PROGRAMME QUALITY HANDBOOK 2018-2019

FdSc-HNC Manufacturing & Mechatronic Engineering

Contents

1. Welcome and Introduction to FdSc Manufacturing & Mechatronic Engineering.

Welcome to FdSc Manufacturing & Mechatronic 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 Manufacturing and Mechatronic 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 Lloyd Heavens. Module leaders for this programme are, Ben Bryant, Rob Smith, 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 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.

Further information can be found by following this link to the University personal tutoring policy.

1.3. Module Leaders

Ben Bryant is the module lead for Design and Mechatronics, Industrial CAD Practices, Manufacturing and Materials, Developing Research and Practice, Application of CAD/CAM and Finite Element Analysis, Quality & Project Management, Mechanical Science and Independent Research Project. Ben has been teaching both FE & HE for over 5 years and teaches a variety of subjects with the Engineering section.

Rob Smith – Rob is the module lead for Engineering Mathematics, Mechanical/Electrical Concepts, 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.

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 Boatbuilding and Marine Engineering.

Peter Moran – Peter will be delivering Project management delivery alongside Ben Bryant for the module – Quality and Project Management. Peter has been a Project manager on various engineering based projects over the last 15 years.

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.

2. FdSc Programme Specification

1. FdSc

Final award title

FdSc Manufacturing and Mechatronic Engineering

Level 4 Intermediate award title(s)

UCAS code **87G5**

JACS code

2. Awarding Institution: University of Plymouth

Teaching institution(s): South Devon College

3. Accrediting body(ies) N/A (Pending application with IET)

Summary of specific conditions/regulations

Date of re-accreditation N/A

4. Distinctive Features of the Programme and the Student Experience

Overview:

- SEMTA validation for HA Advanced manufacturing engineering framework.
- Designed with the Knowledge and Skills requirements for the foundation phase of the DA Product Design and Development Engineer.
- Designed to build on the requirements and be a progression route for the L3 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 Design, CAD/CAE, Manufacturing, Materials and Mechatronics.

- Knowledge then practice approach to delivery for effective scaffolding.
- A well-equipped laboratory and workshop with a growing portfolio of equipment and simulation software.
- Highly accessible staff and support services.

The FdSc Manufacturing and Mechatronic 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 Manufacturing, Mechatronics 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 mechanical, manufacturing and mechatronic laboratory equipment and the exemplary design and rapid prototyping suites

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.

5. Relevant QAA Subject Benchmark Group(s)

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

6. Programme Structure

FHEQ Level: 4 For: HNC / FdSc Manufacturing and Mechatronic Engineering Full Time					
F/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			
		Core or Option Module	Credits	Module	Tutor
1	AY	Core	20	SOUD1454 Engineering Mathematics	Rob Smith
1	AU	Core	20	SOUD1455 Mechanical and Electrical Concepts	Rob Smith
1	AU	Core	20	SOUD1456 Developing Research and Practice	Ben Bryant
1	AY	Core	20	SOUD1457 Manufacturing and Materials	Ben Bryant
1	SP	Core	20	SOUD1458 Industrial CAD Practices	Ben Bryant
1	SP	Core	20	SOUD1459 Design and Mechatronics	Ben Bryant

FHEQ Level: 4 For: HNC / FdSc Manufacturing and Mechatronic Engineering Part Time					
F/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			
		Core or Option Module	Credits	Module	Tutor
1	AY	Core	20	SOUD1454 Engineering Mathematics	Rob Smith
1	AU	Core	20	SOUD1455 Mechanical and Electrical Concepts	Rob Smith
1	SP	Core	20	SOUD1458 Industrial CAD Practices	Ben Bryant
2	AY	Core	20	SOUD1457 Manufacturing and Materials	Ben Bryant
2	SP	Core	20	SOUD1459 Design and Mechatronics	Ben Bryant
2	AU	Core	20	SOUD1456 Developing Research and Practice	Ben Bryant

FHEQ Level: 5 For: FdSc Manufacturing and Mechatronic Engineering Full Time					
F/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			
		Core or Option Module	Credits	Module	Tutor
2	AY	Core	20	SOUD2419 Application of CAD/CAM and Finite Element Analysis.	Ben Bryant
2	AU	Core	20	SOUD2420 Robotics and Mechatronic Industrial control	Rob Smith
2	AU	Core	20	SOUD2421 Mechanical Science	Ben Bryant
2	SP	Core	20	SOUD2422 Robotic / Mechatronic build	Rob Smith
2	SP	Core	20	SOUD2423 Quality & Project Management	Ben Bryant
2	AY	Core	20	SOUD2424 Independent Research Project	Ben Bryant

