Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

PROGRAMME OF STUDY HANDBOOK

MSc International Innovation Management (IIM)

MSc Industry 4.0 Advanced Manufacturing (I4W)

Including the following 'Short Courses'

- Level 6 or 7 Business Improvement with Innovation Management (Post Code dependant)
- Level 5 Continuous Improvement with Industry 4.0
- Level 7 Smart Manufacturing with Industry 4.0

MANUFACTURE ADVANCED DESIGN ENGINEERING

Prifysgol Cymru
Y Drindod Dewi Sant
University of Wales
Trinity Saint David

Cronfeydd Strwythurol a Buddsoddi Ewropeaidd
European Structural and Investment Funds

October 2021

INTRODUCTION 1
FEEDBACK 1
WELCOME MESSAGE 2
PROJECT TEAM 3
PASTORAL SUPPORT 3
EXTERNAL EXAMINERS 4
THIS ACADEMIC YEAR 4
MODULAR TERMINOLOGY 4
ASSESSMENT 5
- Extenuating Circumstances 5
- Additional needs in terms of assessment 5
- Academic Appeals 5
- Assessment Regulations 6
- Responsibilities of students in relation to the assessment process 6

VIRTUAL LEARNING ENVIRONMENT (VLE) 6
ASSESSMENT FEEDBACK VIA TURNITIN 9
PROGRAMME LEARNING OUTCOMES 10
PROGRAMME STRUCTURE 16
- MSc International Innovation Management (IIM) 16
- MSc Industry 4.0 Advanced Manufacturing (I4W) 16
- Short Course – Level 7 (+ Level 6) Business Improvement with Innovation Management 17
- Short Course – Level 5 Continuous Improvement with Industry 4.0 17
- Short Course – Level 7 Smart Manufacturing with Industry 4.0 17
- MADE Cymru Seminars 18
- Student Staff Meetings 18

UNIVERSITY ATTENDANCE POLICY 19
ABOUT UNFAIR PRACTICE AND PLAGIARISM 20
- Plagiarism: Regulations, Procedure and Penalties 20
- Avoiding Plagiarism 20
- Other types of Unfair Practice 21

LIBRARY AND LEARNING RESOURCES 21
STUDENT SERVICES 23
STUDY SKILLS 23
COMPLAINTS 23
MODULE OUTLINES 24
EXAMPLAR ASSIGNMENTS 63

INTRODUCTION

This handbook provides you with detailed information about your MADE Cymru programme starting in October 2021.

The MADE Cymru programme is delivered in 16-week module blocks, starting in October, February and June of each year. The online lectures are delivered between 1pm on a Friday afternoon and depending on your programme, lectures are generally complete by 5:15pm.

Although all the content is delivered online via Microsoft Teams, as we are allowed, we will schedule some face-to-face sessions. These are useful for you to network with your peers on the programmes, but also gives opportunity to see and hear of new and different ways of approaching the many aspects we cover in these programmes.

All the online sessions are recorded; therefore, should you miss a lecture for any reason then you will have full access to all the resources online to enable you to catch up at a suitable time.

We've also included some sample assignment briefs for the programme, these are not your actual assignment briefs for your module, as these can change between deliveries, but will give you some clear indication of the type of assignments we have on the programmes. These exemplar assignments will also give you details of our assessment criteria, the marking and grading of assignments. Please look at the assessment rubric which is a detailed view of how we mark assignments.

The University has made every effort to make the information as full and as accurate as possible, but you should note that minor changes in the organisation of modules between the planning stage and the actual teaching are inevitable. We shall try to keep any such changes to a minimum, and you will receive plenty of advance warning in the event of any alteration. We would also be grateful if you would let us know about any changes that you think might be helpful if introduced into future handbooks.

FEEDBACK

Feedback on your programme of study and modules is welcome and important and will help us to improve and enhance your learning experience. You can give feedback in a number of ways: through the student representative for your programme of study, through module evaluation questionnaires, through informal meetings with your personal tutor, teaching staff or the Principal Research Fellows, through focus groups set up by Schools to gain feedback from students on particular issues, or through the Students' Union. If there are issues, then it is important that you share these with us so that we can address them. Your opinion is valued.

WELCOME MESSAGE

Welcome to studying at the University of Wales Trinity Saint David and in particular to the MADE suite of Programmes. We hope that you will both benefit from and enjoy your chosen programme of study.

Manufacturing and industry are currently experiencing a period of profound and disruptive technological change through the adoption of Industrial Digital Technologies (IDT's). Experts refer to this as the 'Fourth Industrial Revolution' (or more commonly Industry 4.0 or the Industrial Internet). There is broad consensus the incorporation and application of IDTs will lead to significant productivity gains and spur on growth. The future will see a shift away from separately demarcated product lines and factories to a situation in which machines, storage systems and resources are interconnected worldwide as cyber-physical systems that can communicate with each other. The World Economic Forum has shown that, when compared with previous industrial revolutions, I4.0 is evolving at an exponential rather than a linear pace. Moreover, it is disrupting almost every industry in every country, and the breadth and depth of these changes herald the transformation of entire systems of production, management, and supply.

We believe that the key to transforming the performance and sustainability of these companies is through the training of key members of their staff, who will act as champions for advanced manufacturing processes and drive the adoption of these technologies and processes, and thus increase sustainability and productivity for the company as whole.

These programmes are also aligned with the priorities of the UK Industrial Strategy and the UK Research and Innovation (UKRI) council in terms of skills development, in particular the High Value Manufacturing Catapult. At the EU level these programmes are aligned to industrial policy, for example the Factories of the Future Partnership and H2020 topics under Leadership in Enabling and Industrial Technologies and as such been awarded European Social Fund (ESF) funding for delivery.

There are two important characteristics of these programmes that should be highlighted: (a) the programmes have been designed to meet the current and future needs of industry; and (b) the learning outcomes will have immediate beneficial impact within the student's own company.

UWTSD undertook a study into the technical and managerial needs of manufacturing companies within Wales. Interviews with senior management highlighted a clear need for skills development to exploit the emerging areas of Industry 4.0 and innovation management. Welsh industry (and UK industry as a whole) faces a lack of skilled graduates to take advantage of these opportunities. The proposed Masters' portfolio provides a key mechanism for delivering skilled graduates who will act as champions for advanced manufacturing and innovation management within their own companies. The recruitment of the part-time intakes (through the ESF projects) will engage directly with the companies and stress the benefits to both the student and the host employer.

In terms of teaching, delivery will be based on a blended-learning approach with online lectures and face-to-face inter-actions. This flexible approach can be adapted to suit the needs of both the student and their employer. The module assessments are based on written reports and presentation material. This strategy allows the learning outcomes (e.g. best-practice tools and techniques) to be deployed directly within the student's own company. The aim is to deliver positive economic impact back to the sponsoring company throughout the learning process. A prime example of this is the

major project. This piece of research will provide the data and insight to allow the host company to initiate the appropriate technical and managerial changes to solve a tangible industrial problem.

This handbook has been prepared to help you through your studies on the course and gives detailed guidance on a number of issues that we think will be important to you. Read it carefully and please feel free to ask should you require clarification on any point.

Graham Howe
Executive Head of MADE Cymru

PROJECT TEAM

Name and Role	Academic Areas	E-mail
Graham Howe *Principal Research Fellow* *Exec Head of MADE Cymru*	Advanced Manufacturing	graham.howe@uwtsd.ac.uk
Alan Mumby *Lecturer*	Innovation & Design	a.mumby@uwtsd.ac.uk
Jaymie Philips *Research Fellow*	Industry 4.0	jaymie.phillips@uwtsd.ac.uk
Howard Davies *Lecturer*	Finance Planning & Management	howard.davies@uwtsd.ac.uk
Dave Jones *Lecturer*	Continuous Improvement	david.jones@uwtsd.ac.uk
Ilja Asanovic *Lecturer*	Additive Manufacturing	ilja.asanovic@uwtsd.ac.uk

Name and Role	E-mail
Lisa Lucas *Industry Relationship Manager*	lisa.lucas@uwtsd.ac.uk
Lucy Beddall *Project Marketing Officer*	lucy.beddall@uwtsd.ac.uk
Amanda Hughes *Principal Project Officer*	amanda.hughes@uwtsd.ac.uk
Neil Cunningham *Principal Project Officer*	n.cunningham@uwtsd.ac.uk
Mike Swanson *Instructional Designer*	mike.swanson@uwtsd.ac.uk
Glyn Jenkins *Instructional Designer*	glyn.jenkins@uwtsd.ac.uk

PASTORAL SUPPORT

A member of academic staff will be identified at the beginning of the academic year to act as a point of first contact for all pastoral support issues. Details of the arrangements for Pastoral Support are contained in the *University Regulations – Undergraduate Student Guide* which is published on the Academic Office section on the University's website:
http://www.uwtsd.ac.uk/academic-office/university-regulations-student-guide/

EXTERNAL EXAMINERS

All taught Programmes of Study which lead to an award of the University have at least one External Examiner. The principal purposes of the University's external examiner system are to ensure that:

- the standard of each award is maintained at the appropriate level;
- the standards of student performance are comparable with standards on similar programmes or subjects in other UK institutions with which they are familiar;
- the processes for assessment and the determination of awards are sound and fairly conducted.

Students may request a copy of the previous year's External Examiner's Report for their programme of study by contacting the Exec Head of MADE Cymru.

Please note that students are not permitted to make direct contact with the External Examiners without permission and to do so may be considered a disciplinary offence.

