PROGRAMME QUALITY HANDBOOK 2023-24

BSc (Hons) Integrated Technologies Engineering

Contents

1. Welcome and Introduction to BSc (Hons) Integrated Technologies.

1.1 Welcome

Welcome to your Programme Quality Handbook (PQH), this PQH is designed to provide you with programme related information both for before and during your studies. In addition to this PQH our UCSD interactive website contains our online Handbook to support you which studying at UCSD. A link is available here https://www.ucsd.ac.uk/student-life/student-handbook. It can also be navigated by going to www.ucsd.ac.uk and searching for student handbook.

This engineering programme has been designed in partnership with employers. Therefore, successful completion of the programme will help you develop the knowledge, skills and behaviours that employers are looking for.

By studying at the UCSD you will be attending an academic institution that has national recognition as a leading provider of higher education.

All the curriculum staff are both academic and engineering sector professionals. Therefore, they can ensure that your experience is both academically challenging and engineering sector relevant.

All the UCSD and wider South Devon College staff are dedicated to ensuring that you receive the support you need to achieve.

Your voice is important, and we pride ourselves on our ability to listen and thus enable you to influence your higher education experience.

We look forward to welcoming you to this engineering programme and ultimately celebrating your potential achievements.

1.2 Programme Management

Role	Person	Email address
Personal Tutor and/or HE Lead	Ben Bryant	benbryant@southdevon.ac.uk
Programme Coordinator	Ben Bryant	benbryant@southdevon.ac.uk

Higher Education Coordinator	Steve Caunter	stevecaunter@southdevon.ac.uk
Curriculum Head	Adrian Bevin	Abevin@southdevon.ac.uk
Assistant Principal	Steve Caunter	stevecaunter@southdevon.ac.uk

1.3 Personal Tutor

Your personal tutor's role is to support your personal and professional development, develop your academic skills, manage student expectations, achieve positive student-staff communications, provide pastoral support and signposting, and monitor your wellbeing. They should be your first port of call for advice and/or direction for further support on academic or pastoral matters.

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.

1.4 Tutoring at UCSD

UCSD's aim is to facilitate and promote positive student engagement in learning, wellbeing, academic success, and progression. This is coordinated through an integrated tutorial model:

1. Personal and pastoral tutoring to monitor students' wellbeing and support their personal development
2. An academic tutoring curriculum to support in the development of academic and employability skills and monitor your academic and professional progress

3. Professional services including the Student Support Hub team, library services, employability, academic standards and quality, and the University of Plymouth Student's Union for students on UoP programmes.

The integrated tutorial model ensures all students have a personal tutor and scheduled weekly group and/or one-to-one Tutorials, and can access professional study skills, wellbeing, disability and employability guidance from the HE Student Support Hub.

Your personal tutor's role is to support your personal and professional development, develop your academic skills, manage student expectations, achieve positive student-staff communications, provide pastoral support and signposting, and monitor your wellbeing. They should be your first port of call for advice and/or direction for further support on academic or pastoral matters. However, your tutor may refer you to members of the Student Support Hub to provide specialist advice and information. See section Student Support Hub below for more information.

The tutorial and personal development curriculum is tailored for your programme including consideration of the size of programme, the hours that you are studying and the level of your programme. Details will be provided by your personal tutor.

1.5 Course Contact List

Details of your modules leaders and how and when they can be contacted are below. You can also view the profile of the teaching team within the curriculum area that your programme is based via this link: Technology | University Centre South Devon (ucsd.ac.uk)

If you have questions about a module, please contact the appropriate module leader.

If you have any questions about the programme or your pastoral needs please contact your personal tutor.

If you have any questions about fees, funding or support from the university please contact university@southdevon.ac.uk

Module Leader	Modules	Contact	If part time days/hours that are worked
Mr Ben Bryant	SOUD3083 Engineering Leadership & Management SOUD3084 Engineering Project Management SOUD3086 Integrating Technologies for Contemporary and Future Engineering Sectors SOUD3087 Individual Engineering Project	benbryant@southdevon.ac.uk	
Mr Matt Prowse	SOUD3085 Professional Development in Engineering	matthewprowse@southdevon.ac.uk	

1.6 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 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 activities and reading

John Bird’s Basic Engineering Mathematics

Bird, J. (2021) - Bird’s Basic Engineering Mathematics, ISBN-10: 0367643677

Bird, J. (2015) - Science for Engineering, ISBN-10: 113882688X

Casio FX-991EX Calculator

1.7 Curriculum design principles

Programme Rationale (summary)

The design of this programme has been influenced by input from the following stakeholders:

Identified Stakeholders:

- South West LEP
- Torbay Development Agency & Torbay Council
- Pearson Edexcel
- EAL & City and Guilds, Development knowledge and T-Levels
- Industry Sector, (employer network and wider sector business).
- Progressing L3 Students
- University of Plymouth
- PSRB's
- South West Institute of Technology (SWIoT)

Current Degree Apprenticeship standards released in this sector show that learners should be evidencing knowledge in Materials, Manufacturing, CAD/CAE, Practical, Analytical, Business, Management, Lean and Problem-solving skills and demonstrate professional practice. These key elements are embedded within this programme.

Students on BSc programmes will develop skills in adopting a systems approach to multidiscipline issues and, through extensive practical and group work, will understand how to apply core knowledge to more advanced and complex industrial challenges how these can be solved. Students will explore and experience the entire lifecycle of an engineering product – from concept and design to material selection, project managing and development strategies.

This engineering programme is aimed at aspiring Engineers who have completed any of the FdSc Engineering programmes.

This programme provides the essential underpinning mathematical, scientific, and sustainable knowledge and understanding required by aspiring Engineers and industries wishing to up-skill their existing workforce.

Context

The degree programme 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 industrial sectors. The Section has strong links with a range of employers and continuing employer liaison will be possible throughout the programme.

Content

The programme has a strong practical focus, providing ample opportunity for knowledge gained to be strengthened with practical activity based around the ample engineering laboratory equipment.

There are five FdSc engineering programmes that can be topped up to a BSc (Hons). At Level 6, all students will study core engineering modules that will further develop their engineering leadership, project management and professional knowledge, skills and behaviours.

1.8 Teaching and Learning Strategy

In 2017, UCSD was awarded ‘Gold’, the highest level possible, by the Teaching Excellence Framework, which recognises outstanding teaching within our university-level curriculum.

Lectures, seminars, tutorials, practical's, guest speakers and workplace visits will be designed to facilitate students understanding and application of the causality of engineering theory and practice. Students will be supported in their studies with a personal tutor programme and access to the Higher Education study support services provided by the University Centre South Devon.

Formative learning, draft and summative assessments and feedback will support students to achieve the programme and module outcomes. In accordance with the College Teaching and Learning framework, informal assessment and feedback will also be used within all scheduled teaching and learning activities. Students will be encouraged to provide regular feedback on their learning experience using both informal and College wide planned feedback mechanisms.

Students will be supported at all stages of their studies to connect and engage with local companies and thus remain focused on developing the knowledge, understanding and skill that will support employability.

There are two proposed modes of delivery for this programme, full and part-time delivery. Regardless of the mode of study, all students will have a personal tutor with scheduled and additional time available for tutorial support.

Modes of delivery will include

Scheduled Activities	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	Lectures will be used to introduce the key concepts and issues using interactive teaching and learning methods. Dedicated lectures are also used to brief students on the two assignments.
Seminars	Seminars will be used to provide the opportunity for students to engage in deeper discussion and exploration of a particular topic following a lecture
Tutorials	Dedicated tutorials are used for workshops on the assignments, including the provision of formative feedback.
Laboratory Work	To develop practical skill, students will take part in laboratory sessions. The laboratory they use will depend on the programme that they are studying.

Guided independent study	Students are provided with a comprehensive reading list and other resources via the VLE to support independent learning

Students can access their timetables on OnTrack and SDConnect. Notification of amendments will be issued via Moodle/email/MS Teams.

1.9 Research and employment-informed teaching and learning

UCSD supports academic teaching staff to develop their subject knowledge, professional practice and keep currency in their academic field through investment in continuous professional development through a variety of mechanisms.

Professional Development

The engineering staff are members of various professional institutions. Regular institution magazines enable staff to maintain currency awareness of engineering sector developments.

Most of the engineering staff accessed the Torbay Hi-Tech Cluster Research and Innovation Conference that we hosted. At this conference the degree students were able to present poster presentations. This conference engineering degree students and local employers to meet each other and develop connections that ultimately can lead to employment.

Local businesses have provided technical advice and guidance to help support students during their research projects. This improved both the staff and students understanding of real world applications and solutions.

Research and Scholarly Activity

Some of the Engineering academic are external examiners for other Universities. This then helps them inform content and structure of our degree programmes.

Two of the engineering academic staff are completing their doctorate degrees. Consequently, they are actively involved in developing their own subject knowledge, synthesis and critical thinking skills. As part of their research they publish articles and have presented at an International level.

Industry Liaison and Engagement

The Engineering Section have dedicated staff who visit our partner employers on a regular basis. This ensures that students studying as higher or degree apprentices get regular workplace support. In addition staff discuss with employers how the apprentices studies are developing and how we can improve the programme.

The College have a Business Solutions section. They regularly organise employer engagement events, including the Apprenticeships Award Ceremony. These events help both employers and the UCSD discuss and understand the strategic needs of local employer's needs. This is further supported by Business Solutions staff who act as a single point of contact for the businesses and can thus capture their specific training needs. The Engineering Section has two Skills Development Managers. They are specialists at working in partnership with local employers and developing new programmes, courses and modules. All of these various events and staff ensure that the students receive training that is aligned with what the employers are looking for.

1.10 Resources to support outstanding teaching and learning

UCSD provides a wide range of specific resources available to students. It is the intention that these resources help developed students' academic ability through a high-quality experience. Students will also benefit from the development of graduate and employability skills, so they are able to succeed in and beyond higher education. The University Centre campus resources include dedicated HE teaching spaces in the UCSD building, a campus wide wireless network, free access to Microsoft 365 whilst enrolled on your programme and a library with over 25,000 books, newspapers, magazines and eBooks and e-journals, such as the SAGE premier collection. Within your module guides you will be provided with a reading list that you will be able to undertake additional and further reading to support your learning.

Your programme has access to…

The new and innovative £17 million Hi Tech & Digital Centre provides a visionary facility for higher education, towards ever-expanding hi tech, manufacturing, digital and creative sectors across Torbay, South Devon and wider regions. Many of your teaching will take place in the Hi Tech and Digital Centre which has specialist facilities including:

- Manufacturing, 3D printing and precision machining workshops.
- Materials testing suite.

- Programming logical controls (PLC) and electrical suite.
- Computer-aided design (CAD) suite.
- Kao/Hockham Electronic and Photonics Training Suite.

