Course Libraries 2020/21

Courses D – F

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: June 2019

1. What is the course?

Course information

Course Title	Defence Acquisition Management
Course code	MSDAMPTR, PDDAMPTR, PCDAMPTR, SPDAMPTR
Academic Year	Effective from September 2020
Valid entry routes	MSc/PgDip/PgCert
Additional exit routes	PgDip/PgCert
Mode of delivery	Part-time
Location(s)[1] of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence Acquisition
Centre	Centre for Defence Acquisition (CfDA)
Course Director	Steve Barker
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	Yes
Is this course offered as a Cranfield Mastership?	N/A
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	A student who registers for the PgCert will have a registration period of 3 years. For the PgDip this will be 4 years, and for the MSc 5 years.
Course Start Month(s)	No new intake for 2020-21 due to withdrawal of course

Institutions delivering the course

This course is delivered by the Centre for Systems and Technology Management within Cranfield Defence and Security where the research interests include the:

procurement and support, through life of complex, capitally-intensive systems, platforms and services for Defence; the management and leadership of acquisition change programmes; and the application of theories, concepts, analytical tools and techniques to meeting the demands of acquisition management in an increasingly complex, financially constrained, commercialised, and evolving global Defence context. Research interests are approached from an international perspective and incorporate comparisons with the structures, processes and approaches adopted by other nations.

Cranfield University interacts with the following institutions and in the following ways:

UK Ministry of Defence (Defence Equipment and Support, Navy, Army, Air, and Joint Forces Commands, DSTL, and other agencies), and defence industry to ensure that teaching on the DAM MSc reflects current and developing acquisition strategy, policy, and practice, enables informed strategic thinking and decision-making in Defence Acquisition, and ensures that teaching is research-led.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

The Course is accredited by:

1. The Chartered Institute of Purchasing and Supply:

   Easton House
   Easton on the Hill
   Stamford
   Lincolnshire PE9 3NZ
   Tel: 01780 756777
   Fax: 01780 751610
   Email: info@cips.org
   Website: www.cips.org

A student who successfully completes the DAM MSc and meets the conditions specified, may apply for direct entry into corporate membership of the Chartered Institute of Purchasing and Supply (CIPS). Acceptance will be subject to the submission of a formal application form and acceptance by the Institute. Entrance and subscription fees applicable at the time of admission to CIPS will be payable.

The Centre for Defence Acquisition is an approved centre for the:

2. Chartered Management Institute:

Management House
Cottingham Road
Corby,
Northants
NN17 1TT
Tel: 01536 204 22
Fax: 01536 201 651
Email: enquiries@managers.org.uk
Website: www.managers.org.uk

The Centre for Defence Acquisition is a Chartered Management Institute (CMI) Approved Centre (10205903) for the delivery of CMI accredited programmes.

Those achieving a Postgraduate Certificate in Defence Acquisition Management could be eligible for a CMI Level 7 Certificate in Professional Consulting depending upon the modules they select. Individuals should contact CMI to discuss this award further.

Those achieving a Postgraduate Diploma in Defence Acquisition Management or a MSc in Defence Acquisition Management are eligible to apply for a CMI Level 7 Diploma in Professional Consulting.

Students who successfully complete the compulsory modules and the 'Sustainability in Defence' and 'Decision Analysis and Modelling Support' elective options will be eligible to apply for this award.

2. What are the aims of the course?

Cranfield University offers this course in order to provide students with:

1. Critical knowledge of management theories – especially those pertinent to Defence acquisition.

2. Analytical skills for practical application to modern and increasingly commercialised, national and international Defence acquisition management.

3. An ability to work in a team based environment, to enable optimum effectiveness through the abstraction and evaluation of complex and often competing requirements.

4. The ability to exercise informed professional judgement related to acquisition.

5. The skills to critically evaluate and apply to a research thesis based on a relevant acquisition issue, challenge or opportunity.

Postgraduate Certificate (PgCert) and Postgraduate Diploma (PgDip) exit routes are provided for students who wish to access only parts of the course.

This programme is intended for UK MOD students only.