THIS ACADEMIC YEAR

Block One – October to January (Christmas Break on Friday 24th and 31st December)
Block Two – February to May (Easter Break on Friday 15th April)
Block Three – June to September (Summer Break on Friday 19th and 26th August)

INFORMATION ABOUT YOU AND YOUR PROGRAMME OF STUDY

Information about you and your programme of study is held by the University on a central Student Record System managed by the University Registry. It is essential that the University Registry has an accurate record of your personal details at all times. It is equally important to ensure that you are enrolled on the correct Programme of Study and on the correct modules. Failure to inform the Registry of any changes in this respect can result in a range of problems including not being able to borrow materials from the Library and Learning Resources; and not having access to the IT services.

Please take time to check the enrolment information provided by the University Registry and be sure to notify the Registry of any errors or changes.

MODULAR TERMINOLOGY

Level (of Study): 7 and 5.

A level is assigned to each module to define the standard of its academic demand in line with the National Qualifications Framework which incorporates both Further Education and Higher Education.

The level is not necessarily synonymous with a year, though very often Level 4 will be the first year of a Programme of Study, Level 5 will be the second year, and Level 6 will be the third year. The basic characteristics of the relevant levels of study are outlined in section 6.1.5 of Chapter 6 of the University's Academic Quality Handbook, a copy of which is available on the Academic Office section of the website: http://www.uwtsd.ac.uk/academic-office/academic-quality-handbook/

ASSESSMENT

At the start of each module, tutors will provide on Moodle full details of the means by which you will be assessed in that module. This will include a full assessment brief and guidelines on the criteria that will be used for marking your work as well as clear information about when the assessments are due and the turn-around feedback time for the assessments. It will also detail how you will be able to discuss the feedback on your work and your performance and what to do if you have any questions.

All assessed written coursework needs to be submitted in electronic copy via Turnitin; alternative instructions will be provided by the Programme Director for any forms of coursework that cannot be submitted via Turnitin.

The University offers programmes in both English and Welsh. The normal expectation is that you will be assessed in the same language in which the programme or modules are delivered. If you have been taught in English and wish to be assessed in Welsh, or vice versa, you should consult your Programme Director about the options available to you.

You will receive confirmation of your assessment marks at the end of each year. Any marks released prior to formal approval by the Progression / Award Examining Board are provisional.

Extenuating Circumstances

If you believe that there are extenuating circumstances which may have adversely affected your ability to complete coursework or examinations, you should follow the University's procedures for Extenuating Circumstances for Taught Provision, which can be found on the Academic Office section on the University's website:
http://www.uwtsd.ac.uk/academic-office/procedures-for-academic-appeals-complaints-and-other-student-cases/

Additional needs in terms of assessment

If you have any additional needs in terms of assessment, it is your responsibility to liaise with Student Services regarding those needs at the start of the academic year, so that a Statement of Compensatory Measures can be drafted in line with the University's procedures for assessment of students with additional needs.
http://www.uwtsd.ac.uk/services-for-disabled-students/
Note that the period between the end of the summer examinations and the end of the summer term is an independent study period, which should be used to prepare for your next year of study. Further details will be provided by your Programme Director.

Academic Appeals

Information about how to appeal is provided in the 'Academic Appeal Procedure' in Chapter 13 of the Academic Quality Handbook, and in supporting documentation published on the Academic Office section on the University's website:
http://www.uwtsd.ac.uk/academic-office/procedures-for-academic-appeals-complaints-and-other-student-cases/

Additional advice is available from the Students' Union. It is very important that you note carefully the grounds on which appeals may be made and submit your appeal on the appropriate form because incomplete or ineligible appeals cannot be processed.

Assessment Regulations
The rules and regulations that govern the assessment of your Programme of Study are available in Chapters 6 and 7 of the University's Academic Quality Handbook, a copy of which is available on the Academic Office section of the website:
http://www.uwtsd.ac.uk/academic-office/academic-quality-handbook/

Responsibilities of students in relation to the assessment process
As noted in section 7.3 (5) of Chapter 7 of the Academic Quality Handbook, students are responsible for ensuring that:

i) They are correctly enrolled on their programme of study (including re-enrolment for each academic year after initial enrolment).
ii) They read and understand the information provided about how they will be assessed, how their final award will be determined, and the action to take in the event that they experience difficulties relating to assessment.
iii) They attempt every assessment component of a module.
iv) They attend examinations and other assessment events, including re-examination and re-assessment events, as required; and that they are available to attend oral examinations if required to do so within the published dates of terms or semesters, or other date notified to them in advance.
v) They submit work for assessment as required and in accordance with the required format and deadline.
vi) They inform their School or Student Services of any disability or long term impairment which might require special provisions for assessment.
vii) They familiarise themselves with the University's definition of unfair practice and undertake assessments in a manner that does not attempt to gain unfair advantage.
viii) They follow the prescribed procedures in the event that they experience extenuating circumstances or wish to appeal against the decision of an Examining Board.
ix) They keep a copy of work presented for assessment wherever feasible.
x) They make their work available for sampling for external examining purposes and for archiving.

VIRTUAL LEARNING ENVIRONMENT (VLE)

Moodle is the University's Virtual Learning Environment (VLE). The VLE is used to support learning and teaching. It can be accessed by **enrolled** students from anywhere in the world using the internet and a web browser.

Some of Moodle's features allow students to:
- Access course materials
- Facilitate communication between students and tutors
- Support group tasks
- Take online assessments with automatic marking and feedback facilities

Moodle can be used for administration tasks such as:
- Displaying announcements e.g. lecture venue changed
- Submission of assignments electronically
- Administration of online surveys, such as module questionnaires

How to Access:

You can access Moodle in 3 different ways:

1. From MyDay
   Access your MyDay dashboard either by logging into a campus PC and opening Internet Explorer, or accessing http://myday.uwtsd.ac.uk from any browser on an internet-connected device. Click on the Moodle tile.
2. From the University Website
   Navigate to http://uwtsd.ac.uk and select Quick Links (top left side of screen) and then Moodle.
3. URL Input
   Open any browser on an internet-connected device and navigate to http://moodle.uwtsd.ac.uk

Log in using your Network username and password which are the same used to access campus PC.

The language used for the delivery of this award is English.

Students who do not possess these qualifications will still be accepted however no additional support in the use of word-processing, spreadsheet and presentation software will be made available.

To get the most out of using Microsoft Teams, you'll need a webcam and headset which will enable you to make Video and Audio calls. If you don't have a webcam or headset, please contact the IT Service Desk and we'll be able to offer advice on which webcams and headsets are most suitable. UWTSD does not recommend any particular make but you generally get what you pay for.

Microsoft Office 365 is available for all students. https://www.uwtsd.ac.uk/it-exclusives/student-it-exclusives/

You are advised to use Google Chrome as the web browser as this gives the best user experience however Microsoft Internet Explorer, Microsoft Edge and Apple Safari are also compatible.

You will also need to have Microsoft Teams available, and it is important that you login to Microsoft Teams using your Student ID rather than your own organization Login. This is important for ensuring that you are registered for each session and have the access you need to resources during the session.

Programme and Module information including forums and Tutor contact information is found on Moodle at https://moodle.uwtsd.ac.uk

This video will demonstrate access and basic use
https://uwtsd.hosted.panopto.com/Panopto/Pages/Viewer.aspx?id=5871a591-7bc9-454c-bc39-aab800eeca72

If you are missing courses/modules in the **My Courses** block please contact your **Principal Project Officer.** Please note it can take 24hrs for enrolment data to feed into Moodle. If you have problems finding resources (timetables, lecture notes, assignment briefs etc.) please contact the **lecturer** that delivers the course/module.

For any technical issues or error messages contact the **IT Service Desk** via:
Web: https://webhelp.uwtsd.ac.uk
Tel: 0300 500 5055

Or email: ITServiceDesk@uwtsd.ac.uk

In any correspondence please include your name and username (your student number) together with details of your issue.

Mike Swanson, one of our Instructional Designers will also be able to help with any technical queries you may have that this hasn’t answered for you.

ASSESSMENT FEEDBACK VIA TURNITIN

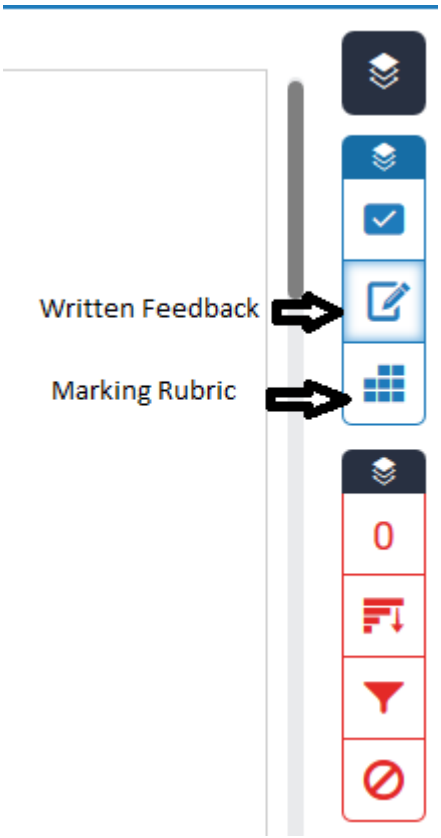
For feedback provided through Turnitin, there are two areas to get your feedback: written feedback, and the marking rubric.

Written feedback will comment on the overall work.

The marking rubric will focus on how the piece of work meets the criteria listed in the relevant rubric.

The marking rubric does not give a mathematically calculated result based on the sum of individual components, but is used holistically to help determine the mark.

Written Feedback and the Marking Rubric can be found by clicking the buttons as shown when you view your submitted assignment in Turnitin.