You will have access to the South Devon Marine Academy facilities which include:

- Composites and traditional boat building workshops with CNC routing and laser capability.
- Marine engineering workshops including hydrid engine technology
- Design software suite including Maxsurf, AutoCad, Inventor
- A range of training vessels for practical on the water training
- 2 x Fully Autonomous Unmanned Surface Vessels (USV) including REAV-16 'USV Dart' - Dynautics prototype; complete with two (2) Torqeedo outboards and two (2) Torqeedo 915Wh propulsion batteries, a Dynautics Spectre autopilot complete with and Remote Control Workstation (RCW) Licence, UHF model, RF handset, batteries and chargers. REAV-10 'USV Exe'; 1m x 0.7m USV with four (4) Blue Robotics T200 thrusters with a novel propulsion system using vectored thrust to manoeuvre the craft, a Dynautics Spectre autopilot complete with a Remote Control Workstation (RCW) licence, UHF modem, RF handset, batteries and chargers, etc.

1.11 Knowledge, skills and behaviours developed on the programme

Knowledge, skills and behaviours are the backbone of any apprenticeship occupational standard https://www.instituteforapprenticeships.org/developing-new-apprenticeships/developing-occupational-standards/ They set out the competencies a student needs to demonstrate to be awarded their technical qualification and apprenticeship standard.

- **Knowledge** - the information, technical detail, and 'know-how' that someone needs to have and understand to successfully carry out the duties. Some knowledge will be occupation-specific, whereas some may be more generic.
- **Skills** - the practical application of knowledge needed to successfully undertake the duties. They are learnt through on- and/or off-the-job training or experience.
- **Behaviours** - mindsets, attitudes or approaches needed for competence. Whilst these can be innate or instinctive, they can also be learnt. Behaviours tend to be very transferable. They may be more similar across occupations than knowledge and skills. For example, team worker, adaptable and professional.

Manufacturing engineer (degree) / Institute for Apprenticeships and Technical Education

Product design and development engineer (degree) / Institute for Apprenticeships and Technical Education

Control technical support engineer / Institute for Apprenticeships and Technical Education

Electrical or electronic technical support engineer (degree) / Institute for Apprenticeships and Technical Education

Knowledge, skills and behaviour mapping to modules

	Manufacturing engineer (degree) / Institute for Apprenticeships and Technical Education	Tutorial	On the job	SOUD3083	SOUD3084	SOUD3085	SOUD3086	SOUD3087	Total modules for each KSB
Knowledge									
K1	Mathematics and science for engineers								2
K2	Materials and manufacture								1
K3	3D Computer Aided Design and Computer Aided Engineering								2
K4	How to run and manage business led projects								3
K5	Engineering operations and business management								1
K6	Manufacturing processes								2
K7	Product improvement and engineering project management								2
Skills									
S1	Comply with statutory and organisational safety requirements and demonstrate a responsible and disciplined approach to risk mitigation, avoidance and management.								3
S2	Undertake project management and schedule of engineering activities								3
S3	Secure and manage appropriate resources								3
S4	Manage budgets								3
S5	Implement engineering processes								2
S6	Monitor and evaluate engineering processes								2
Behaviours									
B1	***Safety mindset:*** This occupation sits within an industry with a high level of safety critical activities. There has to be strict compliance and a disciplined and responsible approach to manage, mitigate and avoid risk.								5
B2	***Strong work ethic:*** Positive attitude, motivated by engineering; dependable, ethical, responsible and reliable.								5
B3	***Logical approach:*** Able to structure a plan and develop activities following a logical thought process, but also able to quickly “think on feet” when working through them.								5
B4	***Problem solving orientation***: Identifies issues quickly, enjoys solving complex problems and applies appropriate solutions. Has a strong desire to push to ensure the true root cause of any problem is found and a solution identified which prevents further recurrence**.**								5
B5	***Quality focus:*** Follows rules, procedures and principles in ensuring work completed is fit for purpose and pays attention to detail / error checks throughout activities.								5
B6	***Personal responsibility and resilience***: Motivated to succeed accountable and persistent to complete task.								5

	Manufacturing engineer (degree) / Institute for Apprenticeships and Technical Education	Tutorial	On the job	SOUD3083	SOUD3084	SOUD3085	SOUD3086	SOUD3087	Total modules for each KSB
B7	***Clear communicator:*** Use a variety of appropriate communication methods to give/receive information accurately, and in a timely and positive manner.								5
B8	***Team player:*** Not only plays own part but able to work and communicate clearly and effectively within a team and interacts/ helps others when required. In doing so applies these skills in a respectful professional manner**.**								5
B9	***Applies Lean Manufacturing Principles***: Continuous improvement in driving effectiveness and efficiency								5
B10	***Adaptability*****:** Able to adjust to different conditions, technologies, situations and environments.								5
B11	***Self-Motivation:*** A 'self-starter', who always wants to give their best, sets themselves challenging targets, can make their own decisions.								5
B12	***Willingness to learn*****:** wants to drive their continuous professional development								5
B13	***Commitment:*** Able to commit to the beliefs, goals and standards of their own employer and to the wider industry and its professional standards.								5
	Total KSBs in each module			4	5	4	17	4	

	Product design and development engineer (degree) / Institute for Apprenticeships and Technical Education	Tutorial	On the job	SOUD3083	SOUD3084	SOUD3085	SOUD3086	SOUD3087	Total modules for each KSB
Knowledge									
K1	Mathematics and science for engineers								2
K2	Materials and manufacture								1
K3	Mechanical. electrical and electronic principles and applications								2
K4	Statics and dynamics								3
K5	How to run and manage business led projects								1
K6	Engineering operations and business management								2
K7	Applying advanced technology techniques								2
Skills									
S1	Comply with statutory and organisational safety requirements and demonstrate a responsible and disciplined approach to risk mitigation, avoidance and management.								3
S2	Effectively use, interpret and evaluate a range of engineering data sources and documentation								3
S3	Organise work efficiently and effectively by managing engineering resources when completing tasks								3
S4	Use computer software packages to assist with engineering activities								3
S5	Carry out Project Management activities								2
S6	Establish design briefs, presenting and discussing technical proposals								2
S7	Manage and control product design changes								
S8	Support team feasibility design reviews								
S9	Demonstrate technical and commercial management by planning and managing tasks & resources								
Behaviours									
B1	***Safety mindset:*** This occupation sits within an industry with a high level of safety critical activities. There has to be strict compliance and a disciplined and responsible approach to manage, mitigate and avoid risk.								5
B2	***Strong work ethic:*** Positive attitude, motivated by engineering; dependable, ethical, responsible and reliable.								5
B3	***Logical approach:*** Able to structure a plan and develop activities following a logical thought process, but also able to quickly “think on feet” when working through them.								5
B4	***Problem solving orientation***: Identifies issues quickly, enjoys solving complex problems and applies appropriate solutions. Has a strong desire to push to ensure the true root cause of any problem is found and a solution identified which prevents further recurrence**.**								5
B5	***Quality focus:*** Follows rules, procedures and principles in ensuring work completed is fit for purpose and pays attention to detail / error checks throughout activities.								5

	Product design and development engineer (degree) / Institute for Apprenticeships and Technical Education	Tutorial	On the job	SOUD3083	SOUD3084	SOUD3085	SOUD3086	SOUD3087	Total modules for each KSB
B6	***Personal responsibility and resilience***: Motivated to succeed accountable and persistent to complete task.								5
B7	***Clear communicator:*** Use a variety of appropriate communication methods to give/receive information accurately, and in a timely and positive manner.								5
B8	***Team player:*** Not only plays own part but able to work and communicate clearly and effectively within a team and interacts/ helps others when required. In doing so applies these skills in a respectful professional manner**.**								5
B9	***Applies Lean Manufacturing Principles***: Continuous improvement in driving effectiveness and efficiency								5
B10	***Adaptability*****:** Able to adjust to different conditions, technologies, situations and environments.								5
B11	***Self-Motivation:*** A 'self-starter', who always wants to give their best, sets themselves challenging targets, can make their own decisions.								5
B12	***Willingness to learn*****:** wants to drive their continuous professional development								5
B13	***Commitment:*** Able to commit to the beliefs, goals and standards of their own employer and to the wider industry and its professional standards.								5
	Total KSBs in each module			4	5	4	17	4	

	Electrical or electronic technical support engineer (degree) / Institute for Apprenticeships and Technical Education	Tutorial	On the job	SOUD3083	SOUD3084	SOUD3085	SOUD3086	SOUD3087	Total modules for each KSB
Knowledge									
K1	Mathematics and science for engineers								2
K2	Materials and manufacture								1
K3	3D Computer Aided Design and Computer Aided Engineering								2
K4	How to run and manage business led projects								3
K5	Understanding actuators and sensors								1
K6	Electrical and electronic principles and electronic devices and applications								2
K7	Product improvement and engineering project management								2
K8	Digital electronics and microprocessors								
Skills									
S1	Comply with statutory and organisational safety requirements and demonstrate a responsible and disciplined approach to risk mitigation, avoidance and management.								3
S2	Undertake project management and schedule of engineering activities								3
S3	Secure and manage appropriate resources								3
S4	Manage budgets								3
S5	Implement engineering processes								2
S6	Monitor and evaluate engineering processes								2
Behaviours									
B1	***Safety mindset:*** This occupation sits within an industry with a high level of safety critical activities. There has to be strict compliance and a disciplined and responsible approach to manage, mitigate and avoid risk.								5
B2	***Strong work ethic:*** Positive attitude, motivated by engineering; dependable, ethical, responsible and reliable.								5
B3	***Logical approach:*** Able to structure a plan and develop activities following a logical thought process, but also able to quickly “think on feet” when working through them.								5
B4	***Problem solving orientation***: Identifies issues quickly, enjoys solving complex problems and applies appropriate solutions. Has a strong desire to push to ensure the true root cause of any problem is found and a solution identified which prevents further recurrence**.**								5
B5	***Quality focus:*** Follows rules, procedures and principles in ensuring work completed is fit for purpose and pays attention to detail / error checks throughout activities.								5
B6	***Personal responsibility and resilience***: Motivated to succeed accountable and persistent to complete task.								5
B7	***Clear communicator:*** Use a variety of appropriate communication methods to give/receive information accurately, and in a timely and positive manner.								5

	Electrical or electronic technical support engineer (degree) / Institute for Apprenticeships and Technical Education	Tutorial	On the job	SOUD3083	SOUD3084	SOUD3085	SOUD3086	SOUD3087	Total modules for each KSB
B8	***Team player:*** Not only plays own part but able to work and communicate clearly and effectively within a team and interacts/ helps others when required. In doing so applies these skills in a respectful professional manner**.**								5
B9	***Applies Lean Manufacturing Principles***: Continuous improvement in driving effectiveness and efficiency								5
B10	***Adaptability*****:** Able to adjust to different conditions, technologies, situations and environments.								5
B11	***Self-Motivation:*** A 'self-starter', who always wants to give their best, sets themselves challenging targets, can make their own decisions.								5
B12	***Willingness to learn*****:** wants to drive their continuous professional development								5
B13	***Commitment:*** Able to commit to the beliefs, goals and standards of their own employer and to the wider industry and its professional standards.								5
	Total KSBs in each module			4	5	4	17	4	

1.12 Assessment and feedback strategy

Assessment of your learning is an essential part of attaining your qualification. Your assessments will be design in accordance with the UCSD Assessment Policy https://www.ucsd.ac.uk/student-life/essential-information/academic-regulations-and-procedures-and-policies/ and the assessment guidance on the UCSD website https://www.ucsd.ac.uk/student-life/support/assessment-guidance/

Your module leaders will support you to develop the skills to succeed in your assessments. But you can also use the self-directed guidance on https://www.ucsd.ac.uk/student-life/support/assessment-guidance/ and receive one-to-one support from the HE Study team by contacting HEstudy@southdevon.ac.uk

Your assessment timetable will be available on Moodle at the start of your course. There are broadly three types of assessment and feedback at UCSD:

- **Formative assessment and feedback** opportunities are embedded into module teaching and assessment for learning. This means your teachers will be continuously assessing you progress and learning towards the modules learning outcomes and giving you verbal feedback, for example in answers to questions, and in response to group activities and your assessment plans.
- **Draft assessment and feedback** are a set time within your module when you can submit a draft version of your assessment for formal feedback. The feedback could be verbal and/or written feedback.
- **Summative assessment and feedback** are the final stages of the assessment cycle. You will formally submit your final assessment task, and receive summative developmental feedback and a grade for the task within 20-working-days.