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate in Defence Acquisition Management

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Analyse defence acquisition in a UK and global context

ILO 2. Critically evaluate strategic management approaches and their applicability within the key management areas that comprise the defence acquisition environment

ILO 3. Apply models, techniques, tools and processes within a defence acquisition environment

ILO 4. Demonstrate systematic knowledge of the relationship between defence acquisition theory, practice and context and, describe the trends that have shaped this relationship

ILO 5. Apply relevant theories and concepts to the management of complex projects in an integrated team based environment

ILO 6. Critically analyse the application of defence acquisition theories and concepts to a specific defence context

ILO 7. Develop and prioritise strategies and approaches that utilise and enhance effective customer supplier relationships

B. Postgraduate Diploma in Defence Acquisition Management

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 8. Demonstrate commercial best practice and identify relevant applications within the defence acquisition environment

ILO 9. Critically evaluate strategies within specific areas of the acquisition environment (e.g. capability requirements, systems engineering, procurement, contracting, supply chain management logistic operations, logistic engineering, knowledge management, sustainability and international acquisition in order to enhance relevant concepts, processes, procedures, techniques and applications

ILO 10. Critically appraise research publications and, communicate the related defence acquisition issues to informed and uninformed audiences

ILO 11. Evaluate and apply concepts and techniques to the through life management of equipment

ILO 12. Develop the body of knowledge that constitutes defence acquisition

ILO 13. Interpret military capability requirements in the specification, procurement and logistic support of equipment, materiel and supplies

ILO 14. Critically assess activities, roles and relationships necessary for the effective integration of the acquisition cycle

ILO 15. Demonstrate an ability to work within teams developing and promoting solutions to acquisition challenges

C. MSc in Defence Acquisition Management

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 16. Demonstrate and deliver key approaches to defence acquisition issues, opportunities and challenges

ILO 17. Undertake analytical research, using an appropriate research methodology, data collection and analysis in a defined area, producing evidence based and applicable recommendations for action to enhance defence acquisition performance

ILO 18. Exercise self-direction, independent learning abilities and originality of thought in optimising, evaluating and presenting defence acquisition management recommendations and solutions

4. How is the course taught?

Students will be supported in their learning and personal development by:

- A highly experienced teaching team that has developed a number of specific case studies that draw out acquisition issues used by more than one module. This enhances the learning experience as students become aware that a complex issue can be viewed from a number of perspectives. This highlights the linkages between the topics and modules and hence the inter-disciplinary nature of the DAM Programme.
- High profile subject matter experts from defence industry and the MOD who are invited to deliver presentations and assist with case studies.
- The utilisation of syndicate work and presentations where students are required to draw on material from prior modules, recognising that acquisition is inter-disciplinary.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	**Credits**
COMPULSORY MODULES:	
Introductory Studies Strategic Management and Introduction to Acquisition	0 10
ELECTIVE MODULES:	**(50 credits)**
Modules: Any 5 modules, but can only include one of the modules listed for PgDip/MSc as elective..	Each module: 10 credits
TOTAL:	60 credits

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	**Credits**

COMPULSORY MODULES:	
Introductory Studies	0
Strategic Management and Introduction to Acquisition	10
Financing Acquisition	10
Programme and Project Management	10
Managing Acquisition Change	10
Supply Network Management in Defence and the Commercial Environment	10
Commercial Relationships in the Defence Environment	10
The International Dimension of Defence Acquisition	10
Cost Estimation and Planning	10
Efficient and Effective Through Life Support	10
Defence Capability Management	10
ELECTIVE MODULES:	**(20 credits)**
Select two modules from:	
Sustainability in Defence	10
Knowledge in Defence	10
Human Centric Systems Engineering	10
Decision Analysis and Modelling Support	10
TOTAL:	120 credits

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Introductory Studies	0
Strategic Management and Introduction to Acquisition	10
Financing Acquisition	10
Programme and Project Management	10
Managing Acquisition Change	10
Supply Network Management in Defence and the Commercial Environment	10
Commercial Relationships in the Defence Environment	10
The International Dimension of Defence Acquisition	10
Cost Estimation and Planning	10
Efficient and Effective Through Life Support	10
Defence Capability Management	10
Research Methods	0
Thesis	80
ELECTIVE MODULES:	**(20 credits)**
Select two modules from:	
Sustainability in Defence	10
Knowledge in Defence	10
Human Centric Systems Engineering	10
Decision Analysis and Modelling Support	10
TOTAL:	200 credits

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Part-time students register for the course in January and are expected to complete the course within 5 years.

Please see the table of Course Modules for details on the individual elements of the course.

This course is currently offered only on an executive (i.e., part-time) basis.