PROGRAMME LEARNING OUTCOMES

Main Award: MSc Industry 4.0 Advanced Manufacturing

Knowledge and understanding (KU)

KU1	A systematic understanding of the academic knowledge and industry best-practice that provide the foundations to Industry 4.0 and Innovation Management.
KU2	A comprehensive understanding of Advanced Manufacturing techniques and a practical awareness of the latest technologies at the core of Industry 4.0.
KU3	A comprehensive knowledge of evolving international standards in Innovation Management and detailed understanding of the inter-related processes needed to manage product development.
KU4	Detailed knowledge of the technical, economic, social and environmental impacts of Innovation Management and Advanced Manufacturing initiatives for industry, academia and government organisations.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Cognitive (thinking) skills (CS)

CS1	A comprehensive understanding of contemporary research methods and the ability to development critiques in order to propose new metrics to evaluate industry-based projects.
CS2	Critical analysis of technical and business scenarios to enable coherent problem definition and the identification of the underlying research questions.
CS3	Detailed understanding of the academic research process to allow reflective analysis of the originality, rigor and significance of the project output.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Practical skills (PS)

PS1	Critical review of academic and professional literature to capture evidence-based insight and highlight the problems of undertaking research into rapidly changing academic disciplines.
PS2	A systematic understanding of the tools and techniques to enable information management and data analysis within complex industry-based projects.
PS3	Practical knowledge of collaborative team working to enable problem solving, advanced scholarship and peer-to-peer learning.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Key skills (KS)

KS1	The ability to critically analyse industry-based projects through the collection of complex, transient data sets, and make coherent decisions/predictions when operating within uncertain environments.
KS2	The communication (both verbal and written) of the results of advanced scholarship to the appropriate level for subject specialists and non-specialist collaborative partners.
KS3	Transferrable skills and independent learning ability needed for employment and continuing professional development.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Intermediate/Exit Awards

Exit Award 1 PGDip Industry 4.0 Advanced Manufacturing

Knowledge and understanding (KU)

KU1	A systematic understanding of the academic knowledge and industry best-practice that provide the foundations to Industry 4.0 and Innovation Management.
KU2	A comprehensive understanding of Advanced Manufacturing techniques and a practical awareness of the latest technologies at the core of Industry 4.0.
KU3	A comprehensive knowledge of evolving international standards in Innovation Management and detailed understanding of the inter-related processes needed to manage product development.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Cognitive (thinking) skills (CS)

CS1	A comprehensive understanding of contemporary research methods and the ability to development critiques in order to propose new metrics to evaluate industry-based projects.
CS2	Critical analysis of technical and business scenarios to enable coherent problem definition and the identification of the underlying research questions.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Practical skills (PS)

PS1	Critical review of academic and professional literature to capture evidence-based insight and highlight the problems of undertaking research into rapidly changing academic disciplines.
PS2	A systematic understanding of the tools and techniques to enable information management and data analysis within complex industry-based projects.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Key skills (KS)

KS1	The communication (both verbal and written) of the results of advanced scholarship to the appropriate level for subject specialists and non-specialist collaborative partners.
KS2	Transferrable skills and independent learning ability needed for employment and continuing professional development.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Exit Award 2 PGCert Industry 4.0 Advanced Manufacturing

Knowledge and understanding (KU)

KU1	A systematic understanding of the academic knowledge and industry best-practice that provide the foundations to Industry 4.0 and Innovation Management.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Cognitive (thinking) skills (CS)

CS1	A comprehensive understanding of contemporary research methods and the ability to development critiques in order to propose new metrics to evaluate industry-based projects.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Practical skills (PS)

PS1	Critical review of academic and professional literature to capture evidence-based insight and highlight the problems of undertaking research into rapidly changing academic disciplines.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Key skills (KS)

KS1	Transferrable skills and independent learning ability needed for employment and continuing professional development.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Main Award: MSc International Innovation Management

Knowledge and understanding (KU)

KU1	A systematic understanding of the academic knowledge and industry best-practice that provide the foundations to Industry 4.0 and Innovation Management.
KU2	A comprehensive understanding of Advanced Manufacturing techniques and a practical awareness of the latest technologies at the core of Industry 4.0.
KU3	A comprehensive knowledge of evolving international standards in Innovation Management and detailed understanding of the inter-related processes needed to manage product development.
KU4	Detailed knowledge of the technical, economic, social and environmental impacts of Innovation Management and Advanced Manufacturing initiatives for industry, academia and government organisations.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Cognitive (thinking) skills (CS)

CS1	A comprehensive understanding of contemporary research methods and the ability to development critiques in order to propose new metrics to evaluate industry-based projects.
CS2	Critical analysis of technical and business scenarios to enable coherent problem definition and the identification of the underlying research questions.
CS3	Detailed understanding of the academic research process to allow reflective analysis of the originality, rigor and significance of the project output.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Practical skills (PS)

PS1	Critical review of academic and professional literature to capture evidence-based insight and highlight the problems of undertaking research into rapidly changing academic disciplines.
PS2	A systematic understanding of the tools and techniques to enable information management and data analysis within complex industry-based projects.
PS3	Practical knowledge of collaborative team working to enable problem solving, advanced scholarship and peer-to-peer learning.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Key skills (KS)

KS1	The ability to critically analyse industry-based projects through the collection of complex, transient data sets, and make coherent decisions/predictions when operating within uncertain environments.
KS2	The communication (both verbal and written) of the results of advanced scholarship to the appropriate level for subject specialists and non-specialist collaborative partners.
KS3	Transferrable skills and independent learning ability needed for employment and continuing professional development.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

<u>Intermediate/Exit Awards</u>

Exit Award 1 PGDip International Innovation Management

Knowledge and understanding (KU)

KU1	A systematic understanding of the academic knowledge and industry best-practice that provide the foundations to Industry 4.0 and Innovation Management.
KU2	A comprehensive understanding of Advanced Manufacturing techniques and a practical awareness of the latest technologies at the core of Industry 4.0.
KU3	A comprehensive knowledge of evolving international standards in Innovation Management and detailed understanding of the inter-related processes needed to manage product development.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Cognitive (thinking) skills (CS)

CS1	A comprehensive understanding of contemporary research methods and the ability to development critiques in order to propose new metrics to evaluate industry-based projects.
CS2	Critical analysis of technical and business scenarios to enable coherent problem definition and the identification of the underlying research questions.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Practical skills (PS)

PS1	Critical review of academic and professional literature to capture evidence-based insight and highlight the problems of undertaking research into rapidly changing academic disciplines.
PS2	A systematic understanding of the tools and techniques to enable information management and data analysis within complex industry-based projects.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Key skills (KS)

KS1	The communication (both verbal and written) of the results of advanced scholarship to the appropriate level for subject specialists and non-specialist collaborative partners.
KS2	Transferrable skills and independent learning ability needed for employment and continuing professional development.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Exit Award 2 PGCert International Innovation Management

Knowledge and understanding (KU)

KU1	A systematic understanding of the academic knowledge and industry best-practice that provide the foundations to Industry 4.0 and Innovation Management.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Cognitive (thinking) skills (CS)

CS1	A comprehensive understanding of contemporary research methods and the ability to development critiques in order to propose new metrics to evaluate industry-based projects.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Practical skills (PS)

PS1	Critical review of academic and professional literature to capture evidence-based insight and highlight the problems of undertaking research into rapidly changing academic disciplines.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

Key skills (KS)

KS1	Transferrable skills and independent learning ability needed for employment and continuing professional development.

Each of the above PLOs is covered by at least 2 modules at the appropriate level (taking into account individual patterns of study)

PROGRAMME STRUCTURE

MSc International Innovation Management (IIM)

MSc Industry 4.0 Advanced Manufacturing (I4W)

Short Course – Level 7 (+ Level 6) Business Improvement with Innovation Management

Additionally, this short course is available as two Level 6 modules due to funding availability in East Wales. These Level 6 and Level 7 modules will be taught together, with a difference in assessment strategies, as shown in the Module Outlines.

Many students having enjoyed this Level 7 two-module short course have opted to continue their studies by adding some extra learning through additional modules or carried on to the full MSc programme.

October 2021	February 2022
Introduction to Innovation	Management of New Product Development

Short Course – Level 5 Continuous Improvement with Industry 4.0

October 2021	February 2022
Six Sigma Green Belt	
Group Project	

Short Course – Level 7 Smart Manufacturing with Industry 4.0

Here we have an option for the 2nd module, you can either study the Advanced Industry 4.0 or the Design for Industry 4.0 module.

Many students having enjoyed this two-module short course have opted to continue their studies by adding some extra learning through additional modules or carried on to the full MSc programme.

October 2021	February 2022
Introduction to Industry 4.0	Advanced Industry 4.0
	Design for Industry 4.0

MADE Cymru Seminars

Often we will use Tuesday evenings for seminars or tutorials, these will run for no more than an hour, and generally run for different modules between 4pm to 8pm. These offer the opportunity for discussion and dialogue with Module Leaders, and importantly give you a chance to discuss the module content and your learning with your student colleagues.

Often we will use the Tuesday evenings for the occasional Tuesday Evening Guest Lecture which is considered to add value to your studies independent of your programme pathway you are following.

Student Staff Meetings

Throughout the year we will run a series of Student Staff Meetings, these will be generally on Tuesday afternoons in December, April, and August and give your elected Student Representative for each group the opportunity to discuss your cohorts feedback of the modules.

Pastoral Care

We are continuously using Microsoft Teams, not only for the Friday afternoon lectures, the Tuesday seminars but also quite often for assignment tutorials and 1:1 online meetings should you need them. Key to your success through the programme is to keep in contact with your module leaders, if you have queries please get in touch as soon as possible so that we are able to help in the best way that we can.