FHEQ Level: 5 For: HNC/FdSc Manufacturing and Mechatronic Engineering Part Time					
F/T Route Year	When in Year? (i.e. autumn, spring etc)	Structure as Agreed at Programme Approval			
		Core or Option Module	Credits	Module	Tutor
3	AU	Core	20	SOUD2421 Mechanical Science	Ben Bryant
3	AY	Core	20	SOUD2419 Application of CAD/CAM and Finite Element Analysis.	Ben Bryant
3	SP	Core	20	SOUD2423 Quality & Project Management	Ben Bryant
4	SP	Core	20	SOUD2422 Robotic / Mechatronic build	Rob Smith
4	AU	Core	20	SOUD2420 Robotics and Mechatronic Industrial control	Rob Smith
4	AY	Core	20	SOUD2424 Independent Research Project	Ben Bryant

7. Programme Aims

1. Students with knowledge and critical understanding of well-established facts, concepts, principles, and theories related to Manufacturing, Mechatronics, design 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 mechatronic and manufacturing systems.

8. Programme Intended Learning Outcomes

8.1. Knowledge and understanding

On successful completion graduates should have developed:

1) the ability to apply general engineering and specialist manufacturing, design and mechatronic 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 moderate complexity
3) the ability to conduct statistically sound appraisal of data

8.2. 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

8.3. 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.

8.4. 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.

8.5. 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

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

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

Entry Requirements for FdSc Manufacturing and Mechatronics 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.

10. Progression criteria for Final and Intermediate Awards

Students who successfully complete the FdSc Manufacturing and Mechatronic Engineering may progress to stage 3 (Level 6) of the BSc (Hons) Mechanical Design and Manufacture at Plymouth University.

11. Exceptions to Regulations

N/A

12. 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 Manufacturing and Mechatronic 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 Manufacturing and Mechatronic Engineering should be studying the “Mechanical” pathway.
    - Part time students who have completed the HNC / FdSc Stage 1 Engineering Technologies wishing to transfer to the HNC / FdSc Stage 2 Manufacturing and Mechatronic Engineering should be studying the “Mechanical” pathway.

13. Mapping and Appendices:

13.1. ILO’s against Modules Mapping (Template attached)

13.2. Assessment against Modules Mapping

13.3. Skills against Modules Mapping

13.4. Appendice

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	SOUD1454 SOUD1455 SOUD1459 SOUD1457
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	Foundation Degree Characteristics Statement (FDCS) (2015)	2, 3	8.2:- 1, 2 8.3:- 2, 3	SOUD1456 SOUD1458 SOUD1459

	LEVEL 4			
FHEQ Descriptors	Subject Benchmark(s)	Programme Aims	Programme Outcomes	Core Modules linked to outcomes
Undertake further training and develop new skills within a structured and managed environment	Subject Benchmark Statement (SBS) Engineering (2015)			
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 SOUD1457 SOUD1458 SOUD1459

	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 SOUD2421 SOUD2423
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;	Foundation Degree Characteristics Statement (FDCS) (2015)	2,3	8.2:- 1, 2, 3 8.3:- 1, 2, 3	SOUD2419 SOUD2422 SOUD2424

	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; Undertake further training, develop existing skills and acquire new competences that will enable them to assume significant responsibility within organisations.	Subject Benchmark Statement (SBS) Engineering (2015)			
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) Engineering (2015)	4,5	8.4:- 1, 2, 3 8.5:- 1, 2, 3	SOUD2419 SOUD2422 SOUD2424

3. FdSc Common 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:	SOUD1454	**MODULE TITLE:**	Engineering Mathematics

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

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

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]***

TEST	
T1 (Test)	**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 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)
At the end of the module the student will be expected to be able to:

1. Demonstrate the ability to solve problems involving algebraic number systems.
2. Apply trigonometric methods to analyse and model Engineering problems.
3. Demonstrate the use of Differentiation and Integration on function combinations and apply the calculus to modelling of engineering problems.
4. Apply statistical techniques and probability to engineering situations.