Assessments are design to enable students to meet the learning outcomes of modules. Assessment of learning outcomes is guided by the University of Plymouth and UCSD assessment policies and affords students the opportunity to undertake a range of different summative tasks including written reports, practical activity and facilitation of workshops, design of promotional material, critical reviews, presentations, tests, literature reviews and research reports throughout their programme of study. All modules require an overall pass mark of 40%. Assessment briefs are published as part

of the module guides ahead of the commencement of module teaching. Each assessment brief outlines how students can meet the learning outcomes through the assessment task, including a breakdown of what is expected, the marking criteria for the assessment task and the generic grading criteria.

There is a diverse mix of assessment methods which ensure that specific students are not disadvantaged by specific forms of assessment, varying assessment activities has also helped develop a broader range of personal and employability skills. Student engagement is improved by using real life contexts in assessments which include case studies and/or linking to local industry to solve a problem. Staff will provide exemplar assessments, where appropriate, that allow students to visualise what the task is and independently or under direction to practise equivalent assessment tasks in advance of 'the real thing' and/or utilise these as formative tasks and discuss openly in taught sessions.

A range of formative learning activities are included throughout the learning materials to enable students to assess their progress, areas of strength and further development needs. Draft submissions and tutorials are planned into the scheme of learning to discuss assessments in a full and detailed approach. Students typically receive written feedback on their draft submission, verbal feedback during their draft tutorial, and generic feedback of common themes identified during the draft tutorial period.

Summative coursework submissions are via Turnitin. This allows students the opportunity to submit their assessment and receive similarity report feedback, thereby enabling them to develop the integrity of their academic writing for final summative submission. Students are offered a range of practical assessment modes, potentially including the development of promotional materials and workshop resources. Practical assessments are marked in the moment, but a Turnitin submission of a reference list or presentation slides enables all feedback to be given via Turnitin for a consistent assessment feedback experience.

A variety of assessment types will be utilised in both formative learning and summative assessments. Graduates are expected to have interpersonal, leadership, and analytical skills, alongside basic business acumen, problem-solving ability, and a depth of specific subject knowledge and practical experience.

The range of formative learning and summative assessment methods to be used will address the needs of students, employers, professional bodies, and progression programmes. Actual assessment methods will vary by module content and purpose but are designed to cover the stated needs above.

All assessment briefs are internally moderated and available to External Examiners before they are distributed to students, and all assessment marking is internally moderated in line with the UCSD policy before summative feedback is released to students. The annual programme monitoring alongside early/end of module reviews allow staff to monitor the success of assessment type against learning outcomes. Student involvement in programme and assessment reviews, helps monitor inclusive practice. Assessment audits enable the team to carry out and share good practice. All assessments will be subject to a rigorous moderation process both internally, and where required by University regulations, externally. Assessments will be reviewed annually through Cluster Programme Meetings with input from students via module reviews and programme level student data.

1.13 Student engagement in ongoing programme development

UCSD sees students as partners in their academic process, we actively seek and respond to your feedback at several points within the year. You and your course peers will elect a Student Representative to represent your views at Student Consultative Forum three times a year. The Lead Student Rep, elected by the whole UCSD student body, chairs the Student Consultative Forum and works with the UCSD leadership team to act on student feedback. Additionally, a Higher Education Student Governor is nominated from the student body to represent your views in South Devon College's governance structures. Students are also asked to give early and end of module review feedback to improve module delivery, and surveys about their student satisfaction once a year. In addition, students can always discuss any concerns or areas of good practice with their personal tutor.

Below, we outline the recent feedback that has been received from students and how we have developed the programme in response to that feedback.

You said:	We did:
Provide dedicated time to access specialist engineering equipment.	Access to specialist engineering equipment is allocated at dedicated time slots.
Mix with other engineering discipline students to get a broader perspective during discussions sessions.	The eight Engineering degree programmes were re-designed and have shared modules allowing students from different disciplines to engage with each other.
Better organisation and use of Microsoft Teams.	Programmes have their own Teams that allows easy access to content, lectures and group chat.

1.14 Student Support Hub

The University Centre South Devon (UCSD) is committed to an ethos of equality and inclusivity. How we will support you is set out in the Student Development Policy, available on the UCSD website https://www.ucsd.ac.uk/student-life/essential-information/academic-regulations-and-procedures-and-policies/ By becoming a UCSD student you enter a partnership with us, committing yourself to positively engaging and actively taking part in scheduled learning activities, self-directed learning and alerting your teaching team and/or the Student Support Hub to any additional needs you have. In return we commit to support you to achieve your potential. This relationship is set out in our Student Charter https://www.ucsd.ac.uk/student-life/essential-information/academic-regulations-and-procedures-and-policies/

The UCSD Student Support Hub https://www.ucsd.ac.uk/student-life/support/ is based on the ground floor of the University Centre. Many students think that the Support Hub is only for when they have exhausted all other avenues of support. But we encourage you to seek us out as soon as you think that you are struggling, because it is much easier to solve issues when they emerge. Also, students may feel that they are expected or should be able to manage any difficulty, but we are here to help and can support you to make the right

decisions for you and your studies. Therefore, all students are encouraged to contact the Hub team early in their student journey, the service is available year-round except for closure days (normally around Christmas), so that you can be supported to thrive:

HE Study Team

The HE Study Team's role is to support you to develop your study and academic skills. You may have just progressed from a Level 3 course such as A' Levels, Access to HE, BTEC, or a Level 3 Diploma, or not have studied for many years, but everyone will find the step up to Higher Education learning a challenge, we are here to support everyone. The team can support you to enjoy and make the most of your academic studies, that includes students who are doing well and want to do better, and those for whom learning is more challenging. There is a wealth of resources on the UCSD website https://www.ucsd.ac.uk/student-life/support/study-skills/ and you can book one-to-one sessions by emailing HEstudy@southdevon.ac.uk sessions can be held face to face or on MS Teams.

HE Disability Team

If you have a disability or difficulty, whether that is physical, sensory, mental health or a learning difficulty, you can receive the support and assistance you need to study. If you are unsure whether your needs would be categorised as a disability or difficulty we are happy to have a chat. Our team will assist and guide you from the initial enquiry, through the application and assessment process, and signpost you to additional resources and services where required. Please contact HEdisability@southdevon.ac.uk How you are paying for the course will impact on the support available and how you apply for it, for more information please visit https://www.ucsd.ac.uk/student-life/support/disability-support

HE Wellbeing Team

The Wellbeing team can provide support to students experiencing wellbeing challenges that impact on their studies we understand that studies can face many difficulties so, don't be afraid to speak to us. The team offers urgent and regular support to help you adjust to and manage student life, stay positive and motivated, encourage you to continue with your studies, and manage the unexpected. Students who have mental health difficulties can apply for disability support to provide regular and specialist support. For more information see https://www.ucsd.ac.uk/student-life/support/wellbeing-support/ or contact

HEwellbeing@southdevon.ac.uk

HE Employability

The Employability team are available to support you as your career plans develop. They support you to search for placement opportunities and help you to find appropriate work while you are studying. You can discuss your ideas, gain support researching opportunities, have feedback on your CV, personal statement or job application, and practice your interview skills. For more information see https://www.ucsd.ac.uk/employability-and-next-steps/ or contact HEemploy@southdevon.ac.uk

Before you start your programme, you should engage with the online resources on our website https://www.ucsd.ac.uk/stepping-up-to-higher-education/ and attend the workshops held by the HE Study team as these provide a detailed and useful introduction to your new academic life. There will also be a course induction by the programme team a week before teaching starts.

UCSD encourages all students to actively engage with their tutor and the HE Student Support Hub to access study skills, wellbeing, disability, and employability support throughout their studies. Make the most of the support available to you, so that you can gain the best degree.

1.15 Becoming a South Devon Graduate

You have enrolled to undertake a qualification about a specific subject, but alongside this UCSD is committed to supporting you to secure higher-level academic knowledge and skills, possess positive personal attributes for your future, and be work-ready with professional knowledge, skills and behaviours. This is known as educational gain – everything you will develop alongside your academic qualification towards becoming a South Devon Graduate. To find out more, visit https://www.ucsd.ac.uk/south-devon-graduate/

Higher-level academic skills

Alongside excellent programme design, and outstanding teaching, learning and assessment on your course, tutors will help you to identify and address any gaps in your academic knowledge, skills and behaviours. This starts before your course begins with preparation activities online and in-person to help you develop foundational academic skills, the tutorial curriculum then scaffolds new and developing knowledge and skills with your peers throughout your course, and you can access one-to-one support from the UCSD Student Support Hub.

At Level 6 you will progress to higher level critical thinking skills associated with analysis, evaluation and application to a professional context. In particular the Engineering Project module will provide the opportunity for you to improve these skills.

Positive personal attributes for your future

South Devon Graduates have positive personal attributes, qualities and characteristics that mean they are confident, resilient and act with integrity. We nurture these attributes through our Ready, Respect and Safe agenda. Students are ready to learn with group and one-to-one support for academic skills, disability and wellbeing. UCSD and our students are encouraged to respect and care for themselves, others and the environment though initiatives related to equality and diversity, sustainability, academic integrity, and behaviour and conduct. Student and staff keep themselves and each other safe through pastoral support, knowledge of safeguarding and Prevent, online safety activities, and opportunities to report misconduct and bullying.