UNIVERSITY ATTENDANCE POLICY

All students are required to attend all scheduled classes and tutorials and we have to record individual academic attendance.

Disciplinary action will be taken for any sustained periods of unauthorised absence. Students who have a legitimate reason for unexpected absences (including the instance of illness or injury) must provide evidence to Principal Project Officer as appropriate, immediately following their return, to ensure that it is noted as authorised leave.

Wherever possible, students should notify our Principal Project Officers in advance of any absence, completing the appropriate forms to explain the circumstances that require this. Although short, authorised absences are not normally counted against the student, these are taken into consideration in the annual review of each student's cumulative attendance (see below). Confirmation of authorised absence will be lodged on each student's record.

If a student does not provide any reasonable justification for periods of unauthorised absence, fails to respond to initial and/or final Attendance Warning Letters, and/or the required actions agreed at meetings with academic staff, and does not improve their attendance record, the Faculty will ask the Registry to withdraw the student.

Appeal against withdrawal due to poor attendance – Information on how to appeal against withdrawal due to poor attendance is provided on the University's website (http://www.uwtsd.ac.uk/academic-office/procedures-for-academic-appeals-complaints-and-other-student-cases/).

It is very important that you note carefully the grounds on which appeals may be made and submit your appeal on the appropriate form (using the Administrative Appeal (Attendance) Application) because incomplete or ineligible appeals cannot be processed (http://www.uwtsd.ac.uk/academic-office/other-forms-and-policies/).

ABOUT UNFAIR PRACTICE AND PLAGIARISM

The University defines unfair practice as 'any act, intentional or otherwise, whereby a person may obtain for himself/herself or for another, an unpermitted advantage…'. Committing unfair practice in assessment is one of the most serious offences in academic life, and its consequences can be severe. It undermines the integrity of scholarship, research, and of the examination and assessment process.

It is very important to understand that it is no defence to claim that unfair practice has been committed unintentionally, accidentally, due to extenuating circumstances or a long-term impairment (irrespective of whether or not these circumstances or long-term impairment have been acknowledged by the University).

Plagiarism is one type of unfair practice. Plagiarism is passing off, or attempting to pass off, another's work as your own. It includes copying the words, ideas, images or research results of another ***without acknowledgement***, whether those words etc. are published or unpublished. It is plagiarism, for example, to copy the work of another student, of a member of staff or a published article without crediting the author. Persons who allow their work to be plagiarised are also guilty.

It should be noted that re-submitting work that has already been submitted for a different assessment task without noting that this is the case is also regarded as plagiarism (and is called self-plagiarism) and will be treated as such.

Plagiarism is one of the worst offences in academic life, and its consequences can be severe. It undermines the integrity of scholarship, research, and of the examination and assessment process. The guidance that follows explains what is meant by plagiarism, describes the University's regulations for dealing with it, and provides help in avoiding it.

When enrolling as a student at the University of Wales Trinity Saint David you have consented to your work being scrutinised both electronically and in person to check for cases of plagiarism. In many Schools your work will be submitted electronically via Moodle.

For submissions outside of the Moodle platform, it is equally important that you reference your sources accurately. In some cases you will be expected to submit both hard and electronic copies, which can be checked against the database of the UK Higher Education Plagiarism Detection Service. For handwritten, portfolio and process workbook submissions check with your module tutor if you are in any doubt about whether you have infringed the regulations. They are here to assist you; ensure that you take advantage of their expertise.

Plagiarism: Regulations, Procedure and Penalties

Full details of the University's procedures and penalties for dealing with issues of plagiarism can be found in Chapter 13 of the *Academic Quality Handbook*, which can be seen on the University website or obtained from the Faculty Offices. These details are also summarised in the *University Regulations – Undergraduate Student Guide* which is published on the Academic Office section on the University's website:
http://www.uwtsd.ac.uk/academic-office/university-regulations-student-guide/

Avoiding Plagiarism

Coursework, dissertations, or creative work are meant to be your own original work. Obviously you will use the work of others. Not only is this inevitable, it is expected.

All scholarship builds on the work of others. The important thing to remember is always to **acknowledge your sources**. The University recognises four referencing styles: APA, Harvard, IEEE and MHRA and provides a handbook for each of these styles. For your programme of study you should be using X. The handbooks can be found online: https://www.uwtsd.ac.uk/library/infoskills/referencing-handbooks/ or in print from the Library and Learning Resources. A Referencing Essentials session will be provided during the first term of your first year but as a general rule of thumb observe the following:

- *Anything that is copied or quoted from another source, including electronic sources such as the internet, must be in quotation marks and attributed to the original author. This may be in the body of the text or as a footnote, depending on which Referencing style you are asked to use.*

- *Paraphrasing or summarising the work of others involves putting their ideas into your words. This is fine, but again, acknowledge your source.*

- *Where you are generally indebted for your ideas to one or two main sources, this can be a bit trickier. If the ideas or the way they are presented come from one or two sources, make this clear. Do the same if they come from lectures. It is important not to claim originality where it does not exist but to indicate in general where the information comes from.*

- *Full citations in timed unseen examinations are obviously not expected, but you should indicate general indebtedness and always credit any quotations you have managed to remember.*

The golden rule is; ***`if in doubt, provide references'*** and your Referencing Handbook will provide you with specific guidance to help you to do this correctly. For support, contact your tutor or Academic Liaison Librarian. There are no penalties for asking for advice and guidance; there are severe penalties for plagiarism and failure to reference means your work could be considered to be plagiarised.

Other types of Unfair Practice

There are other types of unfair practice, including, but not limited to producing work as a group where it is an individual task (called collusion), fabricating data or making false claims to have carried out research, using the service of an essay bank/essay mill, having an unauthorised source of information in an examination, prohibited communication during an examination. The same regulations, procedures and penalties apply to all types of unfair practice.

LIBRARY AND LEARNING RESOURCES

Library and Learning Resources (LLR) supports the learning, teaching and research activities of staff and students across the University with libraries at Carmarthen, Lampeter, London and Swansea and includes online resources, social learning spaces, special collections and archives.

The library prioritises the purchase of e-books over print wherever possible and loan periods are regularly reviewed by the library to ensure that they are appropriate and provide equitable access to resources. It is expected that at least all Essential reading list items are available from the library. The LLR follows a Fairer Fines policy which means students are only fined on items if they are in heavy demand or requested by another library user.

The LLR provides a *Need More?* service which aims to provide a one stop shop for all learning resource needs, for example, if a book, journal or thesis is needed which is not in the library stock then it may be purchased or borrowed from another library. Further information can be found here: http://www.uwtsd.ac.uk/library/library-guide/need-more/.

Learning Spaces
There are six libraries across the Carmarthen, Lampeter, London and Swansea campuses. As well as collections, the library provides a variety of modern and flexible learning spaces, reflecting different styles of working e.g. group study spaces and quiet areas, as well as IT facilities, wireless internet, photocopying and printing facilities and excellent customer service.

Online Library
The LLR offers a wide range of printed and electronic resources including an extensive collection of online e-journals and e-books that are available 24/7. Users may access an extensive collection of online e-journals and e-books that are available 24/7 including scholarly journals, newspapers, company reports and reference material. The library catalogue searches the whole range of print and online library materials and gives access to your library account from anywhere.

InfoSkills
All students are provided with a library tour, a Basic Skills session and a Referencing Essentials session in the first few weeks at the University. Academic Liaison Librarians will help students to develop the skills required to find, use and evaluate information sources within their subject areas. Numerous sessions are offered throughout the year to help students develop their Information Skills further to support their academic success and employability. These include sessions on identifying fake news, using statistics, commercial awareness, managing the information about them that is available online and accessing information sources in accessible formats. The LLR operates an open door policy which enables students to ask for help and advice on the information resources available throughout the academic year. Academic Liaison Librarians are welcomed to Staff / Student Committees, School Board meetings and also attend other relevant Faculty meetings where invited, including Faculty Board. For further information on InfoSkills provision go to: https://www.uwtsd.ac.uk/library/infoskills/

Special Collections and Archives
The Library is also home to the Special Collections of UWTSD, including the University's oldest printed books, manuscripts and archives. The Special Collections include over 35,000 printed works, 8 medieval manuscripts, around 100 post medieval manuscripts, and 69 incunables. Material from the Archives includes the institutional archive of St David's College, later The University of Wales, Lampeter, and Trinity College Carmarthen, both constituent members of the University of Wales Trinity Saint David. Students are encouraged to use these wonderful resources as part of their studies, regardless of discipline. Visits and workshops are often arranged within the purpose-built reading rooms in the Lampeter campus library and there is a regular programme of exhibitions across the campuses and online.

For recent service developments, updates and contact information please visit the University Library website at http://www.uwtsd.ac.uk/library/. Please also follow the Library and Learning Resources on Facebook, Instagram or Twitter for up-to-date news, service developments and information on new services and resources: @UWTSDLib

STUDENT SERVICES

A professional support service providing high quality information, advice, guidance, practical and emotional support to enable all students to reach their full potential. Support available includes the Careers Service, Financial Support, Learning Support, Counselling Service and support for students from a care background. For further details see http://www.uwtsd.ac.uk/student-services/.

STUDY SKILLS

All students have access to study skills support to assist them in their studies. Details of provision are available from the Student Services offices on each campus and at http://www.uwtsd.ac.uk/study-skills/.

Topics covered include:
Developing effective study strategies
Planning and writing assignments
Preparing presentations
Planning for seminars
Preparing for exams

Drop-in study skills sessions and 1:1 appointments are available on the Carmarthen, Lampeter and Swansea campuses during term time – no appointment necessary. Distance learning students are also able to access the Study Skills Distance service using e-mail, telephone or Skype. Please see the Student Services study skills webpages for further details: http://www.uwtsd.ac.uk/study-skills/.