Students commence their studies in January and will normally complete the taught phase in December of the following year. Each module is residential and is taught over a one week period (Monday to Friday). Modules are scheduled to run approximately every two months. Modules are scheduled so that, as far as is practicable, students will have completed and submitted a module assessment by no later than one week before they attend their next module. Most Module Leaders expect students to complete a certain amount of preparatory work during this week. Where students are required to do preparatory work, the necessary material will be released to them, on-line, via the Cranfield Defence and Security Virtual Learning Environment (VLE).

On completion of the taught phase in (normally) December of year two, students will commence the research (thesis) phase, beginning with attendance on the Research Methods, module in either January or Summer (typically July). Students will normally have confirmed their thesis subject topic by the end of this Module. They will then go on to complete the thesis proposal and be allocated a supervisor. The completed thesis will normally be submitted by late April of year four for January starts or by late October

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

of year four for those starting in July. During the research phase, students are expected to maintain monthly contact with their allocated supervisor.

Course modules

The following modules outline all parts of the programme leading to **MSc**. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[4]	Total hours delivered by Visiting Lecturers[5]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[6] - 40% or 50%	Type of Assessment	Weighting within module[7] (%) of	Weighting within module of multi-part assessments[8](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[9]	Assessment Submission and/or exam date[10]	Assessment / Exam Retake date
1	R-DAM-IS	Introductory Studies	Dr S Barker	12	0	0	N	Not running this academic year			N/A	AO	N/A					N/A
2	R-DAM-SMIA	Strategic Management and Introduction to Acquisition	Mr John McCormack	30	0	10	Y	Not running this academic year			40 40	ICW GCW	80 20					TBA

[4] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[5] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[6] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[7] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[8] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[9] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[10] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[4]	Total hours delivered by Visiting Lecturers [5]	Credits	Is the module shared? Y/N	Calendar			Assessment								
												Independent Assessment		Multi-part Assessment			Submission dates		
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[6] - 40% or 50%	Type of Assessment	Weighting within module[7] (%) of	Weighting within module of multi-part assessments [8](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[9]	Assessment Submission and/or exam date[10]	Assessment / Exam Retake date
8	R-DAM-IDDA	The International Dimensions of Defence Acquisition	Dr P Ito	30	0	10	Y	21/12/20	25/01/21	28/01/21	40	ICW	100				08/03/21	TBA
15 (E)	R-SEDC-DAMS	Decision Analysis and Modelling Support	Dr K McNaught	30	0	10	Y	12/10/20 (A20) 18/10/21 (A21)	12/10/20 18/10/21	16/10/20 22/10/21	40	ICW	100				23/11/20 29/11/21	TBA TBA
3	R-DAM-FA	Financing Acquisition	Dr I Ansari	30	0	10	Y	26/02/21	08/03/21	12/03/21	40 40	EX GPRES	70 30				13/04/21 12/03/21	TBA
13 (E)	R-DAM-MKIDA	Knowledge in Defence	Dr Roger Darby	30	0	10	Y	22/02/21	22/03/21	25/03/21	40	ICW	100				04/05/21	TBA
14 (E)	R-SEDC-HCSE	Human Centric Systems Engineering	Dr F Camelia	35	0	10	Y	26/10/20 (A20) 18/02/21 (B20)	23/11/20 15/03/21	27/11/20 19/03/21	40	ICW	100				04/01/21 26/04/21	TBA TBA
4	R-DAM-PPM	Programme and Project Management	Mr J McCormack	30	0	10	Y	31/05/21	28/06/21	02/07/21	50 50			100	ICW GCW	80 20	09/08/21 09/08/21	TBA
9	R-DAM-CEF	Cost Estimation and Planning	Mr Tim Ferris	30	0	10	Y	12/04/21	17/05/21	20/05/21	40	ICW	100				28/06/21	TBA