As an engineering student you will be studying alongside students across five engineering degree programmes. This diversity of background and experience will enable you develop your capacity to build professional relationships and networks.

Work-ready

Your teaching team have designed a course to give you the knowledge and skills for a career in your chosen field. Beyond this you will become work-ready though work-based learning, placement activities and assessments that reflect the real world of work, a tutorial

curriculum that inspires you to reflect on your growing employability and record them in your Personal Development Plan (PDP), and enrichment activities arranged by your programme team or the wider University Centre, such as Research Showcase.

Throughout your studies at UCSD you will be working toward these academic, personal and work-ready knowledge, skills and behaviours making you a South Devon Graduate.

The engineering degree programmes attract students from a wide variety of backgrounds. Many students will be studying as part of a higher or degree apprenticeship. Therefore, by studying alongside each other you will improve your work-ready skills. The teaching team have all worked in the engineering sector and they will teach you how to conduct yourself as an engineer in a professional sector.

1.16 Preparation for employment and further academic study

Preparation for employment and personal development are central to the programme. It is delivered as part of the module teaching and assessment, weekly tutorial, employability and enrichment activities, and UCSD opportunities. As much as practicable, these activities will be organised to enable students to work with students from across the University Centre, widening their social and professional network, and fostering a sense of belonging to UCSD and the University of Plymouth.

Module teaching and assessments contextualise professional, personal and employability development throughout the schemes of learning. The Engineering project with integrated research skills module with work-related research will enable students to work with local employers on real-life research projects, enabling them to focus their experimental design on a particular area of interest and use to an organisation. Students studying this programme as a full-time or stand-alone qualification will benefit from the links made with apprenticeship students.

The employability of graduates is a significant driving force in the design of this programme cluster. Modules will develop skills in areas that employers have identified, as necessary. Strong partnerships with employers will also provide visits and guest lectures to advance the student experience.

Students utilising this programme as the technical qualification for a Higher Apprenticeship Standard or as the technical qualification in the Degree Apprenticeship Standard will benefit from a dedicated industry mentor to help develop the skills set out as essential by the employers in the working groups. It is also hoped that the programme has been designed robustly enough to ensure it can be used as a gateway or APL (Accreditation of Prior Learning) qualification for the Degree Apprenticeship standard once these are in place.

Work-based learning (WBL) and engagement with employers is central to the programme concept, and this is supported through sector focus groups, information leaflets and guidance. Engagement with employers will allow students to manage any work commitments alongside learning. This ongoing relationship with the industry supports the knowledge and consideration of student workloads regarding the assessment calendar. This will allow students who are already in a professional placement to consolidate and further develop essential skills whilst supporting others to achieve these practice-based skills on a Work-Based Learning basis in preparation for employment.

Students studying this programme as the technical qualification tied to the Higher Apprenticeship in Advanced Manufacturing Engineering benefit from support from in-work mentors and dedicated workplace training officers who can help ensure consolidation and skills development.

Weekly tutorials take place following the UCSD Tutorial Curriculum for students, with a focus on academic skills, personal development and employability. All students have a personal tutor who leads weekly tutorials, supports the pastoral and academic development of students one-to-one, and facilitates employability and enrichment opportunities. The personal tutor and teaching team will deliver a package of employability and enrichment activities for students. This may include exchange visits to different students' workplace settings; guest speakers; local, national and/or international visits to explore module and/or employability relevant sites; research dissemination opportunities; vocational training courses, e.g. workshop and laboratory skills, CAD technical certificates, electronics training; and acting as an advocate for the programme at open events, with employers or with students on other levels of study. As much as possible these activities will be co-ordinated to enable students to work with their peers from other UCSD or UoP courses.

UCSD also organises a range of professional development and employability opportunities that students can engage in. These include CV writing or personal statement writing workshops or one-to-one support; advance academic skills support; contributing to UCSD as a Student Rep or Ambassador; support with wellbeing or disabilities needs; and exploration of local and national employment and study opportunities.

Students who complete the BSc (Hons) Integrated Technologies Engineering may apply to progress to studying a Masters level engineering programme at the University of Plymouth.

Transferring between programmes can only be explored if the student has completed the correct sequence of modules, otherwise transferring may require modules to be undertaken at a lower or equal level.

1.17 UCSD Enterprise and Employability Framework Mapping

The UCSD Enterprise and Employability Framework sets out employability criteria that every UCSD graduate should achieve. Evidence here activity within the programme, or signpost to further support, that matches each of the criteria:

FHEQ level: 6						
Employability Criteria	**Definition**	**Programme Aims and Intended LOs**	**Module Aims and LOs**	**Assessment**	**Extra activity (i.e. trips)**	**Other UCSD areas of activity**
Job-specific skills	Students demonstrate the specialist and technical knowledge and skills needed by employers (in the sector) locally and nationally.	PA: 1, 2, 3 PILOs: 2.8.3, 2.8.5	SOUD3087 LOs: 1, 2, 3, 4	SOUD3087 Viva-voce Report	Student trip to local and national employers related to modules.	UCSD HE Study Skills support

General skills (aka. Transferable skills, 'soft' skills)	Students demonstrate the general knowledge, behaviours, and skills needed by every employer and workplace.	PA: 4, 5 PILOs: 2.8.3	SOUD3084 LOs: 1, 2, 3, 4	SOUD3084 Essay, Presentation	Employer based projects and briefs, liaising with employers and customers	Engagement in UCSD Student Voice activities
Digital skills	Students demonstrate the essential digital knowledge, behaviours, and skills needed by employers.	PA: 1, 2, 3 PILOs: 2.8.1, 2.8.2	SOUD3086 LO: 1, 2, 3, 4	SOUD3086 Poster Practical	Student trip to local and national employers related to modules.	Accessing SDC VLE, LRC etc Email and Teams
Practice and Experience	Students apply their knowledge and skills to specific career-relevant situations, and within career-relevant contexts.	PA: 2, 3, 5 PILO: 2.8.5	SOUD3086 LO: 1, 2, 3, 4 SOUD3087 LO: 1, 2, 3, 4	SOUD3086 Poster Practical SOUD3087 Viva-voce Report	Student trip to local and national employers related to modules.	SDC & UCSD Career Events
Careers Guidance	Students explore their knowledge, skills, and behaviours, in terms of their future, employment, and chosen career areas.	PA: 4, 5 PILO: 2.8.4	SOUD3085 LOs: 1,2, 3, 4, 5	SOUD3085 Portfolio Interview	Guest speakers from module related employer base	UCSD Employability Support Personal Tutor Support

Enterprise	Students create ideas, set within practical situations, which lead to cultural, social or economic value. This can, but does not have to, lead to venture creation.	PA: 2, 3, 5 PILO: 2.8.2, 2.8.4	SOUD3084 LOs: 1, 2, 3, 4 SOUD3085 LO: 1, 2, 3, 4, 5	SOUD3084 Report, Presentation SOUD3085 Portfolio Interview	Employer based projects and briefs, liaising with employers and customers	
Personal Development	Students reflect on their identities, qualities, and values to better understand themselves, from which to make informed choices about future employment.	PA: 4 PILO: 2.8.3	SOUD3085 LOs: 1, 2, 3, 4, 5	SOUD3085 Portfolio Interview	Personal tutorial programme	UCSD HE Study Skills Support Personal Tutor support
Professional Behaviours	Students display the professional behaviours required of best practice and suitable for general employment.	PA: 4, 5 PILO: 2.8.3, 2.8.4	SOUD3083 LOs: 2, 3, 4	SOUD3083 Report Presentation	Encouraged throughout the programme and module delivery	Engagement with Personal Tutor and Programme Staff
Networking	Students have opportunities to grow and utilise personal	PA: 5	SOUD3087	SOUD3087		

	networks of support for a wide range of career- and industry-related activities.	PILO: 2.8.3, 2.8.4	LO: 1, 2, 3, 4, 5	Viva-voce Report	Student trip to local and national employers related to modules.	Linkedin
Further information: Employability is a vital part of the learning journey of all UCSD students and is integrated throughout the programme at. As detailed in the UCSD Enterprise and Employability Framework, UCSD students develop their employability across nine criteria.						

1.18 Regulations, Policy and Procedures

This is not a definitive list, the UCSD Student Handbook can provide more information https://www.ucsd.ac.uk/student-life/student-handbook/

Policy/Procedure/Regulation	Provision	Comments
Regulations	Regulations for both UCSD and UoP can be found here	
Terms and Conditions	UCSD	
Fee Policy	UCSD	
Admission Policy	UCSD	
Academic Complaints Policy	UCSD	
Service Complaints Policy	UCSD	
Code of Conduct and Disciplinary Policy	UCSD	
Fitness to Study/Study and Wellbeing Review Policy	UCSD	
Academic Offences Policy	Policy for both UCSD and UoP can be found here	Depending on the awarding body
Extenuating Circumstances Policy	UCSD	
Academic Appeals	Regulations for both UCSD and UoP can be found here	Depending on the awarding body
Assessment Policy	UCSD	

2. Programme Specification

2.1 BSc (Hons) Integrated Technologies Engineering Programme

Final award titles:

BSc (Hons) Integrated Technologies Engineering

UCAS code: H110

HECOS codes: 100184

2.2 Awarding Institution: University of Plymouth

Teaching institution(s): University Centre South Devon - South Devon College

2.3 Accrediting body:

This programme exists as a level-6 only Top-Up award. It is unlikely that the programme itself will be accredited due to existing as a single stage of study. However, to assist graduates with their professional development, the Programme Intended Learning Outcomes (section 8) for this programme have been illustratively mapped against the Incorporated Engineering (IEng) expectations from the UK Engineering Council's '*The Accreditation of Higher Education Programmes, UK Standard for Professional Engineering Competence Third edition*' guidance for Incorporated Engineer (IEng)[1].

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

2.4 Distinctive Features of the Programme and the Student Experience

This BSc (Hons) Integrated Technologies Engineering:

- is careful aligned, through its learning outcomes and delivery structure, with the UK Engineering Council's requirements for programmes accredited to Incorporated Engineer (IEng) status. Along with the ability to focus many assessments on real workplace applications, this enables students, particularly for those based in the workplace, to plan for the next stage in their careers and their potential to progress to more senior roles and responsibilities in engineering.

- is a level-6, final-year degree, 'top-up' award for students, particularly those already in the workplace, that arrive with either level-5 (HND, Diploma HE or Foundation Degree) qualifications, or significant work experience that evidences suitability for undertaking the final year of this degree, or a mixture of both across mechanical, manufacturing, electrical and electronic, and digital technologies.

- develops critical and transformative graduates with understanding of, and intellect for the parameters of engineering industries, the application of project management, and the ethos and skills for career-long professional development, complete within the context of technical knowledge, skill development and application across mechanical, electrical and electronic engineering and digital technologies.