COMPLAINTS

You have a right to make a complaint about any specific concern about the provision of your Programme of Study or a related academic service. Full details of the complaints process can be found in the 'Procedure for Student Complaints' in Chapter 13 of the Academic Quality Handbook and in supporting documentation published on the Academic Office section on the University's website:
http://www.uwtsd.ac.uk/academic-office/procedures-for-academic-appeals-complaints-and-other-student-cases/

This page is intentionally blank.

Module Code	ACPA6000
Title	New Product Development
Date	04/08/2021
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To evaluate the primary elements of the new product development process.
- To develop the knowledge, skills and expertise necessary to plan, implement and manage a successful product development process.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Develop and evaluate a detailed plan for an appropriate new product development process for a given product scenario.
- Make critical judgements on alternative approaches to new product development based on technological, strategic and financial / business considerations.

INDICATIVE CONTENT

- Knowledge acquisition and evaluation
- Business opportunity appraisal
- Product design specifications
- Distributive new product development
- Concept generation
- Prototyping and evaluation
- Technical and market testing
- Market introduction

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written report	4,500 words	100%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	**100%**

READING LIST

Module Code	**ACPA6000**	
Module Title	**New Product Development**	
Classification	**Reading List entry**	**Electronic***
Essential	Paul Trott (2012), *Innovation Management and New Product Development*, 5th edition, London: Prentice Hall.	☒
Essential	Joe Tidd and John Bessant (2013), *Managing Innovation: Integrating Technological, Market and Organizational Change*, 5th edition, Wiley. Online reference material: http://johnbessant.org/the-innovation-portal/	☐
Essential	Robert Cooper and Scott Edgett (2005) *Lean, Rapid and Profitable New Product Development*, Product Development Institute.	☐
Further	Peter Drucker (2012) *Innovation and Entrepreneurship*, Taylor and Francis.	☒
Further	Malcolm Goodman and Sandra Dingli (2013) *Creativity and Strategic Innovation Management*, New York: Routledge.	☒
Further	Journal of Product Innovation Management	☒
Further	Journal of Engineering and Technology Management	☒
Further	Technovation	☒
Further	Journal of Product and Brand Management	☒
Further	Production and Operations Management	☒

Module Code	ACPA6001
Title	Innovation Management
Date	04/08/2021
Level	6
Credits	20
Pre-Requisites	None

AIM(S)

- To review innovation best practice within an industrial context and understand the factors which both influence and contribute to the successful management of innovation.

- To evaluate innovation management concepts and apply this understanding to the analysis of real-world innovation exemplars.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Evaluate the uncertainties and technical/business risks inherent within any innovation-based activities.

- Demonstrate a systematic understanding of the key elements that contribute to successful innovation management processes.

- Synthesise a detailed view of how individual, team and corporate behaviour can both facilitate or stifle innovation, in relation to best-practice procedures.

INDICATIVE CONTENT

- Innovation, uncertainty and risk

- Individual, collective and corporate innovation

- Pre-conditions for innovation – corporate culture and innovation

- Innovation and business strategy

- Leadership styles and change management

- Theory of innovation management (including business model canvas)

- Scenario planning

- Strategies and implementation plans

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Group seminar presentation	15 mins per person	50%

Assessment Component 2

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written report	2,500 words	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	50%
Practical	50%
TOTAL	**100%**

READING LIST

Module Code	**ACPA6001**	
Module Title	**Innovation Management**	
Classification	**Reading List entry**	**Electronic***
Essential	Paul Trott (2012), *Innovation Management and New Product Development*, 5th edition, London: Prentice Hall.	☒
Essential	Joe Tidd and John Bessant (2013), *Managing Innovation: Integrating Technological, Market and Organizational Change*, 5th edition Wiley. Online reference material: http://johnbessant.org/the-innovation-portal/	☐
Essential	Peter Drucker (2012) *Innovation and Entrepreneurship*, Taylor and Francis.	☒
Further	OECD/Eurostat (2018), *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation*, 4th edition, Paris/Eurostat, Luxembourg.	☒

Further	Malcolm Goodman and Sandra Dingli (2013) *Creativity and Strategic Innovation Management*, New York: Routledge.	☒
Further	Mark Dodgson, David Gann and Nelson Phillips (2015), *The Oxford Handbook of Innovation Management*, Oxford University Press.	☐
Further	Journal of Product Innovation Management	☒
Further	Research Technology Management	☒
Further	European Journal of Innovation Management	☒
Further	Asia-Pacific Journal of Management Research and Innovation	☒
Further	Journal of Open Innovation	☒

Module Code	ACPA7006
Title	Management of New Product Development
Date	23/04/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To evaluate the primary elements of the new product development process.
- To develop the knowledge, skills and expertise necessary to plan, implement and manage a successful product development process.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Systematically document and evaluate a detailed plan for an appropriate new product development process for a given product scenario.
- Make critical judgements on alternative approaches to new product development based on technological, strategic and financial / business considerations.
- Comprehensively understand the challenges inherent in incremental and disruptive new product development practices.

INDICATIVE CONTENT

- Knowledge acquisition and evaluation
- Business opportunity appraisal
- Product design specifications
- Distributive new product development
- Concept generation
- Prototyping and evaluation
- Technical and market testing
- Market introduction

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written report	4,500 words	75%

Assessment Component 2

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Individual presentation	10 mins	25%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	75%
Practical	25%
TOTAL	**100%**

READING LIST

Module Code	**ACPA7006**	
Module Title	**Management of New Product Development**	
Classification	**Reading List entry**	**Electronic***
Essential	Paul Trott (2012), *Innovation Management and New Product Development*, 5th edition, London: Prentice Hall.	☒
Essential	Joe Tidd and John Bessant (2013), *Managing Innovation: Integrating Technological, Market and Organizational Change*, 5th edition, Wiley. Online reference material: http://johnbessant.org/the-innovation-portal/	☐
Essential	Robert Cooper and Scott Edgett (2005) *Lean, Rapid and Profitable New Product Development*, Product Development Institute.	☐
Further	Peter Drucker (2012) *Innovation and Entrepreneurship*, Taylor and Francis.	☒

Further	Malcolm Goodman and Sandra Dingli (2013) *Creativity and Strategic Innovation Management*, New York: Routledge.	☒
Further	Journal of Product Innovation Management	☒
Further	Journal of Engineering and Technology Management	☒
Further	Technovation	☒
Further	Journal of Product and Brand Management	☒
Further	Production and Operations Management	☒

Module Code	ACPA7005
Title	Introduction to Innovation Management
Date	23/04/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To review innovation best practice within an industrial context and understand the factors which both influence and contribute to the successful management of innovation.

- To evaluate innovation management concepts and apply this understanding to the analysis of real-world innovation exemplars.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Critically evaluate the uncertainties and technical/business risks inherent within any innovation-based activities.
- Demonstrate a systematic understanding of the key elements that contribute to successful innovation management processes.
- Synthesise a detailed view of how individual, team and corporate behaviour can both facilitate or stifle innovation, in relation to best-practice procedures.

INDICATIVE CONTENT

- Innovation, uncertainty and risk
- Individual, collective and corporate innovation
- Pre-conditions for innovation – corporate culture and innovation
- Innovation and business strategy
- Leadership styles and change management
- Theory of innovation management (including business model canvas)
- Scenario planning
- Strategies and implementation plans

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Group seminar presentation	15 mins per person	50%

Assessment Component 2

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written report	3,000 words	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	50%
Practical	50%
TOTAL	**100%**

READING LIST

Module Code	**ACPA7005**	
Module Title	**Introduction to Innovation Management**	
Classification	**Reading List entry**	**Electronic***
Essential	Paul Trott (2012), *Innovation Management and New Product Development*, 5th edition, London: Prentice Hall.	☒
Essential	Joe Tidd and John Bessant (2013), *Managing Innovation: Integrating Technological, Market and Organizational Change*, 5th edition Wiley. Online reference material: http://johnbessant.org/the-innovation-portal/	☐
Essential	Peter Drucker (2012) *Innovation and Entrepreneurship*, Taylor and Francis.	☒
Further	OECD/Eurostat (2018), *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation*, 4th edition, Paris/Eurostat, Luxembourg.	☒
Further	Malcolm Goodman and Sandra Dingli (2013) *Creativity and Strategic Innovation Management*, New York: Routledge.	☒
Further	Mark Dodgson, David Gann and Nelson Phillips (2015), *The Oxford Handbook of Innovation Management*, Oxford University Press.	☐
Further	Journal of Product Innovation Management	☒
Further	Research Technology Management	☒

Further	European Journal of Innovation Management	☒
Further	Asia-Pacific Journal of Management Research and Innovation	☒
Further	Journal of Open Innovation	☒

Module Code	ACPA7003
Title	International Innovation Management
Date	23/04/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To place the theoretical aspects of innovation management within an international context.
- To develop an understanding of the practical implications of innovation management through the analysis of 'real world' international case studies.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Critically analyse the links between academic innovation theory with industry best-practice through an exemplar international product development project.
- Document and communicate a comprehensive understanding of the key elements of the international innovation process: business model, technology/manufacturing drivers, and global considerations.
- Critically reflect on the latest innovation research methodologies and systematically plan the detailed timings/milestones for an international comparative study in innovation management.