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[4]	Total hours delivered by Visiting Lecturers [5]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[6] - 40% or 50%	Type of Assessment	Weighting within module[7] (%) of	Weighting within module of multi-part assessments [8](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[9]	Assessment Submission and/or exam date[10]	Assessment / Exam Retake date
5	R-DAM-MAC	Managing Acquisition Change	Edith Wilkinson	30	0	10	N	22/03/21	26/04/21	29/04/21	40	ICW	100				07/06/21	TBA
10	R-DAM-EETLS	Efficient and Effective Through Life Support	Mr Matt Summers	30	0	10	Y	07/06/21	12/07/21	15/07/21	40	ICW	100				23/08/21	TBA
6	R-DAM-SNMCE	Supply Network Management in Defence and the Commercial Environment	Stuart Young	30	0	10	Y	03/08/20 (A20) 09/08/21 (A21)	07/09/20 13/09/21	10/09/20 16/09/21	40	ICW	100				19/10/20 25/10/21	TBA TBA
11	R-DAM-DCM	Defence Capability Management	Mr M Summers	30	0	10	N	10/08/20 (A20) 16/08/21 (A21)	14/09/20 20/09/21	18/09/20 24/09/21	50	ICW	100				26/10/20 01/11/21	TBA TBA
12 (E)	R-DAM-SD	Sustainability in Defence	Mr Rich Fisher	30	0	10	Y	05/10/20 (A20) 11/10/21 (A21)	09/11/20 15/11/21	13/11/20 19/11/21	40	ICW ICW	100 100				21/12/20 27/12/21	TBA TBA

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[4]	Total hours delivered by Visiting Lecturers [5]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[6] - 40% or 50%	Type of Assessment	Weighting within module[7] (%) of	Weighting within module of multi-part assessments [8](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[9]	Assessment Submission and/or exam date[10]	Assessment / Exam Retake date
7	R-DAM-CRDE	Commercial Relationships in the Defence Environment	Dr R Allen	30	0	10	Y	26/10/20 (A20)	30/11/20	03/12/20	40	ICW	100				11/01/21	TBA
								01/11/21 (A21)	06/12/21	09/12/21	40	ICW	100				17/01/22	TBA
16	R-DAM-RM	Research Methods	Mr R Fisher	25	0	0	N	18/01/21	18/01/21	21/01/21	N/A	AO	N/A				N/A	N/A
17	R-DAM-THESIS	Thesis	Mr R Fisher	0	0	80	N	03/06/19 (B18)	N/A	N/A	50	THESIS	100				03/09/20	N/A
								24/02/20 (A19)	N/A	N/A							24/05/21	N/A
								01/06/20 (B19)	N/A	N/A							01/09/21	N/A
								01/03/21 (A20)	N/A	N/A							01/03/22	N/A
								07/06/21 (B20)	N/A	N/A							07/06/22	N/A

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	**Module title**	**Course that owns the module**	**Other course(s)/ programme(s) that use the module**
R-SEDC-HCSE	Human Centric Systems Engineering	Systems Engineering for Defence Capability	Defence Acquisition Management
R-SEDC-DAMS	Decision Analysis Modelling and Support	Systems Engineering for Defence Capability	Defence Acquisition Management
R-DAM-IDDA	The International Dimensions of Defence Acquisition	Defence Acquisition Management	Systems Engineering for Defence Capability Defence and Security Programme
R-DAM-MKIDA	Knowledge in Defence	Defence Acquisition Management	Systems Engineering for Defence Capability
R-DAM-PPM	Programme and Project Management	Defence Acquisition Management	Systems Engineering for Defence Capability
R-DAM-SNMCE	Supply Network Management in Defence and the Commercial Environment	Defence Acquisition Management	Systems Engineering for Defence Capability
R-DAM-MAC	Managing Acquisition Change	Defence Acquisition Management	Defence and Security Programme
R-DAM-FA	Financing Acquisition	Defence Acquisition Management	Defence and Security Programme
R-DAM-SD	Sustainability in Defence	Defence Acquisition Management	Defence and Security Programme

8. How are the ILOs assessed?

The following assessment types are utilised:

The course employs a range of assessment types. The specifics of assessment vary, depending on the particular electives the student chooses. During the taught phase, students can expect to sit 1 examination and write at least 10 assignments (either contributing to a proportion of the module assessment or forming the full module assessment). They can also expect to complete case studies, group exercises and group reports during particular modules which contribute to the modules' formative assessment.

This approach has been adopted because:

It helps achieve a balanced portfolio of assessment types and reflects the fact that some subjects lend themselves more readily to one form of assessment than to another. Where the assessment type for a module is an examination, it will be scheduled to give the students time to prepare, and an optional revision session will be run by the module manager shortly before the examination.