- provides a scaled-insight into the knowledge, skill development and applications needed to lead and manage innovative and enterprising engineering solutions that integrate mechanical, electrical and electronic engineering and digital technologies. This includes: the breadth of industrial awareness and philosophies needed to lead in technological industries; the processes needed to manage through to achieving engineering solutions; and the development of the individual so as to be critical, transformative, knowledgeable and skilled within a society that will ever continue to require engineering solutions.

- offers an innovative experiential approach to developing and furthering technological knowledge and skills. The novel embedding of professional/commercial-styled technological 'short courses', complete with 'certificates of attendance', within the programme's Professional Development module enables students to reflect on their strategic alignment with industry and their future careers. This experiential learning process of 'do and review' is thus firmly focused on developing the philosophy and function required to be transformative for engineering as an industry as well as their own careers.

- embraces the words of the UK Engineering Council[2] in that "*Engineering is concerned with the art and practice of changing the world we live in. Driven by the needs of society and business, engineers strive to find solutions to complex challenges. They work to achieve useful and beneficial outcomes that enhance the welfare, health and safety of all whilst paying due regard to the environment.*" Furthermore, this programme aligns with the ethos of Incorporated Engineer (IEng) status in the "*development and attainment of the know-how necessary to apply technology to engineering problems and processes, and to maintain and manage current technology, sometimes within a multidisciplinary engineering environment*".

2.5 Relevant QAA Subject Benchmark Group(s)

QAA Subject Benchmark - Engineering (2019)

- This programme is designed to equip students with the ability to deliver practical solutions to problems by applying the three core elements of scientific principles, mathematics and realisation in a creative and innovative way.
- The programme will develop students who have the skills to begin a professional career.

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

UK Quality Code for Higher Education (2018)

- This degree programme will be delivered as part of the University Centre South Devon provision and will therefore maintain the highest academic standards.
- Being a part of the University Centre South Devon means that students will be offered multiple opportunities to engage in a programme of activities designed to support their research and scholarly studies.

Foundation Degree Characteristic Statement (2020)

- Analysis, evaluation and application to work context are embedded within all modules.
- Verbal and written communication will be developed through a mixture of assessment methods and teaching and learning strategies.
- Student-employer connection and engagement will be ongoing throughout the degree programme.

SEEC Credit Level Descriptors for Higher Education (2021)

- Students learn to apply an understanding of wide-ranging areas of engineering knowledge and a range of skills in learning, work or practice contexts of varying complexity.
- Students will learn to act with partial self-direction and work within relevant guidelines using a wide range of techniques.
- Students will learn to take responsibility for achieving personal and/or group outcomes/output and evaluate their own capabilities and development using relevant criteria.
- Students will use a range of principles to analyse, evaluate, organise and communicate the reliability and validity of information sources.
- Students will develop a range of relevant projects and/or activities to improve areas of their own and/or others learning, work or practice.

2.6 Programme Structure

BSc (Hons) Integrated Technologies Engineering								
Undertaken Full-Time or Part-Time in any arrangement across one or two years, * apart from the Individual Project, which must be undertaken in the final year of part-time study				**Assessment % (or Pass/Fail)**				
Module Code	**Title**	**Credits**	**When/Where**	**E1**	**T1**	**C1**	**P1**	**A1**
SOUD3083	Engineering Leadership and Management	20	AY (PC)			50%	50%	
SOUD3084	Engineering Project Management	20	AY (PC)			50%	50%	
SOUD3085	Professional Development in Engineering	20	AY (PC)			50%	50%	
SOUD3086	Integrating Technologies for Contemporary and Future Engineering Sectors	20	AY (PC)				100%	Pass / Fail
SOUD3087	Individual Engineering Project	40	AY (PC) P/T = Final Year			70%	30%	

2.7 Programme Aims

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

The programme is intended to:

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

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

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

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

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

[3] Closely paraphrased from: QAA Subject Benchmark Engineering, February 2019, section 3 'The characteristics of engineering graduates'

2.8 Programme Intended Learning Outcomes (PILOs)

All PILOs have been written so as to map against the UK Engineering Council's '*The Accreditation of Higher Education Programmes, UK Standard for Professional Engineering Competence Third edition' guidance for Incorporated Engineer (IEng)*', as shown in the right hand column. This has been done for completeness and ease of reference. For clarity, as this programme is a single-level (level 6) top-up award, it would not be expected to achieve, and therefore has not been presented in application of, UK Engineering Council accreditation.

8.1. Knowledge and understanding

PILO: On successful completion graduates should have developed *critical*[4] knowledge and understanding of:	Cross-Referenced to UK Engineering Council's IEng Accreditation[5]
1. the scientific, mathematical and statistical principles underpinning application of	Science and mathematics

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

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

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

	Engineering activity can have impacts on the environment, on commerce, on society and on individuals. Graduates therefore need the skills to manage their activities and to be aware of the various legal and ethical constraints under which they are expected to operate, including: • Understanding of the need for a high level of professional and ethical conduct in engineering and a knowledge of professional codes of conduct Engineering practice This is the practical application of engineering skills, combining theory and experience, and use of other relevant knowledge and skills. This can include: • Knowledge of contexts in which engineering knowledge can be applied (eg operations and management, application and development of technology, etc)

8.2. Cognitive and intellectual skills

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

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

3. knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering industries	Design Design at this level is the creation and development of an economically viable product, process or system to meet a defined need. It involves technical and intellectual challenges and can be used to integrate all engineering understanding, knowledge and skills to the solution of real problems. Graduates will need the knowledge, understanding and skills to: • Define the problem, identifying any constraints including environmental and sustainability limitations; ethical, health, safety, security and risk issues; intellectual property; codes of practice and standards

8.3. Key and transferable skills

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

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

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

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

8.4. Employment related skills

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

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

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

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

8.5. Practical skills

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

2.9 Admissions Criteria, including APCL, APEL and Disability Service arrangements

Entry Requirements for BSc (Hons) Engineering (Top-Up)	
Numeracy and Literacy	Numeracy and Literacy skills can be evidenced with a level 2 qualification in Maths and English (GCSE grade 4 / C or above), or completion of a controlled entry assessment.
Progression from Level 5 study	Students may apply from technological level-5 programmes. Either progression will be already defined within the Programme Specification of those level-5 programmes or they will be considered by admissions tutors on individual merit, based on prior technology-focused study to level-5 and its alignment with setting the individual student up for completion to meet the PILOs of this programme.
International Students – English Language Requirements	If English is not your first language, you will need an IELTS score of 7.0 with a minimum score of 6.5 in each component (Reading, Writing, Listening and Speaking or an equivalent English Language qualification).
A-level/AS-level	Normal minimum entry requirements are 48 UCAS Points, to include Mathematics or a science-based subject.
T-Levels	Diploma in a related subject area. 48 UCAS points minimum. To include Mathematics or related module

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
Welsh Baccalaureate	24 Points. Mathematics must be included
Scottish Qualifications Authority	48 points minimum from Higher Certificate
Irish Leaving Certificate	48 points minimum from Higher Certificate
International Baccalaureate	24 Points. Mathematics must be included
Criminal Records	Students undertaking work experience or professional activity may be required to undertake a satisfactory DBS check. Criminal records should be positively disclosed upon application, in order for applicant suitability to be assessed.
Non-standard entry	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. Assessments will be graded in line with Level 5 standards

APEL/APL	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. Accreditation of Prior Learning (APL) - University of Plymouth.

2.10 Non Standard Regulations

Not applicable.

2.11 Progression Opportunities

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

2.12 Transitional Arrangements for existing students looking to progress onto the programme

None.

Appendix 1: Programme Specification Mapping

columns as required.

Core Modules		Award Learning Outcomes contributed to (for more information see Section 8)																		Compensation Y/N	Assessment Element(s) and weightings [use KIS definition] E1- exam E2 – clinical exam T1- test C1- coursework A1 – generic assessment P1 - practical
		8.1. Knowledge & understanding					8.2. Cognitive & intellectual skills				8.3. Key & transferable skills				8.4. Employment related skills				8.5. Practical skills				
		1	2	3	4		1	2	3		1	2	3		1	2	3		1	2	3		
Level 6	**Core Modules:**																						
	Engineering Leadership and Management		✓				✓				✓				✓	✓							Y	50% C1 50% P1
	Engineering Project Management		✓					✓	✓		✓	✓								✓	✓		Y	50% C1 50% P1

	Professional Development in Engineering				✓		✓				✓		✓		✓		✓		✓		✓			Y	50% C1 50% P1
	Integrated Technologies for Contemporary and Future Engineering Sectors			✓	✓			✓	✓			✓		✓				✓			✓			Y	100% P1 Pass/Fail A1
	Individual Engineering Project	✓		✓			✓	✓			✓		✓			✓	✓		✓		✓			N	70% C1 30% P1
Level 6 Los & Confirmed Award LOs		1[9]	2	2	2		3	3	2		4	2	2		3	2	2		3	2	3				

[9] N.B. PILO met within the non-compensatable 40 credit project module. Effectively double weighted due to 40 credits, and notably fundamental to achieving this module. There is no risk that this PILO would not be met.

3. Module Records

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3083	**MODULE TITLE: Engineering Leadership and Management**	
CREDITS: 20	**FHEQ LEVEL: 6**	**HECOS CODE: 100088**
PRE-REQUISITES: None	**CO-REQUISITES: None**	**COMPENSATABLE: Y**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module focuses on developing the critical knowledge and understanding of what parameterises and drives the breadth of engineering industries. In this context, students will develop the cognitive and employability skills necessary to be strategically critical and transformative in their future leadership and management of engineering.

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

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

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

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

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Demonstrate critical knowledge and understanding of regional, national and international engineering enterprises in the engineering sector and the challenges they face.	8.1.2: critical knowledge and understanding of product placement, management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors
2. Defend their cognition and intellect of leadership and enterprise in engineering through sourcing, critically analysing, applying and evaluating information from academic and other industry relevant literature.	8.2.1: critically analyse, apply and evaluate information sourced from academic and technical literature and other sources

	8.4.1. employment related skills to be transformative in how they use appropriate codes of practice and industry standards
3. Evidence their ability to balance internal and external factors of engineering enterprises to position those businesses for their immediate, wider and future markets.	8.4.2: synthesise considerations of business, customer and user needs alongside the wider engineering context, public perception and aesthetics
4. Communicate critical knowledge and understanding through both written and verbal communication.	8.3.1: key and transferable skills to be transformative through how they conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally.