INDICATIVE CONTENT

- International standards (ISO 56000) in innovation management.
- Exemplar international product development case-studies.
- The innovation management processes with a specific international dimension.
- The underlying global business models and conceptual frameworks.
- Contemporary academic innovation theory and practical implications for global collaboration.
- Cultural factors in international innovation.
- Analysis of market, technological and organisational change.
- Feasibility of research methods and data sources for international projects.
- Exemplar international NPD project plans and timeline considerations.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Group seminar presentation	15 mins per person	50%

Assessment Component 2

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written report	3,000 words	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	50%
Practical	50%
TOTAL	**100%**

READING LIST

Module Code	**ACPA7003**	
Module Title	**International Innovation Management**	
Classification	**Reading List entry**	**Electronic***
Essential	Paul Trott (2012), *Innovation Management and New Product Development*, 5th edition, London: Prentice Hall.	☒
Essential	Joe Tidd and John Bessant (2013), *Managing Innovation: Integrating Technological, Market and Organizational Change*, 5th edition Wiley. Online reference material: http://johnbessant.org/the-innovation-portal/	☐
Essential	The new ISO 56000 series of International Standards in Innovation Management.	☒

	Standards will be purchased by ESF/ERDF project team and disseminated through teaching material.	
Essential	Melissa Schilling (2013), Strategic Management of Technological Innovation, 4th edition, New York: McGraw-Hill.	☐
Further	OECD/Eurostat (2018), *Oslo Manual 2018: Guidelines for Collecting, Reporting and Using Data on Innovation*, 4th edition, Paris/Eurostat, Luxembourg.	☒
Further	Mark Dodgson, David Gann and Nelson Phillips (2015), *The Oxford Handbook of Innovation Management*, Oxford University Press.	☐
Further	International Journal of Innovation Studies	☒
Further	Journal of Product Innovation Management	☒
Further	The International Journal of Entrepreneurship and Innovation	☒
Further	European Journal of Innovation Management	☒
Further	Research Technology Management	☒
Further	Asia-Pacific Journal of Management Research and Innovation	☒

Module Code	**ACPA7004**
Title	**Introduction to Industry 4.0**
Date	**23/04/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To enable the students to develop an understanding of the principles of the core areas, necessary to analyse and solve challenges in an Industry 4.0 driven manufacturing environment.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Demonstrate a systematic and comprehensive understanding of the principles, practice and current challenges of Industry 4.0 technologies.

- Critically evaluate existing manufacturing systems at an operational level, applying engineering analysis methods to solve complex problems and identify opportunities for new and emerging Industry 4.0 technology enablers to deliver sustainable economic and societal benefit.

INDICATIVE CONTENT

- Historical context of the 4th Industrial Revolution, including drivers, enablers, compelling forces and challenges for Industry 4.0

- Lean thinking manufacturing strategies, continuous improvement utilising tools such as Value Stream Mapping (VSM) whilst ensuring resilient supply chains through discrete event simulation using appropriate software.

- Theory of Constraints, Lean and Agile Manufacturing strategies

- Robotics and Automation, including low-cost automation.

- Control systems, including an overview of PLCs

- Appreciation of Programme languages, such as Python, C and Java and their use for Internet of Things, Industrial Internet of Things, Internet of Services applications.

- Smart manufacturing, smart devices, smart logistics.

- Circular economy and its influence on the manufacturing strategy.

- Role of data, information, cloud-based computing and cybersecurity.

- Enabling manufacturing strategies to deliver efficient operations in an Industry 4.0 world including the role of the 'Digital Twin' in the Factory of the Future.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written Report	1,500 words	25%

Assessment Component 2
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Essay	4,500 Words	75%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	**100%**

READING LIST

Module Code	**ACPA7004**	
Module Title	**Introduction to Industry 4.0**	
Classification	**Reading List entry**	**Electronic***
Essential	Gilchrist, A. (2016). *Industry 4.0 The Industrial Internet of Things.* New York: Apress.	☒
Essential	Schwab, K. (2016). *The Fourth Industrial Revolution.* Geneva: World Economic Forum.	☐
Essential	Goldratt, E. M., & Cox, J. (2014) *The Goal: A process of ongoing improvement.* Great Barrington, MA: North River Press.	☐

Further	Nash, M A & Poling, S.R. (2008) *Mapping the Total Value Stream.* Florida: Productivity Press.	☒
Further	Womack, J P & Jones, D T (2007) *Lean Solutions; How Companies and Customers can create value and wealth together.* London: Simon & Schuster	☐
Further	Womack, J P & Jones, D T (2007) *The Machine that changed the World.* London: Simon & Schuster	☐
Further	**Journals** Journal of Manufacturing Systems CIRP Journal of Manufacturing Science and Technology The International Journal of Advanced Manufacturing Technology Procedia Manufacturing International Journal of Operations & Production Management International Journal of Machine Tools and Manufacture	☒

Module Code	**ACPA7000**
Title	**Advanced Industry 4.0**
Date	**23/04/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To enable students to critically evaluate a range of complex issues that influence and affect an industry 4.0 driven manufacturing environment with particular attention to the total supply chain pressures and delivering authentic economic and societal benefit.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Critically evaluate manufacturing systems at a strategic level to identify opportunities for new and emerging Industry 4.0 technology enablers, whilst identifying the cultural and workforce factors that may contribute to delivering authentic economic and societal benefit.

- Identify new business models and forms of operations leading to new sources of value that could be enabled with new and emerging Industry 4.0 technologies.

INDICATIVE CONTENT

- Industry 4.0 technologies leveraging existing Lean / Six Sigma / Continuous improvement efforts.

- Explore ‘hidden factories’ issues in process models and operations development of workforce skills including the elimination of inefficiencies across the ‘digital thread’

- Commoditisation of products, and the influence on manufacturing strategy.

- Industry 4.0 enabled business and operational models, e.g. smart automated plants, customer-centric plans and e-plants leading to new sources of value created.

- Industry 4.0 enabled supply chain strategies including production models such as make-to-order, configure-to-order and engineer-to-order.

- Optimisation of the value chain, including information flow from raw material to final product delivery, captured through the ‘digital thread’.

- Applications of advanced technology (such as virtual reality, augmented reality, mixed reality) to develop and enhance the effectiveness of the ‘digital twin’

- Industrial Internet of Things and Internet of Services relating to Intellectual Property, protection and security issues to enable adoption of Industry 4.0 technologies.

- Systems leadership, considering technology, governance, values and ethical aspects of the new and emerging Industry 4.0 technologies and how these would affect implementation strategies.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Report	1,500 words	25%

Assessment Component 2
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Essay	4,500 Words	75%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	100%
Practical	0%
TOTAL	**100%**

READING LIST

Module Code	**ACPA7000**	
Module Title	**Advanced Industry 4.0**	
Classification	**Reading List entry**	**Electronic***
Essential	Gilchrist, A. (2016). *Industry 4.0 The Industrial Internet of Things.* New York: Apress.	☒

Essential	Lazaro, O., & Cavadini, F,. Soldatos, J,. (2019) *The Digital Shopfloor: Industrial Automation in the Industry 4.0 Era.* Gistrup*:* River Publishers	☐
Essential	Banafa, A., (2019) *Secure and Smart Internet of Things (IoT)* Gistrup*:* River Publishers	☒
Essential	Stallings, W. (2010) *Cryptography and Network Security: Principles and Practice,* Upper Saddle River: Prentice Hall	☒
Further	Schwab, K. (2016). *The Fourth Industrial Revolution.* Geneva: World Economic Forum.	☐
Further	Goldratt, E. M., & Cox, J. (2014) *The Goal: A process of ongoing improvement.* Great Barrington, MA: North River Press.	☐
Further	**Journals** Journal of Manufacturing Systems CIRP Journal of Manufacturing Science and Technology The International Journal of Advanced Manufacturing Technology Procedia Manufacturing International Journal of Operations & Production Management International Journal of Machine Tools and Manufacture	☒

Module Code	**ACPA7001**
Title	**Design for Industry 4.0**
Date	**23/04/2019**
Level	**7**
Credits	**20**
Pre-Requisites	**None**

AIM(S)

- To provide a comprehensive understanding of the implications and challenges of sustainable manufacturing factors for Industry 4.0 applications.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Critically appraise the broad range of manufacturing-related considerations of a product and synthesize design solutions with appropriate consideration of new and emerging Industry 4.0 manufacturing technologies.

- Analyse the requirements for other factors relevant for capturing full value from new and emerging Industry 4.0 technologies (e.g. design for automated assembly, design for automated dis-assembly, design for recycling and re-use, reliability, maintainability, recyclability, sustainability) and specify appropriate design features.

INDICATIVE CONTENT

- Design for Industry 4.0 Manufacturing strategies (such as additive manufacturing and implications of new and advanced materials) and how these maturing technologies can be exploited through design.

- Design processes and methodologies, including Design for Automated Assembly / Dis-assembly.

- Quality of Design Techniques - Failure Mode and Effects Analysis (design and process), Quality Function Deployment.

- Fool-proofing. Families of components. Value analysis/engineering. Economics of process selection. Integration of Design and Manufacture.

- Design for recycling, reliability, maintainability, sustainability to develop innovative products and services, systems, components to fulfil new requirements.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Seminar Presentation (individual)	20 Minutes	50%

Assessment Component 2
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Reflective Essay	3,000 words	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	50%
Practical	50%
TOTAL	**100%**

READING LIST

Module Code	**ACPA7001**	
Module Title	**Design for Industry 4.0**	
Classification	**Reading List entry**	**Electronic***
Essential	Brissaud, D et al (2006) *Innovation in Lifecycle Engineering & Sustainable Development,* Springer, Berlin	☒
Essential	Boothroyd, G (2005) *Assembly Automation & Product Design,* CRC Press, Florida	☒
Further	Hon, H (2004) *Design & Manufacture for Sustainable Development,* Professional Engineering Publishing, London	☐
Further	Mascitelli, R (2004) *The Lean Design Guidebook,* Technology Perspectives,	☐
Further	**Journals**	☒

	The International Journal of Advanced Manufacturing Technology Procedia Manufacturing International Journal on Interactive Design and Manufacturing International Journal of Operations & Production Management	

Module Code	ACPA7002
Title	Financial Management and Planning
Date	23/04/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- To provide students with an understanding of financial management and planning to support the general management process and an informed appreciation of how specialist financial management and planning can contribute to the attainment of business objectives and strategies.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Critically analyse financial and accounting concepts and apply them to prepare detailed business justification for innovation and manufacturing project investment.
- Comprehensively understand financial statement analysis to interpret complex data and prepare reports analysing corporate financial statements.
- Systematically review and analyse the main theories of corporate finance and be able to apply them to investment problems and financing decisions.