DATE OF APPROVAL:	09/10/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	17/09/2017	**SCHOOL/PARTNER:**	South Devon College
DATE(S) OF APPROVED CHANGE:	N/A	**TERM/SEMESTER:**	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: 2018/19	**NATIONAL COST CENTRE:** 115

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

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
Scheduled Seminars	45	Weekly classroom sessions with guided learning activities
Scheduled Tutorials	55	Assessment development and revision
Guided Independent Study	100	Directed weekly activity on Moodle and other VLE to re-enforce classroom content, Tutorial and improvement sessions.
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*
Written Test	**T1**	End Test Stats & Number systems	50%	LO1, LO4
		End Test Trig and Calculus	50%	LO2, LO3
			Total = 100%	

Updated by:	**Date:**	**Approved by:**	**Date:**
Rob Smith	05/09/2017	Ben Bryant	08/09/2017

Recommended Texts and Sources:

Core

- Bird, J., 2014. Engineering Mathematics. 7th ed. Oxford: Newnes.

Recommended

- Booth, D. & Stroud, K., 2007. Engineering Mathematics. 6th ed. Basingstoke: Palgrave Macmillan.

Others

- Tooley, M. & Dingle, L., 2004. Higher National Engineering. 2nd ed. Oxford: Newnes.
- Tooley, M. & Dingle, L., 2012. Engineering Science: For Foundation Degree And Higher National. 1st ed. Oxford: Routledge.

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:	09/10/2017	**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

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: 2018/19	**NATIONAL COST CENTRE:** 115

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

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 Seminars	45	Weekly classroom sessions with guided learning activities
Scheduled Practical / Lab sessions	22	Weekly practical sessions with guided learning activities
Technician Assisted Labs	28	Laboratory sessions around module content
Scheduled Tutorials	5	Individual/small group discussion and progress tracking
Guided Independent Study	100	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:**
Rob Smith	05/09/2017	Ben Bryant	08/09/2017

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:	09/10/2017	**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

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: 2018/19	**NATIONAL COST CENTRE:** 115

MODULE LEADER: Rob Smith	**OTHER MODULE STAFF:** Andy Scott;; Ben Bryant; Matthew Prowse

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 Lectures & Seminars	20	Taught classroom sessions
Work related project visits	25	Visiting the customer to set specifications and requirements.
Industry Visits	20	Industry visits to relevant research companies
Scheduled Tutorials	35	Guided research and support
Guided Research	100	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:**
Rob Smith	05/09/2017	Ben Bryant	08/09/2017

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:	10/2017	**FACULTY/OFFICE:**	Academic Partnerships
DATE OF IMPLEMENTATION:	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

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: 2018-19	**NATIONAL COST CENTRE: 119**

MODULE LEADER: Ben Bryant	**OTHER MODULE STAFF: Rob Smith, Andy Scott**

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**
Lectures	25	Delivery of theory and design methods
Practical Classes and workshops	45	Consolidation of theory and methods
Technician Assisted Lab	40	Technician assisted, design and build mechatronic system
Guided independent study	90	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: Ben Bryant	**Date:** 05/09/2017	**Approved by:** Lloyd Heavens	**Date:** 08/09/2017

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:	10/2017	**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

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ACADEMIC YEAR: 2018/19	**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 Seminars	30	Classroom sessions with guided learning activities.
Scheduled practical classes and workshop	50	Laboratory sessions with guided learning activities.
Trips/Visits to industry	20	Guided visits to manufacturing companies
Guided independent study	100	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	05/09/2017	Ben Bryant	08/09/2017

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:	10/2017	**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

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: 2018/19	**NATIONAL COST CENTRE: 119**

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

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**
Lectures	25	Delivery of theory and design methods
Practical Classes and workshops	50	Consolidation of theory and methods
Industrial Visit	15	Automation in industry
Visiting Industrial Experts	10	Visiting guest lecturers
Guided independent study	100	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:**
Ben Bryant	05/09/2017	Lloyd Heavens	08/09/2017

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:	10/2017	**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

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: 2018/19	**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 Seminars	45	30 weekly classroom sessions with guided learning activities
External Visits	30	Visits to industrial environments / events
Scheduled Tutorials	10	Individual/small group discussion and progress tracking
Guided Independent Study	100	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	05/09/2017	Lloyd Heavens	08/09/2017