Assessment and ILO Mapping

	Postgraduate Certificate DAM							Postgraduate Diploma DAM							
Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO8	ILO9	ILO10	ILO11	ILO12	ILO13	ILO14	ILO15
1	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	ICW GCW	ICW GCW	ICW GCW	ICW GCW		ICW									GCW
3	GPRES	EX	EX GPRES												GPRES
4	GCW	ICW	ICW GCW	GCW	ICW GCW	ICW GCW	GCW		GCW	GCW					GCW
5		ICW	ICW		ICW	ICW	ICW								
6			ICW		ICW			ICW	ICW	ICW			ICW		
7			ICW	ICW	ICW	ICW	ICW	ICW	ICW	ICW	ICW		ICW	ICW	
8	ICW			ICW	ICW	ICW	ICW	ICW	ICW	ICW		ICW			
9		ICW	ICW	ICW		ICW			ICW	ICW	ICW			ICW	
10			ICW			ICW		ICW	ICW		ICW		ICW	ICW	
11		ICW	ICW		ICW	ICW	ICW		ICW	ICW					
12 (E)	ICW		ICW			ICW			ICW		ICW		ICW	ICW	
13 (E)			ICW	ICW		ICW									
14 (E)	ICW	ICW	ICW		ICW				ICW		ICW			ICW	
15 (E)	ICW		ICW		ICW				ICW		ICW				

MSc DAM

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 16	ILO17	ILO18
16	**N/A**	**N/A**	**N/A**
17	THESIS	THESIS	THESIS

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

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Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

Generally students from defence industry and from overseas are sponsored by their employer, who will see the Defence Acquisition Management MSc programme as a significant professional development opportunity, with those students they sponsor going on to take up senior acquisition-related roles.

Serving military officers and civil servants from the UK Ministry of Defence who are sponsored by their parent Service or by their current employing organisation, for example Defence Equipment and Support, the Defence Infrastructure Organisation, or the Commands (Navy, Army, Air, and Joint Forces), will be well prepared for a range of acquisition-related roles, including: acquisition change management; project team management and leadership; commercial and contracts management; capability management; resources management and programme scrutiny; integrated logistic support management; support chain management; and requirements management. Achievement of the MSc, the PgDip, or the PgCert, should benefit a student in general career development terms whatever their employing organisation, current or future. As well as deriving these same acquisition business benefits, students from defence industry, commercial organisations, research organisations, and other Government departments should acquire a more detailed knowledge of how Defence procurement and through life support works and be able to advance their business and personal career interests accordingly.

Students who complete the MSc will be well placed to further their research interests via an MPhil or PhD.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

COURSE TITLE: Postgraduate Certificate Defence and Security Export

Date of first publication/latest revision: January 2021

1. What is the course?

Course information

Course Title	Defence and Security Export
Course code	PCDSEPTR, SPDSEPTR
Academic Year	2020/2021
Valid entry routes	PgCert, Short Courses for Credit
Additional exit routes	PgCert
Mode of delivery	Part-time
Location(s)[1] of Study	Cranfield
School(s)	Defence and Security and School of Management
Theme	Defence and Security
Centre	Centre for Defence Management and Leadership
Course Director	Professor Ron Matthews
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A
Teaching Institution	Cranfield University

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Admissions body	Cranfield University
Entry requirements	Standard University Entry Requirements
UK Qualifications Framework Level	QAA FHEQ Level 7
Benchmark Statement(s)	Business and Management
Registration Period(s) available	24 Months: registration extends across two years to allow for flexibility in student study scheduling
Course Start Month(s)	January

Institutions delivering the course

This course is delivered by Cranfield University academics. The research interests and teaching expertise of those from the Centre for Defence Management and Leadership include a range of defence management topics, such as defence exports, export control and compliance and research methodology. Marketing and negotiation skills will be taught by academics from the Department of Marketing at the School of Management, Cranfield campus.

Cranfield University interacts with the following institutions and in the following ways:

There will be contributions from visiting lecturers who are leading practitioners in the field sourced from a range of defence and security sector organisations as appropriate to the course.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

As this is a new course formal accreditation can only be sought towards the end of the first year of operation with a view to the first cohort of students receiving that accreditation. The University is seeking accreditation from the Chartered Institute of Marketing (CIM). The course is therefore not currently accredited by any external body.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- Provide a qualification, appropriate to defence and security marketing professionals plus industrial, government and military business and export control executives.
- Offer niche, skill-based, modules to defence and security executives and government officials,
- Exploit the enormous global economic and educational opportunities stemming from BREXIT, and the government's contemporary priority on export promotion.