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

<u>Additional Guidance for Learning Outcomes:</u>

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

- Framework for Higher Education Qualifications

  http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf

- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2023/24 **NATIONAL COST CENTRE: 115**

MODULE LEADER: TBC **OTHER MODULE STAFF:** Matthew Prowse

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

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures and Seminars	40	Combining taught elements with considerable use of seminar discussions to engage conceptual theory with real-world application.
Tutorials	5	Focused on formative assessment in the form of discussion groups

Directed Individual Study	30	Task directed activities, such as specific reading/DLE activities
Self-directed Individual Study	125	Background reading to develop critical understanding of theory, and assessment work
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Sectioned Essay/Report: 3000 word (not including tables, figures, in-text references) synthesising industrial understanding and academic theories in line with predictions and insight into the future of a personally chosen engineering sector.	100 % 100%
Practical	Case Study Presentation: synthesis of industrial understanding and academic theory in critical evaluation of an engineering case study.	100 % 100%

REFERRAL ASSESSMENT

Element Category	Component Name	Component Weighting

Coursework (in lieu of practical)	Case Study Presentation by video: synthesis of industrial understanding and academic theory in critical evaluation of an engineering case study. This must be of a different case study to the first attempt at this summative assessment.	% % 100%
Coursework	Sectioned Essay/Report: 3000 word (not including tables, figures, in-text references) critical discussion of the wider engineering sector in line with relevant enterprise, leadership and management considerations.	% % 100%

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 11/02/2021	**Approved by**: Date: XX/XX/XXXX

Reading List

Webpages:

www.prospects.ac.uk

www.engineerjobs.co.uk

UK Engineering Council, 2014, The Accreditation of Higher Education Programmes, www.engc.org.uk Published May 2014

Books:

Bessant, J. Tidd, J. (2018). Managing Innovation: integrating technological, market and organizational change (6th Ed). New York: John Wiley & Sons.

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

Christy, G. Mullins, L. J.(2013). Management & Organisational Behaviour (10th Ed). Harlow: Pearson.

Flumerfelt, S., Kahlen, F-J., Alves, A., Siriban-Manalang, A.B., 2015, Lean engineering education: driving content and competency mastery, American Society of Mechanical Engineers, 144p

(https://primo.plymouth.ac.uk/primo-explore/fulldisplay?docid=44PLY_ALMA_DS5161644350001281&context=L&vid=VU_PLY&lang=en_US&search_scope=44PLY_ALL%20PC&adaptor=Local%20Search%20Engine&tab=local&query=any,contains,engineering%20leadership&facet=searchcreationdate,include,2005%7C,%7C2019&facet=searchcreationdate,include,2010%7C,%7C2019&mode=Basic&offset=0)

Gaynor, G.H., Decisions: an engineering and management perspective, Wiley, 300p
(https://primo.plymouth.ac.uk/primo-explore/fulldisplay?docid=44PLY_ALMA_DS5165449350001281&context=L&vid=VU_PLY&lang=en_US&search_scope=44PLY_ALL%20PC&adaptor=Local%20Search%20Engine&tab=local&query=any,contains,engineering%20leadership&facet=searchcreationdate,include,2005%7C,%7C2019&facet=searchcreationdate,include,2010%7C,%7C2019&mode=Basic&offset=0)

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

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

Storey, J. (2016). Leadership in Organizations: current issues and trends (3rd Ed). Oxford: Routledge.

Example Journal Articles for Wider Reading:

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

Cox, M.F., Cekic, O., Adams, S.G., 2010, Developing Leadership Skills of Undergraduate Engineering Students: Perspectives from engineering faculty, Journal of STEM Education: Innovations & Research, 11(3/4), pp22-23

(https://web.a.ebscohost.com/abstract?direct=true&profile=ehost&scope=site&authtype=crawler&jrnl=15575276&asa=Y&AN=53171861&h=dhh1dhhBE%2b%2b1Uzv%2bT%2bJi8FzceMLvFrfQVB4lYRnhzykqCOT7xgEZus2N%2fmeMDHmA4x8nTgUlrmSFxvKgQ7m%2b2g%3d%3d&crl=c&resultNs=AdminWebAuth&resultLocal=ErrCrlNotAuth&crlhashurl=login.aspx%3fdirect%3dtrue%26profile%3dehost%26scope%3dsite%26authtype%3dcrawler%26jrnl%3d15575276%26asa%3dY%26AN%3d53171861)

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

Kumar, S., Hsiao, J.K., 2007, Engineers Learn “Soft Skills the Hard Way”: Planting a Seed of Leadership in Engineering Classes, Leadership and Management in Engineering, 7(1), pp.18-23

(https://ascelibrary.org/doi/full/10.1061/%28ASCE%291532-6748%282007%297%3A1%2818%29)

Rottmann, C., Sacks, R., Reeve, D., 2015, Engineering leadership: Grounding leadership theory in engineers’ professional identities, Leadership, 11(3), pp.351-373

(https://journals.sagepub.com/doi/pdf/10.1177/1742715014543581?casa_token=Yt1-JmnNPLEAAAAA:Amy1w8pWMWZet9bvXdWiTj4KeDs7--CA574sZZS7h1l9oVwdXVgWFcO2X6cERtEVvZ-S39NsfP239w)

Schuhmann, R.J., 2010, Engineering Leadership Education – The Search for Definition and a Curricular Approach, Journal of STEM Education, 11(3 & 4), pp.61-69

(https://s3.amazonaws.com/academia.edu.documents/43953357/JSTEM_SCHUHMANN_2010.pdf?response-content-disposition=inline%3B%20filename%3DEngineering_Leadership_Education_The_Sea.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190911%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190911T095444Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=fde5f382cb1dc1edfb39329a64abf3827995a14b2c3c44c89e29219a50bc9289)

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3084 **MODULE TITLE: Engineering Project Management**

CREDITS: 20 **FHEQ LEVEL: 6** **HECOS CODE: 100812**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

This module enables students to develop critical knowledge and understanding of and the ability to employ project management theory in engineering context(s).

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

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

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

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

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Demonstrate critical knowledge and understanding of project management and specific techniques that are contemporary within the engineering sector, and its positioning within wider business considerations.	8.1.2. product placement, management, project-management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors.
2. Critically analyse and evaluate their application of project management techniques to implement design solutions	8.2.2. critically analyse, apply and evaluate through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. 8.2.3. critically analyse, apply and evaluate knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering industries
3.. Apply problem solving skills and resources, act appropriately and communicate	8.3.1. key and transferable skills to be transformative through how they conduct and

professionally, in their project management of engineering problems	manage themselves through personal and team programmes of work with the ability to communicate professionally. 8.3.2. key and transferable skills to be transformative through how they apply problem-solving skills, including engagement with and effective use of IT applications and facilities.
4. Be productive in how they work with information that may be incomplete or uncertain to create project management solutions.	8.5.2. practical skills to be productive in how they work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering related systems in practice. 8.5.3. practical skills to be productive in how they create or adapt design and management solutions.

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

Additional Guidance for Learning Outcomes:

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

- Framework for Higher Education Qualifications

  http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf

- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2023/24 **NATIONAL COST CENTRE: 115**

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

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

SUMMARY OF TEACHING AND LEARNING *[Use HESA KIS definitions]*		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	20	Covering project management as employed across scales and foci of engineering industries, as well as theories, models and methods for project management.
Tutorials	25	In-class development of individual or group project management, and including formative assessment in the form of discussion groups

Seminars	4	Guest speakers from industry.
Directed Individual Study	26	Task directed activities, such as specific reading/DLE activities
Self-directed Individual Study	125	Background reading to develop critical understanding of theory, and assessment work
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	Component Name	Component Weighting
Coursework	Sectioned Essay/Report: 2000 word (not including tables, figures, in-text references) synthesising project-management theory and industrially recognised methodologies in line with a personally chosen engineering application case study.	100% % 100%
Practical	Project Management Presentation: synthesis of learnt project management theory with project management of an actual engineering problem and solution.	100% % 100%

REFERRAL ASSESSMENT

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

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 11/02/2021	**Approved by**: Date: XX/XX/XXXX

Reading List

Websites:

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

Books:

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

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

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

Watts, G., (2016). *Scrum Mastery*. Cheltenham: Inspect & Adapt Ltd.

Adkins, L., Highsmith, J. and Cohn, M., 2010. *Coaching Agile Teams*. (2nd ed.) Upper Saddle River(NJ): Addison-Wesley.

Doney, J., 2019. *Total Quality Management (TQM):Concepts, Implementation And Applications*. NY: Nova Science Publishers.

AXELOS, 2017. *Managing Successful Projects With PRINCE2*. 6th ed. London (London): Stationary Office.

Journals:

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

Mir, F.A., Pinnington, A.H., 2014, Exploring the value of project management: Linking Project Management Performance and Project Success, International Journal of Project Management, 32, pp:202-217

https://www.sciencedirect.com/science/article/pii/S0263786313000884

Spalek, S., 2013, Improving Industrial Engineering Performance through a Successful Project

Management Office, Inzinerine Ekonomika-Engineering Economics, 24(2), pp:88-98

https://papers.ssrn.com/sol3/papers.cfm?abstract_id=2581494

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3085 **MODULE TITLE: Professional Development in Engineering**

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

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

Undertaking a collection of short courses within this module enables students to track, document, synthesise, reflect on and evaluate their professional development in line with their learning in higher education. This professionally extends their development of their engineering knowledge and skills whilst assessing students' ability to be critically transformative in respect to their career development.

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

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

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

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

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Evidence critical understanding of professional development and alignment with the needs of industry and the wider value of engineering.	8.1.4.critical knowledge and understanding of the merging of technologies that form the breadth of engineering industries and offer future

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

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**

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

Notes:

Additional Guidance for Learning Outcomes:

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

- Framework for Higher Education Qualifications
  http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE:115**

MODULE LEADER: Matthew Prowse **OTHER MODULE STAFF:**

Summary of Module Content

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

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions]***		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	10	Covering CPD and the areas of foci within UK Engineering Council accreditation
Tutorials	20	Including guidance with portfolios, professional body presentations and formative feedback.

Short Course	100	Collection of individual short courses with certificates of attendance.
Directed Individual Study	35	Directed reading & VLE activity around each short course
Self-directed Individual Study	35	Background reading to develop critical understanding. Preparation of assessment work.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

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

REFERRAL ASSESSMENT

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

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 12/02/2021	**Approved by**: Date: XX/XX/XXXX

Reading List

Websites:

UK Eng Council Accreditation of Graduates: https://www.engc.org.uk/education-skills/accreditation-of-higher-education-programmes/information-on-accreditation-for-higher-education-students-and-graduates/

Professional Engineering Institutions: https://www.engc.org.uk/about-us/our-partners/professional-engineering-institutions/

UK Eng Council Standards: https://www.engc.org.uk/standards-guidance/standards/

UK Standard for Professional Engineering Competence (UK Spec): https://www.engc.org.uk/standards-guidance/standards/uk-spec/

UK Engineering Spec: https://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3086	**MODULE TITLE: Integrating Technologies for Contemporary and Future Engineering Sectors**	
CREDITS: 20	**FHEQ LEVEL: 6**	**HECOS CODE: 100184**
PRE-REQUISITES: None	**CO-REQUISITES: None**	**COMPENSATABLE: Y**

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

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

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

E1 (Examination)		**C1** (Coursework)		**P1** (Practical**)**	100%
E2 (Clinical Examination)		**A1** (Generic assessment)	Pass/Fail		
T1 (Test)					

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

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

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

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Demonstrate critical knowledge and understanding of the relevant mix of key principles, materials and processes factors that enable integrated technologies to be employed for solving engineering problems across industries.	8.1.3. critical knowledge and understanding of the relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice. 8.1.4. critical knowledge and understanding of the merging of technologies that form the breadth of engineering industries and offer future

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

4. Act with awareness of appropriate codes of practice and industry standards in the development and implementation of engineering solutions.	8.4.1. employment related skills to be transformative through how they use appropriate codes of practice and industry standards

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

Additional Guidance for Learning Outcomes:

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

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements

- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE: 115**

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

Summary of Module Content

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

SUMMARY OF TEACHING AND LEARNING ***[Use HESA KIS definitions]***		
Scheduled Activities	**Hours**	**Comments/Additional Information (briefly explain activities, including formative assessment opportunities)**
Lectures	20	
Seminars	30	Timetabled sessions for groups to prepare their assessment task with guidance and advice available from the tutor. Plus timetabled sessions to prepare the tradeshow itself.