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:	09/10/2017	**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

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: 2018/19	**NATIONAL COST CENTRE:** 115

MODULE LEADER: Ben Bryant	**OTHER MODULE STAFF:** None

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 Lectures/Seminars	12	1.5 hours per week for 8 weeks
Scheduled Tutorials	7.5	One-to-one tutorial 1.5 hours per week for 5 weeks
Scheduled Tutorials	7.5	Group tutorial 1.5 hours per week for 5 weeks
Project Supervision	50	5 hours per week for 10 weeks
Industry Visits	23	Industry visits
Guided Independent Study	100	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	05/09/2017	Lloyd Heavens	08/09/2017

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

4. M & M Module Records

SECTION A: DEFINITIVE MODULE RECORD.

MODULE CODE:	**SOUD1457**	**MODULE TITLE:**	**Manufacturing and Materials**
CREDITS: 20		**FHEQ Level: 4**	**JACS CODE: G160**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

Module provides an introduction to engineering material properties, selection and processing of materials for engineering applications, methods of inspection and test. It continues on to investigate the links between material structure, properties and appropriate manufacturing methods, materials properties and applying these to traditional and non-traditional manufacturing techniques. Students should gain a knowledge of how material properties effect manufacturing choices.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

COURSEWORK	
C1 (Coursework)	**100%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Manufacturing and Mechatronics Engineering

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- To provide an introduction to the selection of materials based on structure, behaviour and processing methods available. An appreciation should be gained in the measurement of material properties and how these can be changed with strengthening techniques.
- To develop a students' understanding of the relationship between material selection and processing requirements by providing an introduction to manufacturing methods.

ASSESSED LEARNING OUTCOMES: (additional guidance below)

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

1. Discuss the basic structure, mechanical and physical properties of a range of common engineering materials.
2. Discuss effects of processing methods available to alter structure and properties and show an ability to select materials for engineering applications.
3. Perform destructive or non-destructive tests on given materials and analyse the results.
4. Discuss and contrast traditional and novel manufacturing techniques.

DATE OF APPROVAL:	10/2017	**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: **2018-19**	NATIONAL COST CENTRE: **115**

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

SUMMARY of MODULE CONTENT

- Primary forming techniques
- Secondary forming techniques
- Properties of materials with qualitative descriptions of structure and effects of processing
- Modification of material properties such as heat treatment / working / alloying
- Applications of materials in engineering

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled Seminars	45	30 weekly classroom sessions with guided learning activities
Scheduled practical classes & workshop	90	30 weekly classroom sessions with guided learning activities
Guided Independent Study	65	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	C**1**	Assignment	60%	Report LO1, LO2, LO4
		Laboratory report	40%	Report LO3
			Total = 100%	

Updated by:	Date:	Approved by:	Date:
Ben Bryant	05/09/2017	Lloyd Heavens	08/09/2017

Recommended Texts and Sources:

Bolton, W. (2004) *Higher Engineering Science.* (2nd edition), Oxford: Newnes.
Craig, R.R. (2000) Mechanics of Materials. (2nd edition), New York: John Wiley and Sons.
Dingle, L. and Tooley, M. (2004) Higher National Engineering. (2nd edition), Oxford: Newnes.
Fischer, T. (2009) Materials Science for engineering students. London: Academic Press.
Ghassemieh, E., 2011. Materials in Automotive Application, State of the Art and Prospects. In: M. Chiaberge, ed. New Trends and Developments in Automotive Industry. s.l.:InTech, pp. 347-394.
Higgins, R.A. (2010) Materials for engineers and technicians. Newnes.
Timings, R.L. (1992) Manufacturing Technology Vol.1. Longman.
Timings, R.L. (1993) Manufacturing Technology Vol.2. Longman.
Timings, R. (2000) Engineering Materials Vol.2. (2nd edition), Harlow: Pearson Education.

SECTION A: DEFINITIVE MODULE RECORD.

MODULE CODE:	**SOUD1458**	**MODULE TITLE:**	**Industrial CAD Practices**

CREDITS: 20	**FHEQ Level: 4**	**JACS CODE: H130**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module will introduce learners to 2D, 3D and Parametric design software and processes. Learners will gain a working knowledge of the software and tools available for component design and the creation of production documentation through hands-on 2D detailing and 3D modelling exercises to generate a comprehensive evidence portfolio.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

COURSEWORK	
C1 (Coursework)	**100%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Manufacturing and Mechatronics Engineering

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

- Students will learn how to produce, interpret and use Engineering standards for production documentation.
- To develop a broad understanding of differing drafting and modelling software in relation to industry.
- To enhance students employability skills through knowledge and application of Design process and Standards.

