical standards and legal restrictions, plan for and collect suitable data, using appropriate methods.
3. Disseminate the findings of research using appropriate formats.
4. Interpret the data collected within the parameters of the project.

DATE OF APPROVAL:	23/05/17	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	NA.	**TERM/SEMESTER:**	ALL YEAR

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

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2020/21	**NATIONAL COST CENTRE:** 115

MODULE LEADER: Jim Macaulay	**OTHER MODULE STAFF:** Ben Bryant, Rob Smith

SUMMARY of MODULE CONTENT

Action planning, data collection/ handling and time management. Application of research skills. Data interpretation, application and presentation. Personal reflection and appraisal.

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled activities Scheduled Tutorials	45	Weekly classroom sessions with guided learning activities Individual/small group discussion and progress tracking
Guided Independent Study	155	Directed weekly reading, moodle based tasks, and assessment development/revision
Total	200	(NB: 1 credit = 10 hours or learning; 10 credits = 100 hours, etc)

Category	*Element*	*Component Name*	*Component Weighting*	*Comments include links to learning objectives*
Coursework	C1	Project Proposal Project Report (Methodology) Conclusion	10% 20% 70% Total = 100%	LO1 – Short proposal to include ethical assessment. LO2 – Methodology to include risk assessment. LO3, LO4 – Project report to include findings, conclusion, and dissemination in the form of presentation or academic poster.

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	07/07/2021	Adrian Bevin	08/07/2021

Recommended Texts and Sources:

Core

- Lock D – Project Management (Gower Publishing, 2003) ISBN 9780566085512
- Melton Trish – Project Management Toolkit, the Basics for Project Success (Butterworth-Heinemann, 2007) ISBN 9780750684408

- Melton Trish – Real Project Planning: Developing a Project Development Strategy (Butterworth-Heinemann, 2007) ISBN 9780750684729

Recommended

- Project Management Institute – A Guide to the Project Management Body of Knowledge (Project Management Institute, 2008) ISBN 9781933890517
- Smith N J – Engineering Project Management (Blackwell Publishing, 2007) ISBN 9781405168021