Workshops	30	Enabling groups to prepare their assessment product, whilst engaging with the range of technologies in practice and undertaking their competency assessment.
Directed Individual Study	20	Directed to engage with their groups to refine and complete the assessment task.
Self-directed Individual Study	100	Recommended engagement with mechanical, electrical and electronic, and computing technologies, through reading and, if appropriate, practice, so as to inform future engagement with these technologies throughout their careers.
Total	**200**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Practical	Group trade show stand and poster defence, plus engineering solution pitch	100% % 100%

Assessment	Pass/Fail competency assessment: safe and appropriate use of equipment within timetabled lab and workshop time.	Pass/Fail

REFERRAL ASSESSMENT

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

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 12/02/2021	**Approved by**: Date: XX/XX/XXXX

Reading List

Websites:

future generation computer systems

Engineering the future of the UK - a vision for the future of UK engineering

Emerging Technologies in Mechanical Engineering

Books/articles:

Prof. Dr. Christian Harteis in Professional and Practice-based Learning (2018), The Impact of Digitalization in the Workplace - An Educational View, vol 21. Springer, Cham

Hämäläinen R., Lanz M., Koskinen K.T. (2018) Collaborative Systems and Environments for Future Working Life: Towards the Integration of Workers, Systems and Manufacturing Environments. In: Harteis C. (eds) The Impact of Digitalization in the Workplace. Professional and Practice-based Learning, vol 21. Springer, Cham

Lean Automation enabled by Industry 4.0 Technologies

Lucas Santos Dalenogare, Guilherme Brittes Benitez, Néstor Fabián Ayala, Alejandro Germán Frank, The expected contribution of Industry 4.0 technologies for industrial performance, International Journal of Production Economics,

Volume 204, 2018, Pages 383-394, ISSN 0925-5273, https://doi.org/10.1016/j.ijpe.2018.08.019.

(http://www.sciencedirect.com/science/article/pii/S0925527318303372)

Nascimento, D.L.M., Alencastro, V., Quelhas, O.L.G., Caiado, R.G.G., Garza-Reyes, J.A., Rocha-Lona, L. and Tortorella, G. (2019), "Exploring Industry 4.0 technologies to enable circular economy practices in a manufacturing context: A business model proposal", Journal of Manufacturing Technology Management, Vol. 30 No. 3, pp. 607-627. https://doi.org/10.1108/JMTM-03-2018-0071

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3087 **MODULE TITLE: Individual Engineering Project**

CREDITS: 40 **FHEQ LEVEL: 6** **HECOS CODE: 100184**

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

Work-based, industry-focused or academic independent critical inquiry of an engineering problem. A critical review of extant knowledge allows the student to identify a focus for their inquiry that may relate to either integrated technologies or mechanical, electrical and electronic or digital technologies as appropriate to their degree choice. The student is guided by an academic supervisor in seeking their work to be defensible by the evidence their review of extant knowledge and own empirical work provides.

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

E2 (Clinical Examination)		**A1** (Generic assessment)			
T1 (Test)					

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

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

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

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**

1. Demonstrate critical knowledge and understanding of specialist engineering/disciplinary topics and the fundamental principles of science, mathematics, statistics, resources and processes specifically relevant to enabling them to be investigated.	8.1.1 critical knowledge and understanding of the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering. 8.1.3. critical knowledge and understanding of relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.
2. Critically defend their project-based inquiry of engineering problems through analysis, application and evaluation of extant information and techniques, procedures and methods relevant to the chosen topic.	8.2.1. critically analyse, apply and evaluate information sourced from academic and technical literature and other sources. 8.2.2. critically analyse, apply and evaluate through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. 8.5.1. practical skills to be productive in how they select appropriate equipment and work safely and competently within a workshop or laboratory environment. 8.5.2. practical skills to be productive in how they work with information that may be incomplete or

	uncertain to monitor, analyse and evaluate engineering related systems in practice.
3. Create and/or adapt engineering solution(s) and synthesis them in line with the project purpose and its findings within the context of business, customer or user needs and the wider engineering context.	8.4.2. employment related skills to be transformative through how they synthesise considerations of business, customer and user needs alongside the wider engineering context, public perception and aesthetics 8.5.3. practical skills to be productive in how they create or adapt design and management solutions.
4. Communicate professionally through project reporting of an engineering problem and their empirical investigation of it, and personal reflection of their professional development through their undertaking of it.	8.3.1. key and transferable skills to be transformative through how they conduct and manage themselves through personal ~~and team~~ programmes of work with the ability to communicate professionally. 8.3.3. key and transferable skills to be transformative through how they plan and carry out autonomous work. 8.4.3. employment related skills to be transformative through how they focus and reflect on professional development so as to target their lifelong learning within the working environment.

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

Additional Guidance for Learning Outcomes:

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

- Framework for Higher Education Qualifications
  http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE: 115**

MODULE LEADER: Geoff Jaggs **OTHER MODULE STAFF:**

Summary of Module Content

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

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

Total	**400**	**(NB: 1 credit = 10 hours of learning; 10 credits = 100 hours, etc.)**

SUMMATIVE ASSESSMENT

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

REFERRAL ASSESSMENT

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

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 12/02/2021	**Approved by**: Date: XX/XX/XXXX

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3083 **MODULE TITLE: Engineering Leadership and Management**

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

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

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

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

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

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Demonstrate critical knowledge and understanding of regional, national and international engineering enterprises in the engineering sector and the challenges they face.	8.1.2: critical knowledge and understanding of product placement, management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors

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

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

Additional Guidance for Learning Outcomes:

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

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Andrew Faulkner **OTHER MODULE STAFF:** Matthew Prowse

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

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

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**

Coursework	Sectioned Essay/Report: 3000 word (not including tables, figures, in-text references) synthesising industrial understanding and academic theories in line with predictions and insight into the future of a personally chosen engineering sector.	100% % 100%
Practical	Case Study Presentation: synthesis of industrial understanding and academic theory in critical evaluation of an engineering case study.	100% % 100%

REFERRAL ASSESSMENT

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

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 11/02/2021	**Approved by**: Date: XX/XX/XXXX

Reading List

Webpages:

www.prospects.ac.uk

www.engineerjobs.co.uk

UK Engineering Council, 2014, The Accreditation of Higher Education Programmes, www.engc.org.uk Published May 2014

Books:

Bessant, J. Tidd, J. (2018). Managing Innovation: integrating technological, market and organizational change (6th Ed). New York: John Wiley & Sons.

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

Christy, G. Mullins, L. J.(2013). Management & Organisational Behaviour (10th Ed). Harlow: Pearson.

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

Gaynor, G.H., Decisions: an engineering and management perspective, Wiley, 300p (https://primo.plymouth.ac.uk/primo-explore/fulldisplay?docid=44PLY_ALMA_DS5165449350001281&context=L&vid=VU_PLY&lang=en_US&search_scope=44PLY_ALL%20PC&adaptor=Local%20Search%20Engine&tab=local&query=any,contains,engineering%20leadership&facet=searchcreationdate,include,2005%7C,%7C2019&facet=searchcreationdate,include,2010%7C,%7C2019&mode=Basic&offset=0)

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

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

Storey, J. (2016). Leadership in Organizations: current issues and trends (3rd Ed). Oxford: Routledge.

Example Journal Articles for Wider Reading:

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

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

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

Kumar, S., Hsiao, J.K., 2007, Engineers Learn “Soft Skills the Hard Way”: Planting a Seed of Leadership in Engineering Classes, Leadership and Management in Engineering, 7(1), pp.18-23

(https://ascelibrary.org/doi/full/10.1061/%28ASCE%291532-6748%282007%297%3A1%2818%29)

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

Schuhmann, R.J., 2010, Engineering Leadership Education – The Search for Definition and a Curricular Approach, Journal of STEM Education, 11(3 & 4), pp.61-69 (https://s3.amazonaws.com/academia.edu.documents/43953357/JSTEM_SCHUHMANN_2010.pdf?response-content-disposition=inline%3B%20filename%3DEngineering_Leadership_Education_The_Sea.pdf&X-Amz-Algorithm=AWS4-HMAC-SHA256&X-Amz-Credential=AKIAIWOWYYGZ2Y53UL3A%2F20190911%2Fus-east-1%2Fs3%2Faws4_request&X-Amz-Date=20190911T095444Z&X-Amz-Expires=3600&X-Amz-SignedHeaders=host&X-Amz-Signature=fde5f382cb1dc1edfb39329a64abf3827995a14b2c3c44c89e29219a50bc9289)

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3084 **MODULE TITLE: Engineering Project Management**
CREDITS: 20 **FHEQ LEVEL: 6** **HECOS CODE: 100812**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: Y**
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
This module enables students to develop critical knowledge and understanding of and the ability to employ project management theory in engineering context(s).

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

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

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

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

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Demonstrate critical knowledge and understanding of project management and specific techniques that are contemporary within the engineering sector, and its positioning within wider business considerations.	8.1.2. product placement, management, project-management, professional conduct, risk and legislation, quality and sustainability as appropriate to the industry within its specific landscape of Political, Economic, Social, Technological, Legal and Environmental factors.
2. Critically analyse and evaluate their application of project management techniques to implement design solutions	8.2.2. critically analyse, apply and evaluate through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. 8.2.3. critically analyse, apply and evaluate knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering industries
3.. Apply problem solving skills and resources, act appropriately and communicate professionally, in their project management of engineering problems	8.3.1. key and transferable skills to be transformative through how they conduct and manage themselves through personal and team programmes of work with the ability to communicate professionally. 8.3.2. key and transferable skills to be transformative through how they apply problem-solving skills, including engagement with and effective use of IT applications and facilities.
4. Be productive in how they work with information that may be incomplete or	8.5.2. practical skills to be productive in how they work with information that may be incomplete or

uncertain to create project management solutions.	uncertain to monitor, analyse and evaluate engineering related systems in practice. 8.5.3. practical skills to be productive in how they create or adapt design and management solutions.