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

1. Analyse the major features and compare different drawing standards e.g: BS8888 technical product documentation, Geometric product specification, Geometric tolerance specification and Engineering drawings.
2. Apply industry drawing standards to a set of production drawings evidencing key commands and drafting techniques in a 2D system. eg: Layers; Line styles; Construction geometry; Dimensioning strategies.
3. Apply concept, ideas and principles of 3D Parametric modelling to a given design scenario.

DATE OF APPROVAL:	10/2017	**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: **2018-19**	NATIONAL COST CENTRE: **121**

MODULE LEADER: **Ben Bryant**	OTHER MODULE STAFF: **Andy Scott**

SUMMARY of MODULE CONTENT

- Use of 2D drafting systems: Set-up and use eg: Software; hardware; directories; units; dimensioning schemes; international standards; templates; layers; input methods; sharing data.
- Engineering Drawing Standards: International variations eg: BS8888; BSI; DIN; ISO; JIS
- Use of 3D Modelling systems: Set-up and use eg: Software; hardware; Solids; Surfaces; patterns; Smart Geometry; Paths; Assemblies; Tables; Driven geometry.
- Kinematics in 3D assemblies: Set-up; Constraints; fix and float; bearings; CAMs; Belts / chains.

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled Seminars	22	15 weekly classroom sessions with guided learning activities
Scheduled practical classes & workshop	45	15 weekly classroom sessions with guided learning activities
Guided Independent Study	33	Guided practical study sessions
Guided Independent Study	100	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	Report 1 Design Portfolio	50% 50% **Total = 100%**	Report – L.O1 Portfolio - LO2, LO3

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	05/09/2017	Lloyd Heavens	08/09/2017

Recommended Texts and Sources:

- Banach, D. and Jones, T. (n.d.). Autodesk inventor 2017 essentials plus. 1st ed.
- Omura, G. and Benton, B. (n.d.). Mastering AutoCAD 2017 and AutoCAD LT 2017. 1st ed.
- Planchard, D. (n.d.). Solidworks 2016 reference guide. 1st ed.

SECTION A: DEFINITIVE MODULE RECORD.

MODULE CODE:	SOUD2419	**MODULE TITLE:**	Application of CAD/CAM and Finite element analysis.

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 a complete route through design for manufacture, using both 2D non-associative design and Parametric modelling, to output of models for post processing and final realisation onto Computer Controlled production systems. Each stage is supported with hands-on practice and realistic component requirements.

ELEMENTS OF ASSESSMENT *Use HESA KIS definitions]*

COURSEWORK		PRACTICAL	
C1 (Coursework)	**60%**	**P1** (Practical)	**40%**

SUBJECT ASSESSMENT PANEL Group to which module should be linked: FdSc Manufacturing and Mechatronics Engineering

Professional body minimum pass mark requirement: NA

MODULE AIMS:

- To introduce students to the concept of design for manufacture / top down design
- To develop students to knowledge of 3D (Parametric) design software
- Use simulation techniques in relation to Finite Element Analysis and mathematical modelling.
- To introduce students to data exchange, exchange formats, limitations of systems
- To introduce students to NC manufacturing equipment, file formats and on-line modification, NC machine setting and programme validation
- To encourage students to perform validation testing to confirm modelling data.

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

1. Develop a mathematical model to achieve a solution for a design criteria.
2. Using Parametric modelling and FEA analysis software to develop a CAD model and validate FEA solutions for the design criteria and critically analyse the results.
3. Generate the associated documentation, CAM modelling and process data, for a given manufacturing problem.
4. Operate, set and validate your programme data on a machining centre or prototyping facility.
5. Perform validation testing on your manufactured article.