This programme is intended for the following range of students:

- Existing sales, marketing and export control employees in defence, aerospace and security industrial companies
- Armed forces personnel aiming to equip themselves with relevant commercial defence and security expertise, reflected via a respected university postgraduate qualification to enhance career prospects in MoD staff postings and post-service commercial appointments
- Civil service personnel working in export-driven government departments, such as the MoD, UKTI and BEIS.

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Evaluate the conceptual, contextual and policy-relevant backdrop to the field of defence and security marketing, including legal and political considerations, offset requirements and strategic trade and export controls
ILO 2. Examine defence and security marketing data, analyse and interpret country risks and trends, and critically evaluate real and potential business opportunities and threats, linked to appropriate offset strategies, to shape successful marketing campaigns
ILO 3. Apply the skills necessary to undertake successful identification of defence and security market prospects, produce an appropriate marketing plan and pursue the deal through effective negotiation to achieve acceptable contractual outcomes
ILO 4. Analyse the institutional constraints to defence and security trade from both national government legislation and supra-national organisations, such as the EU, UN, Wassenaar Arrangement and the Missile Technology Control Regime (MTCR).
ILO 5. Apply the research and methodological skills acquired to source and analyse the evidence to prove or refute arguments on which policy positions and corporate decision-making are based

4. How is the course taught?

PgCert and short course students will be supported in their learning and personal development through the appointment of academic mentors.

A multi-layered approach to learning is provided, employing formal lectures designed to encourage and provoke student participation. There will also be syndicated discussions leading to group presentations on relevant and applied topics. All modules will provide formative learning activities. An additional important dimension of the learning process will be visiting lectures from expert practitioners possessing substantial experience gained from the various industrial and governmental defence and security marketing domains.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 7. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 1-7	60
ELECTIVE MODULES:	
TOTAL:	60

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria
The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[3] [4]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Part-time students register for the course in January and are normally expected to complete the course within one year, though flexibility is provided through the students being able to spread their study across the two year registration period. The first residential school covers modules 1 and 2. Module 1 provides the study induction and Module 2 provides the contextual relevance, and therefore both Modules 1 and 2 are pre-requisites for the modules that follow.

Students will be required to attend an opening five-day residential school (to include the SOM induction day and Modules 1 and 2) followed by three three-day and one four day residential schools held between January and September each year. All schools will be located at the Cranfield Campus. The period October - December will be dedicated to the Independent Study Project.

[3] For students who were registered before 1 August 2015, the requirement to obtain a minimum mark for a taught assessment will not apply for taught assessment taken before 31 August 2015 (unless the assessment was designated as a "key assessment" under the previous Assessment Rules).

[4] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

7. Course Level Assessment Strategy[5]

The PgCert DSE is designed to have a practical bias, with a student participants targeted on mid-career sales, export and control and compliance defence and aerospace professionals. Learning is expected to occur through class debate via shared experiences. The structure of the programme is meant to be flexible, with busy delegates able to mix and match their module attendance over a two year registration period. Accordingly, only the first module, Legal, Ethical and Political Defence Frameworks, is a prerequisite. The five taught modules are skill based, and cover such topics as Defence Marketing, Negotiations, Defence and Security Offset and Strategic Export Control and Compliance. This Cranfield export-oriented course of study is the only one of its kind in the UK, if not in Europe. All the taught modules have a 2,500 word assignment as the principal summative assessment. The time periods devoted to student research and assignment writing are equi-distant between each of the residential schools, averaging a preparatory time periods of around two months. The assignment topics are framed to have relevance to the host module's subject matter. There are several directed assignment topics, but additionally in one or two of the modules there is a self-select question where students can choose an assignment topic themselves, subject to the caveat that it must fall within the parameters of the module's syllabus. Such topics will need to be cleared by the module manager. The teaching structure of each of the taught modules is informed by the module ILOs. The material is delivered not so much through formal lectures but rather by guided class debate, with the expectation that students will contribute their knowledge and practical experience to question the applicability of accepted theory. Student participation in learning exercises, such as syndicate discussion, student presentation, strategy evaluation, case study analysis, reflective writing, quizzes and technology driven exercises, are integrated into the three-day module residential schools. The cohorts are populated by mature and confident executives, and thus this participatory and interactive process is characterised by high levels of problem-solving, refined organisational and managerial leadership, precise articulation of policy challenges and exceptional communication skills. The taught module topics are interrelated but diverse, and this helps to foster adaptability, flexibility and lateral thinking amongst the students. The module leader is expected to make regular interventions in these formative learning exercises, providing guidance and alternative perspectives. The module leaders are also expected to provide copious, insightful and constructive critical feedback on student summative graded assignment submissions. The sixth module is the Independent Study Project (ISP). This is a 4,000 word report based on a student self-selected topic chosen after consultation with the sponsoring company. It is expected to be a mini-consultancy exercise, researching a topic of professional relevance and applicability to the student's employing institution. While awareness of the appropriate scholarship is important and should be demonstrated in the report, the ISP is not meant to be an academic dissertation. Rather, it should be written as an analytical thought piece focused on a practical problem, leading to policy-related conclusions and recommendations. The ISP is intended to reflect the culmination of learning from the previous five modules. The students will be supported in their research and writing endeavours by a focused research methodology half day session just prior to their engagement on ISP research. This session acts to complement the half-day study skills session the students received as part of their induction during the first residential school.