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

Additional Guidance for Learning Outcomes:

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

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Ben Bryant **OTHER MODULE STAFF:**

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

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

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**

Coursework	Sectioned Essay/Report: 2000 word (not including tables, figures, in-text references) synthesising project-management theory and industrially recognised methodologies in line with a personally chosen engineering application case study.	100% % 100%
Practical	Project Management Presentation: synthesis of learnt project management theory with project management of an actual engineering problem and solution.	100% % 100%

REFERRAL ASSESSMENT

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

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 11/02/2021	**Approved by**: Date: XX/XX/XXXX

Reading List

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

Books:

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

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

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

Watts, G., (2016). *Scrum Mastery*. Cheltenham: Inspect & Adapt Ltd.

Adkins, L., Highsmith, J. and Cohn, M., 2010. *Coaching Agile Teams*. (2nd ed.) Upper Saddle River(NJ): Addison-Wesley.

Doney, J., 2019. *Total Quality Management (TQM):Concepts, Implementation And Applications*. NY: Nova Science Publishers.

AXELOS, 2017. *Managing Successful Projects With PRINCE2*. 6th ed. London (London): Stationary Office.

Journals:

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

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

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

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3085 **MODULE TITLE: Professional Development in Engineering**
CREDITS: 20 **FHEQ LEVEL: 6** **HECOS CODE: 100184**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: Y**
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
Undertaking a collection of short courses within this module enables students to track, document, synthesise, reflect on and evaluate their professional development in line with their learning in higher education. This professionally extends their development of their engineering knowledge and skills whilst assessing students' ability to be critically transformative in respect to their career development.

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

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

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

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

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Evidence critical understanding of professional development and alignment with	8.1.4.critical knowledge and understanding of the merging of technologies that form the breadth of

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

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

Additional Guidance for Learning Outcomes:

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

- Framework for Higher Education Qualifications
  http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf

- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE:115**
MODULE LEADER: Matthew Prowse **OTHER MODULE STAFF:**

Summary of Module Content

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

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

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**

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

REFERRAL ASSESSMENT

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

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 12/02/2021	**Approved by**: Date: XX/XX/XXXX

Reading List

Websites:
UK Eng Council Accreditation of Graduates: https://www.engc.org.uk/education-skills/accreditation-of-higher-education-programmes/information-on-accreditation-for-higher-education-students-and-graduates/
Professional Engineering Institutions: https://www.engc.org.uk/about-us/our-partners/professional-engineering-institutions/
UK Eng Council Standards: https://www.engc.org.uk/standards-guidance/standards/

UK Standard for Professional Engineering Competence (UK Spec): https://www.engc.org.uk/standards-guidance/standards/uk-spec/
UK Engineering Spec: https://www.engc.org.uk/engcdocuments/internet/Website/UK-SPEC%20third%20edition%20(1).pdf

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3086 **MODULE TITLE: Integrating Technologies for Contemporary and Future Engineering Sectors**

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

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

SHORT MODULE DESCRIPTOR: *(max 425 characters)*

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

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

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

MODULE AIMS:

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

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

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

Assessed Module Learning Outcomes	**Award/ Programme Learning Outcomes contributed to**
1. Demonstrate critical knowledge and understanding of the relevant mix of key principles, materials and processes factors that enable integrated technologies to be employed	8.1.3. critical knowledge and understanding of the relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.

for solving engineering problems across industries.	8.1.4. critical knowledge and understanding of the merging of technologies that form the breadth of engineering industries and offer future opportunities for engineers, markets and societies alike.
2. Evidence their ability to critically analyse and evaluate integrated technologies as they are applied through project based design solutions for engineering problems.	8.2.2. critically analyse, apply and evaluate through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. 8.2.3. critically analyse, apply and evaluate knowledge and understanding through projects in order to implement design solutions and contribute to their evaluation for engineering industries
3. Engage with determining and employing relevant and available resources, including IT, engineering facilities and equipment, in their design and management problem solving.	8.3.2. key and transferable skills to be transformative through how they apply problem-solving skills, including engagement with and effective use of IT applications and facilities. 8.5.1. practical skills to be productive in how they select appropriate equipment and work safely and competently within a workshop or laboratory environment. 8.5.3. practical skills to be productive in how they create or adapt design and management solutions.
4. Act with awareness of appropriate codes of practice and industry standards in the development and implementation of engineering solutions.	8.4.1. employment related skills to be transformative through how they use appropriate codes of practice and industry standards

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

Additional Guidance for Learning Outcomes:

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

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Ben Bryant **OTHER MODULE STAFF:**

Summary of Module Content

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

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

SUMMATIVE ASSESSMENT

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

REFERRAL ASSESSMENT

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

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 12/02/2021	**Approved by**: Date: XX/XX/XXXX

Reading List

Websites:

future generation computer systems

Engineering the future of the UK - a vision for the future of UK engineering

Emerging Technologies in Mechanical Engineering

Books/articles:

Prof. Dr. Christian Harteis in Professional and Practice-based Learning (2018), The Impact of Digitalization in the Workplace - An Educational View, vol 21. Springer, Cham
Hämäläinen R., Lanz M., Koskinen K.T. (2018) Collaborative Systems and Environments for Future Working Life: Towards the Integration of Workers, Systems and Manufacturing Environments. In: Harteis C. (eds) The Impact of Digitalization in the Workplace. Professional and Practice-based Learning, vol 21. Springer, Cham

Lean Automation enabled by Industry 4.0 Technologies

Lucas Santos Dalenogare, Guilherme Brittes Benitez, Néstor Fabián Ayala, Alejandro Germán Frank, The expected contribution of Industry 4.0 technologies for industrial performance, International Journal of Production Economics,
Volume 204, 2018, Pages 383-394, ISSN 0925-5273, https://doi.org/10.1016/j.ijpe.2018.08.019.
(http://www.sciencedirect.com/science/article/pii/S0925527318303372)

Nascimento, D.L.M., Alencastro, V., Quelhas, O.L.G., Caiado, R.G.G., Garza-Reyes, J.A., Rocha-Lona, L. and Tortorella, G. (2019), "Exploring Industry 4.0 technologies to enable circular economy practices in a manufacturing context: A business model proposal", Journal of Manufacturing Technology Management, Vol. 30 No. 3, pp. 607-627. https://doi.org/10.1108/JMTM-03-2018-0071

UNIVERSITY OF PLYMOUTH MODULE RECORD

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

MODULE CODE: SOUD3087 **MODULE TITLE: Individual Engineering Project**
CREDITS: 40 **FHEQ LEVEL: 6** **HECOS CODE: 100184**
PRE-REQUISITES: None **CO-REQUISITES: None** **COMPENSATABLE: N**
SHORT MODULE DESCRIPTOR: *(max 425 characters)*
Work-based, industry-focused or academic independent critical inquiry of an engineering problem. A critical review of extant knowledge allows the student to identify a focus for their inquiry that may relate to either integrated technologies or mechanical, electrical and electronic or digital technologies as appropriate to their degree choice. The student is guided by an academic supervisor in seeking their work to be defensible by the evidence their review of extant knowledge and own empirical work provides.

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

SUBJECT ASSESSMENT PANEL to which module should be linked: Engineering

Professional body minimum pass mark requirement: N/A

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

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

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

Assessed Module Learning Outcomes	Award/ Programme Learning Outcomes contributed to
1. Demonstrate critical knowledge and understanding of specialist engineering/disciplinary topics and the fundamental principles of science, mathematics, statistics, resources and processes specifically relevant to enabling them to be investigated.	8.1.1 critical knowledge and understanding of the scientific, mathematical and statistical principles underpinning application of current technologies, and their evolution, in engineering. 8.1.3. critical knowledge and understanding of relevant materials, equipment, tools, processes, products and practice to be employed within workshop and laboratory practice.
2. Critically defend their project-based inquiry of engineering problems through analysis, application and evaluation of extant information and techniques, procedures and methods relevant to the chosen topic.	8.2.1. critically analyse, apply and evaluate information sourced from academic and technical literature and other sources. 8.2.2. critically analyse, apply and evaluate through identifying, reviewing and selecting techniques, procedures and methods relevant to engineering. 8.5.1. practical skills to be productive in how they select appropriate equipment and work safely and competently within a workshop or laboratory environment. 8.5.2. practical skills to be productive in how they work with information that may be incomplete or uncertain to monitor, analyse and evaluate engineering related systems in practice.
3. Create and/or adapt engineering solution(s) and synthesis them in line with the project purpose and its findings within the context of business, customer or user needs and the wider engineering context.	8.4.2. employment related skills to be transformative through how they synthesise considerations of business, customer and user needs alongside the wider engineering context, public perception and aesthetics

	8.5.3. practical skills to be productive in how they create or adapt design and management solutions.
4. Communicate professionally through project reporting of an engineering problem and their empirical investigation of it, and personal reflection of their professional development through their undertaking of it.	8.3.1. key and transferable skills to be transformative through how they conduct and manage themselves through personal ~~and team~~ programmes of work with the ability to communicate professionally. 8.3.3. key and transferable skills to be transformative through how they plan and carry out autonomous work. 8.4.3. employment related skills to be transformative through how they focus and reflect on professional development so as to target their lifelong learning within the working environment.

DATE OF APPROVAL: February 2021	**FACULTY/OFFICE: Academic Partnerships**
DATE OF IMPLEMENTATION: September 2021	**SCHOOL/PARTNER: South Devon College**
DATE(S) OF APPROVED CHANGE: XX/XX/XXXX	**SEMESTER: Semester 1 & 2**

Notes:

Additional Guidance for Learning Outcomes:

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

- Framework for Higher Education Qualifications http://www.qaa.ac.uk/docs/qaa/quality-code/qualifications-frameworks.pdf
- Subject benchmark statements https://www.qaa.ac.uk/quality-code/subject-benchmark-statements
- Professional, regulatory and statutory (PSRB) accreditation requirements (where necessary e.g. health and social care, medicine, engineering, psychology, architecture, teaching, law)
- QAA Quality Code https://www.qaa.ac.uk/quality-code

SECTION B: DETAILS OF TEACHING, LEARNING AND ASSESSMENT

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

ACADEMIC YEAR: 2021/22 **NATIONAL COST CENTRE: 115**
MODULE LEADER: Geoff Jaggs **OTHER MODULE STAFF:**

Summary of Module Content

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

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

SUMMATIVE ASSESSMENT

Element Category	**Component Name**	**Component Weighting**
Practical	Mid-year project outline viva-voce, including review of extant information on the topic and research methodology outline.	100% % 100%

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

REFERRAL ASSESSMENT

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

To be completed when presented for Minor Change approval and/or annually updated	
Updated by: Dr Ross Pomeroy Date: 12/02/2021	**Approved by**: Date: XX/XX/XXXX