INDICATIVE CONTENT

- Financial principles and metrics.
- Overview of costing methods such as activity-based costing, throughput accounting and management accounting.
- Sources of finance and organisational relationships with financial markets.
- Financial statements.
- The financial position of businesses using ratio analysis.
- Analysis of financial data.
- Project appraisal and management accounting principles.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written report	3,000 words	50%

Assessment Component 2

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Presentation and Questions	20 minutes	50%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	50%
Practical	50%
TOTAL	**100%**

READING LIST

Module Code	**ACPA7002**	
Module Title	**Financial Management and Planning**	
Classification	**Reading List entry**	**Electronic***
Essential	Edward Fields (2011) *The Essentials of Finance and Accounting for Non-Financial Managers*, 2nd Edition, American Management Association.	☒
Essential	Martin Fridson and Fernando Alvarez (2011) *Financial Statement Analysis: A Practitioner's Guide*, 4th Edition, Wiley 2011	☒
Further	Torleif Halkjelsvik and Magne Jorgensen (2018) *Time Predictions: Understanding and Avoiding Unrealism in Project Planning and Everyday Life*, Springer.	☒
Further	Financial Innovation	☒
Further	Journal of the Knowledge Economy	☒
Further	European Financial Management	☒
Further	Industrial Marketing Management	☒
Further	Journal of Business Research	☒
Further	International Journal of Project Management	☒

Module Code	ACFA7003
Title	Master's Project
Date	08/01/2019
Level	7
Credits	60
Pre-Requisites	None

AIM(S)

- To allow the student to advance their knowledge and understanding by undertaking and managing a significant project of their own choice, related to the major themes of their MSc programme.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- To critically identify and develop an advanced research topic
- Review appropriate literature by contextualising and integrating the study into the continuing development of knowledge and understanding of chosen research topic
- Critically formulate a series of research objectives and devise strategies to support these.
- Demonstrate and display advanced critical, analytic and creative thinking
- Demonstrate advanced professional skills to present information both orally and in a written form

INDICATIVE CONTENT

The Master's Project is an essential part of the degree; it is the culmination of the Master's programme. As such, it has been designed and conceived as an integral part of the programme. Preparation for the Master's Project begins early in the programme and students acquire analytical and other research skills throughout part 1. This underpins and enhances the student's ability to undertake research.

- Formulation and rationale for suitable post-graduate research objectives
- Application of an appropriate methodology for the investigation.
- Collation and communication - recording and organising information, analysis of results, communicating the results, referencing, plagiarism.
- Critical review of appropriate literature within a conceptual/theoretical framework.
- Determination of research results.
- Critical appraisal of the results/solutions of the investigation.
- Project planning - project time scale control
- Oral/visual critique and presentation of the results of the investigation.
- Written and verbal critique of the research
- Intellectual property - copyright, trademarks, patents.
- Social and cultural context, and ethical issues

- Intellectual property - copyright, trademarks, patents.
- Social and cultural context, and ethical issues

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	15	2.5%
Independent learning	585	97.5%
Placement learning	0	0%
TOTAL	**600**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Master's Project	15,000 words equivalent Students will produce a research portfolio of work appropriate to the nature of their project. This will vary slightly according to the nature of the project undertaken. Portfolio elements may include a selection of the following, to be agreed with the external examiner: • Written Report (all students) • Exhibition Board (all students) • Presentation slides • Hardware and/or software implementation	80%

Assessment Component 2
(Tick one)

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Viva voce	15 mins (before questions)	20%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	80%
Practical	20%
TOTAL	**100%**

READING LIST

Module Code	**ACFA7003**	
Module Title	**Master's Project**	
Classification	**Reading List entry**	**Electronic ***
Essential	McCormac, C. and Davis, J. (2015) *Research Project Success: The Essential Guide for Science and Engineering Students*, Cambridge: Royal Society of Chemistry	☒
Essential	Greenfield, T. (2016) *Research Methods for Postgraduates,* London: Arnold	☒
Essential	Cottrell, S. (2011) *Critical Thinking Skills: Developing Effective Analysis and Argument - Palgrave Study Guides, 2nd Edition,* London: Palgrave Macmillan	☒
Essential	Cottrell, S. Dissertations and Project Reports: A Step by Step Guide (Palgrave Study Skills, 2014)	☒
Essential	O'Leary, Z. (2013) *Doing Your Research Project (2nd Edition)*, SAGE Publications Ltd	☒
Further	O'Leary, Z. (2015) The Essential Guide to *Doing Your Research Project,* Newcastle upon Tyne: Sage	☒
Further	Kranzler, J. H. (2017) *Statistics for the Terrified,* Upper Saddle River: Prentice Hall	☒
Further	Dawson, C. W. (2009) *Projects in Computing and Information Systems: a Student's Guide, 2nd Edition,* Boston: Addison-Wesley	☒
Further	Dipankar, D. (2019) Engineering Research Methodology: A Practical Insight for Researchers. Springer	☐
Further	Fellows, R. and Liu, A. *Research Methods for Construction (*Blackwell Oxford, 2015)	☐
Further	Few, S. (2012) *Show Me the Numbers*, Burlingame: Analytics Press	☒
Further	Hughes, B. and Cotterell, M. (2009) *5th Software Project Management*, New York: McGraw-Hill	☐
Further	Phillips, J. (2010) *IT Project Management: On Track from Start to Finish*, New York: McGraw-Hill	☐
Further	Gregoire, T.G. & Valentine, H.T. (2008) *Sampling strategies for natural resources and the environment*. Chapman, London	☐
Further	Baase, S. (2012) *A Gift of Fire: Social, Legal, and Ethical Issues for Computing and the Internet: International Edition, 4th Edition,* Boston: Pearson	☐
Further	Collis, J. and Hussey, R. (2009) Business Research: a Practical Guide for Undergraduate and Postgraduate Students, 3rd Edition, London: Palgrave Macmillan	☐
Further	Cottrell, S. (2011) Critical Thinking Skills: Developing Effective Analysis and Argument - Palgrave Study Guides, 2nd Edition, London: Palgrave Macmillan	☐

Further	Davies, M. B. (2007) Doing a Successful Research Project, London: Palgrave Macmillan	☐
Further	Dawson, C. W. (2009) Projects in Computing and Information Systems: a Student's Guide, 2nd Edition, Boston: Addison-Wesley	☐
Further	Hewson, C., Vogel, C. & Laurent, D. (2015) Internet research methods. Sage: London.	☐
Further	Few, S. (2012) Show Me the Numbers: Designing Tables and Graphs to Enlighten, Burlingame: Analytics Press	☐
Further	Quinn, M. J. (2010) Ethics for the Information Age: International Edition - 4th Edition, Boston: Pearson	☐
Further	Yin, R. K. (2008) Case Study Research: Design and Methods, 4th Edition, Newcastle upon Tyne: Sage	☐
Further	Spence, R. (2014) *Information Visualization: an Introduction,* Boston: Addison-Wesley	☐
Further	Thiel, D.V. (2014) Research methods for engineers. Cambridge UP	☒
Further	Wheater, C.P. & Cook, P.A. (2015) Using statistics to understand the environment Routledge	☐
Further	**Journals** ACM Transactions on Information Systems Behaviour and Information Technology Communications on the ACM International Journal of Electronic Commerce Journal of Strategic Information Systems Journal of Systems Management	☒
Further	**Websites** http://www.acm.org http://www.bized.co.uk http://www.managers.org.uk http://www.cbronline.com http://www.eevl.ac.uk http://juno.emeraldinsight.com http://www.ft.chadwyck.co.uk http://www.itwales.com http://www3.gartner.com http://www.silicon.com http://www.mckinseyquarterly.com http://www.zdnetweek.co.uk http://projectmanagement.ittoolbox.com/ http://www.ics.ltsn.ac.uk/resources/projman/index.html http://www.niwotridge.com/Resources/PM-SWEResources/PMResources.htm http://www.tickit.org/international.htm http://www.bcs.org/ http://www.uml.org/ http://www.omg.org/	☒

Module Code	ACFA7004
Title	Research Methods and Professional Development
Date	24/01/2019
Level	7
Credits	20
Pre-Requisites	None

AIM(S)

- The aim of this module is for students to develop a problem-solving approach to research to facilitate their production of a valid and reliable postgraduate dissertation.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Generate a project proposal that meets a given domain research requirements.

- Identify and visualise a complex research problem within a specific research domain, outline the investigative approach and comprehensively consider appropriate methods and solutions.

- Critically appraise the research process and its outcomes.

INDICATIVE CONTENT

- Core lectures on the principles of postgraduate research
  - Research principles and approaches (e.g. the research process, purpose, sources of data including primary/secondary research, quantitative/qualitative data, objective/hypothesis formation, reliability, validity)
  - Research methodologies - historical, descriptive, correlational, comparative, experimental.
  - Field data - survey design, questionnaires, sampling, statistical techniques, interviews, case studies, observation.
  - Developing a proposal - research statement, research outline and design research schedule
  - Project planning - project time scale control
  - Intellectual property - copyright, trademarks, patents.
  - Social and cultural context, and ethical considerations.