[5] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Course modules

The following modules outline all parts of the programme leading to **Postgraduate Certificate**. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[8] - 40% or 50%	Type of Assessment	Weighting within module[9] (%) of Independent assessments	Weighting within module of multi-part assessments[10]	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
1	R-DMR-IS	Introductory Studies	Gemma Collantes Celador	7	N/A	0	N	N/A	18/01/21	18/01/21	N/A	AO	N/A				N/A	N/A
2	R-DMR-LEPDSF	Legal, Ethical and Political Defence &	Anicee Van Engeland	21	2	10	Y	19/01/21	19/01/21	21/01/21	40	ICW	100				15/03/21	TBC

[6] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[7] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[8] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[9] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[10] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[11] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[12] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

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												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[8] - 40% or 50%	Type of Assessment	Weighting within module[9] (%) of Independent assessments	Weighting within module of multi-part assessments	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
		Security Frameworks (incl. SoM induction day)																
3	R-DMR-DSM	Defence & Security Marketing	Mr Richard Fisher	21	4	10	Y	08/03/21	15/03/21	17/03/21	40	ICW	100				10/05/21	TBC
4	R-DMR-N	Negotiations	Dr Robby Allen	21	0	10	Y	03/05/21	10/05/21	12/05/21	40	ICW	100				05/07/21	TBC
5	R-DMR-DSO	Defence & Security Offset	Prof Ron Matthews	21	0	10	Y	28/06/21	05/07/21	07/07/21	40	ICW	100				13/09/21	TBC
6	R-DMR-STCC	Strategic Trade Controls and Compliance	Peter Jolliffe	21	0	10	Y	06/09/21 A21	13/09/21	15/09/21	40	ICW	100				08/11/21	TBC
7	R-DMR-ISP	Independent Study Project	Prof Ron Matthews / Gemma Collantes Celador	7 (plus 13 individual supervision)	0	10	N	06/09/21 A21	16/09/21	16/09/21	40	ICW	100				31/01/22	TBC

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Please list all modules that are used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
R-DMR-LEPDSF	Legal, Ethical and Political Defence and Security Frameworks	Defence and Security Export	Executive MBA (Defence Export option) Defence and Security Programme
R-DMR-DSM	Defence and Security Marketing	Defence and Security Export	Executive MBA (Defence Export option)
R-DMR-N	Negotiations	Defence and Security Export	Defence and Security Programme
R-DMR-DSO	Defence and Security Offset	Defence and Security Export	Executive MBA (Defence Export option) Defence and Security Programme
R-DMR-STCC	Strategic Trade Controls and Compliance	Defence and Security Export	Executive MBA (Defence Export option)

8. How are the ILOs assessed?

The following assessment types are utilised:

1. Individual written assignments, on an applied relevant topic, will all have a targeted length of 2,500 words.

2. In-class group presentations.

3. There will also be an Independent Study Project conducted as a mini consultancy project within the student's company, or, if self-funded, a library-based project. The submitted report will be 4,000 words in length.

This approach has been adopted because:

The appropriate assessment strategy is held to comprise assignments to provide the student body with the opportunity to develop academic writing and research skills in support of the later Independent Study Project, whilst the group presentations are intended to encourage the sharing of ideas, knowledge and relevant practical experiences, developing presentation skills.

Assessment and ILO Mapping

A.