DATE OF APPROVAL:	09/10/2017	**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: 2018/19	**NATIONAL COST CENTRE:** 115

MODULE LEADER: Ben Bryant	**OTHER MODULE STAFF:** Andy Scott

SUMMARY of MODULE CONTENT

- Mathematical modelling techniques and software (eg hand calculations, Excel, SMATH, MathCAD, LabView)
- Direct CAM 2D design software (eg MasterCam), indirect 2D Design software (eg AutoCad), Parametric Design software (e.g. Inventor, Pro-E, Solidworks)
- Top-down design, design optimisation, manufacturing considerations in design
- Design analysis (eg simulation, flow analysis, stress analysis, environmental analysis)
- 2D Data post-processing, 3D data exchange and processing limitations
- NC Machine setting and validation
- Traditional NC machines, non-traditional low volume / high value / prototyping techniques
- Design testing & validation techniques

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled Seminars	22	15 weekly classroom sessions with guided learning activities
Scheduled practical classes & workshop	45	15 weekly classroom sessions with guided learning activities + guided lab sessions
Guided Independent Study	33	Guided practical study sessions
Industrial Trips and Visits	15	Visits to CNC and related discipline industries
Guided Independent Study	85	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	Mathematical Model, CAD/CAM/FEA files, processing data and analyses report.	Total 100%	Portfolio – LO1, LO2, LO3
Practical	P1	Operate, Set & Validate, Validation testing.	Total 100%	Practical – LO4, LO5

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	05/09/2017	Lloyd Heavens	08/09/2017

Recommended Texts and Sources:

- Banach, D. and Jones, T. (n.d.). Autodesk inventor 2017 essentials plus. 1st ed.
- Omura, G. and Benton, B. (n.d.). Mastering AutoCAD 2017 and AutoCAD LT 2017. 1st ed.
- MacMillan, J. (n.d.). Autodesk Fusion 360. 1st ed.
- Planchard, D. (n.d.). Solidworks 2016 reference guide. 1st ed.
- Shih, R. (n.d.). Introduction to finite element analysis using SolidWorks Simulation 2016. 1st ed.

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

MODULE CODE:	SOUD2421	**MODULE TITLE:**	Mechanical Science

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module investigates static and dynamic mechanical systems. Statics will investigate complex systems in 2 and 3 dimensional loading along with performance of loaded beams, columns and pressurised vessels – while dynamics will investigate power transfer mechanisms and rotational motion.
Thermodynamics will investigate steady-state 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 Manufacturing and Mechatronics Engineering

Professional body minimum pass mark requirement: NA

MODULE AIMS:

- To provide students with a working knowledge of analysis techniques used on a range of complex mechanical systems. This knowledge will provide a basis for further study in specialist areas and an understanding of the principles of design used in mechanical systems.

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

1. Critically analyse and provide solutions for a range of complex static, dynamic and power transmission systems.
2. Determine the parameters and provide solutions for a given Thermo-fluid system
3. Demonstrate the ability to solve a range of technical calculations involving a selection of Static, Dynamic, Power transmission and thermo-fluid problems.

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: 2018/19	**NATIONAL COST CENTRE:** 115

MODULE LEADER: Ben Bryant	**OTHER MODULE STAFF:** None

SUMMARY of MODULE CONTENT

- Elastic constants, two and three dimensional loading and strain, Poisson's Ratio
- Loaded beams and columns, bending theories, thin and thick walled pressure vessels
- Single and multi-plane balance, rotational energy storage, angular momentum, coupling losses
- Belt and chain drive parameters, gear train parameters and associated internal / external torques, Coupling parameters and associated clutch power theories (pressure and wear)
- Fluid properties, dynamics of fluids, non-flow energy equations and steady flow energy equations

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

Scheduled Activities	Hours	Comments/Additional Information
Scheduled Seminars	45	15 Weekly classroom sessions with guided learning activities
Scheduled Practical classes & Workshop	22	15 workshop sessions with guided learning activities
Scheduled Tutorials	13	Individual/small group discussion and progress tracking
Technician support labs	20	Laboratory work to support module content
Guided Independent Study	100	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	Total: 100%	LO1, LO2.
Test	T1	In class test	Total: 100%	LO3

Updated by:	**Date:**	**Approved by:**	**Date:**
Ben Bryant	05/09/2017	Lloyd Heavens	08/09/2017

Recommended Texts and Sources:

- Tooley, M. & Dingle, L., (2004). *Higher National Engineering.* 2nd ed. Oxford: Newnes
- Tooley, M. and Dingle, L. (2012). Engineering science. 1st ed. London: Routledge.