- Writing up and publishing

- Domain specific research methods:
  - Research for engineering
  - Project planning for computing
  - Advanced Quantitative research methods
  - Advanced Qualitative research methods

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1
(Tick one)

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Research Proposal	4,000 words	70%

Assessment Component 2
(Tick one)

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Presentation	10 mins (plus questions)	30%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	70%
Practical	30%
TOTAL	**100%**

READING LIST

Module Code	**ACFA7004**	
Module Title	**Research Methods and Professional Development**	
Classification	**Reading List entry**	**Electronic***
Essential	Cottrell, S. (2011) *Critical Thinking Skills: Developing Effective Analysis and Argument - Palgrave Study Guides, 2nd Edition,* London: Palgrave Macmillan	☒
Essential	Cottrell, S. (2014) Dissertations and Project Reports: A Step by Step Guide, Palgrave Study Skills	☒
Essential	O'Leary, Z. (2013) *Doing Your Research Project (2nd Edition)*, SAGE Publications Ltd	☒
Further	Dawson, C. W. (2009) *Projects in Computing and Information Systems: a Student's Guide, 2nd Edition,* Boston: Addison-Wesley	☒

Further	Dipankar, D. (2019) Engineering Research Methodology: A Practical Insight for Researchers. Springer	☐
Further	Fellows, R. and Liu, A. (2015) *Research Methods for Construction,* Oxford: Blackwell	
Further	Few, S. (2012) *Show Me the Numbers*, Burlingame: Analytics Press	☐
Further	Gregoire, T.G. & Valentine, H.T. (2008) Sampling strategies for natural resources and the environment. London : Chapman	☐
Further	Hart, C. (1998) Doing a Literature Review, Sage	☒
Further	Hewson, C. , Vogel, C. & Laurent, D. (2015) Internet research methods. London: Sage	☐
Further	Kranzler, J. H. (2011) *Statistics for the Terrified, 5th Edition,* Upper Saddle River: Prentice Hall	☐
Further	Leedy. P. D. and Ormrod, J. E. (2012) *Practical Research Planning and Design, 10th Edition, Boston:* Pearson Education	☒
Further	Maylor, H. (2010) *Project Management*, Boston: Pearson Education	☐
Further	Oppenheim, A. (1992) *Questionnaire Design, Interviewing and Attitude Measurement,* London: Continuum	☒
Further	Spence, R. (2014) *Information Visualization: an Introduction,* Boston: Addison-Wesley	
Further	Thiel, D.V. (2014) Research methods for Engineers. Cambridge UP	☒
Further	Wheater, C.P. & Cook, P.A. (2015) Using statistics to understand the environment, Routledge	☐

Module Code	ACMA5005
Title	Six Sigma Green Belt
Date	01/02/2021
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- To enable the student to apply the DMAIC problem-solving methodology to a green belt standard on a product/service, process operation.

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Demonstrate a range of tools and techniques when applying the six sigma DMAIC methodology to a chosen problem
- Design and execute a Six Sigma Green Belt project

INDICATIVE CONTENT

- Six Sigma- what is it, benefits and weaknesses applications and its uses
- Define – Developing problem statements, the customer, project charter, process mapping
- Measure – Sources of variation, FMEA analysis, data collection, process capability and measurements system analysis
- Analyse – graphical tools, roots cause analysis, sources of variation and review analysis methods
- Improve – generate improvement alternative, improve FMEA phase, cost/benefit analysis, future state process map, piloting and validate improvements
- Control – Develop control strategy, develop control plan and SOP and training plan
- Quality tools and techniques – Pareto Analysis, Cause and Effect analysis, Process Mapping, Gage R & R studies, capability studies, FMEA and data collection analysis
- Quality systems – their role in assuring quality and business management, principles of quality management and different quality standards (ISO 9001: 2015, ISO 17025 and TS/ISO 16949

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0%
TOTAL	**200**	**100%**

ASSESSMENT

Assessment Component 1

☒ **Written exam** ☐ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Examination 1 (Open Book)	1.5 hours	50%

Assessment Component 2

☒ **Written exam** ☐ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Examination 2 (Open Book)	1.5 hours	50%

Assessment Summary

Activity type	Percentage
Written exam	100%
Coursework	0
Practical	0
TOTAL	**100%**

INDICATIVE READING LIST

Module Code	ACMA5005	
Module Title	Six Sigma Green Belt	
Classification	**Reading List entry**	**Electronic***
Essential	Pyzdek, T (2018) The Six Sigma Handbook, 5th Edition, McGraw Hill Education, United States	☐
Essential	Muroe, A (2007) The Certified Six Sigma Green Belt Handbook, ASQ Quality Press, Milwaukee	☐
Essential	Bicheno, J and Holweg, M (2016) The Lean Toolbox, 5th Edition, Picsie Books, Buckingham	☐
Further	Dale, B. Bamford, D and Van der Wiele, T (2016) Managing Quality: An Essential Guide and Resource Gateway, 6th Edition, John Wiley & Sons, Chichester	☐
Further	Russell, R.S (2009) Operations Management, John Wiley & Sons, USA	☐
Further	Trivium (2019) Six Sigma Green Belt Study Guide 2019: Trivium Test Prep	☐
Further	Setter, C (2018) Six Sigma: A Complete Step-by-Step Guide, Council for Six Sigma Certification, Buffalo	☐
Further	Barsalou, M (2014) Root Cause Analysis, Productivity Press, Boca Raton	☐
Further	Sartor, M and Orzes, G (2019) Quality Management: Tools, Methods and Standards, Emerald Publishing Limited, Bingley	☐
Further	Slack, N and Brandon-Jones, A (2019) Operations Management, 9th Edition, Pearson, Harlow	☐
Further	Stevenson, W (2018) Operations Management, McGraw Hill Education, New York	☐
Further	Computers and Industrial Engineering	☒
Further	European Journal of Operations Research	☒
Further	International Journal of Production Economics	☒
Further	International Journal for Project Management	☒
Further	Journal of Cleaner Production	☒
Further	Journal of Manufacturing Systems	☒
Further	Journal of Operations Management	☒
Further	Journal of Purchasing and Supply Management	☒
Further	Operations Research Perspectives	☒
Further	Reliability Engineering and System Safety	☒
Further	www.quality.org	☒
Further	www.asp.org	☒
Further	www.isixsigma.com	☒
Further	www.cips.org	☒

Module Code	ACMA5009
Title	Group Project
Date	01/02/2021
Level	5
Credits	20
Pre-Requisites	None

AIM(S)

- Provide students with an understanding of the principles of effective research, design and development and leads to a group project involving one or more of the major topic areas of the programme being studied as well as creating an understanding of research concepts and the development of research competencies, including project management.

Where students have completed a work placement:

- To enable students to reflect upon the experiences gained during a 6-week industrial placement that took place during the end of the first year of the programme

LEARNING OUTCOMES

Upon the successful completion of this module, the student should be able to:

- Design and execute an engineering project using management strategies within time and budget constraints, considering the environment and sustainability.
- Demonstrate cognitive skills in the research and analysis of technical and business concerns and how these may conflict
- Demonstrate key transferable skills in working as part of a team, time management, communication and presentation skills.

INDICATIVE CONTENT

- Systematic design and development procedures.
- CAE, CAD and Engineering Design
- Research methodologies and techniques.
- Objective design and development selection.
- Project Planning.
- Statistical Techniques and Evaluation.
- Cost prediction, manufacturing and sustainability.
- Quality and reliability.
- Technical report writing.
- Group working and management.
- Communication skills.

Study Time Allocation

The study time for the module is divided as follows:

Activity type	Hours	Percentage
Scheduled learning	48	24%
Independent learning	152	76%
Placement learning	0	0
TOTAL	**200**	**100%**

ASSESSMENT

Where student conducts a work placement;
Assessment will be by means of a report reflecting on the work placement undertaken and a group report and supporting viva documenting the group project carried out.

OR

Where student does not conduct a work placement;
Assessment will be by means of an interim viva reflecting on progress and project specification followed by a group report and supporting viva documenting the completion of the project carried out.

Assessment Component 1

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Interim Viva / Work Placement Viva Report	15 minutes	30%

Where students have completed a work placement, component 1 will be a report reflecting on the work placement and the experience gained through it.

Assessment Component 2

☐ **Written exam** ☐ **Coursework** ☒ **Practical**

Mode of assessment	Volume	Weighting
Final Project Viva	12 minutes	20%

Assessment Component 3

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Written Project report / A3 report	2,500 words	50%

ALTERNATIVE ASSESSMENT

☐ **Written exam** ☒ **Coursework** ☐ **Practical**

Mode of assessment	Volume	Weighting
Reflective report	5,000 words	100%

Assessment Summary

Activity type	Percentage
Written exam	0%
Coursework	50%
Practical	50%
TOTAL	**100%**

INDICATIVE READING LIST

Module Code	**ACMA5009**	
Module Title	**Group Project**	
Classification	**Reading List entry**	**Electronic***
Essential	Maylor, H., Project Management 4th Edition (FT Prentice Hall, 2010)	☐
Further	Seppala, N., Business Ethics and Corporate Social Responsibility (Cengage Learning, 2010)	☐
Further	Blowfield, M., Corporate Social Responsibility (Oxford University Press, 2019)	☐
Further	Masterman, G., Sponsorship – for a Return on Investment Butterworth (Heinemann, 2007)	☐

EXAMPLAR ASSIGNMENTS

This page is intentionally blank.