Award ILOs / Module No.	1	2	3	4	5
2	ICW	ICW		ICW	ICW
3		ICW	ICW		
4			ICW	ICW	ICW

Award ILOs / Module No.	1	2	3	4	5
5	ICW	ICW	ICW		ICW
6	ICW			ICW	ICW
7	ICW		ICW		ICW

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

As this is a new course we cannot give evidence of the employment destinations of recent graduates. However, the PgCert in Defence and Security marketing will be attractive to employers seeking skilled personnel in the sales and marketing arena of defence, aerospace and security organisations. The knowledge and skills acquired on the PgCert will reflect learning in the key areas of marketing management, specifically related to the defence, aerospace and security sectors and as such will be highly attractive to employers.

There are three reasons why career advancement will be strengthened by taking the PgCert. Firstly, it is the only qualification on the market that offers dedicated learning with respect to defence and security marketing. Secondly, the combination of module topics is appropriate to the skill requirements of marketing executives and government officials seeking to specialise in this field. Thirdly, it is the only course that offers tuition and training specifically geared towards defence and security trade control and compliance, representing essential knowledge for those working in this area of endeavour.

COURSE SPECIFICATION

Cranfield University: Course Specifications
Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: October 2020

1. What is the course?

Course information

Course Title	MSc in Defence and Security (Engineering) with a pathway option in Aero Systems MSc in Defence and Security (Leadership and Management) with a pathway option in Leadership and Security MSc in Defence and Security (Technology)
Course code	**Defence and Security (Engineering) – MSc, PgDip and PgCert** MSDENPTR, PDDENPTR, PCDENPTR **Defence and Security (Leadership and Management) – MSc, PgDip and PgCert** MSDLEPTR, PDDLEPTR, PCDLEPTR **Defence and Security (Technology) – MSc, PgDip and PgCert** MSDTEPTR, PDDTEPTR, PCDTEPTR **Defence and Security (Leadership and Management) Leadership and Security pathway– MSc, PgDip and PgCert** MSDLDPTR, PDDLDPTR, PCDLDPTR **Defence and Security (Engineering) Aero Systems pathway – MSc, PgDip and PgCert** MSDEAPTR, PDDEAPTR, PCDEAPTR **Defence and Security – Short Course for Credit** SPDSPPTR **Capstone route** **Defence and Security (Engineering) – MSc and PgCert.** MSCDEPTR, PCCDEPTR **Defence and Security (Leadership and Management) – MSc and PgCert.** MSCDLPTR, PCCDLPTR **Defence and Security (Technology) – MSc and PgCert**

	MSCDTPTR, PCCDTPTR *The Capstone route is **not available** on the Aero Systems or Leadership and Security pathways*
Academic Year	2020-2021
Valid entry routes	MSc, MSc Capstone, PgDip, PgCert in Defence and Security (Engineering) MSc, MSc Capstone, PgDip, PgCert in Defence and Security (Leadership and Management) MSc, MSc Capstone, PgDip, PgCert in Defence and Security (Technology)
Additional exit routes	PgCert (MSc and MSc Capstone route), PgDip (MSc route only)
Mode of delivery	Part-time
Location(s)[1] of Study	Shrivenham or Cranfield and online. The Leadership and Security pathway is delivered fully online
School(s)	Cranfield Defence and Security
Theme	Cranfield Defence and Security
Centre	Engineering, Leadership and Management, Leadership and Security and Technology
Programme Director **Course Director**	Professor Emma Sparks Dr Ifti Zaidi (Leadership and Management stream, Leadership & Security pathway) Dr Tim Ferris (Engineering and Technology streams)
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	MSc in Defence and Security (Leadership and Management) is offered as a Cranfield Mastership. The Leadership and Security pathway is not.
Apprenticeship Standard the course is mapped to	Senior Leaders Standard for the MSc in Defence and Security (Leadership and Management)
Is the Degree apprenticeship integrated or non-integrated?	Non Integrated for the MSc in Defence and Security (Leadership and Management)
Is the Mastership offered as an open and/or closed course?	Open for the MSc in Defence and Security (Leadership and Management)
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	The Standard University Entry Requirements as dictated by the course.

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

	Leadership and Management stream and associated pathway normally requires IELTS 6.5. All other courses and pathways normally require IELTS 7. The Aero Systems pathway additionally requires students to attend the Pre-sessional 2-week course studies in August.
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Part Time: 3 years MSc, 2 years PgDip and PgCert,
Course Start Month(s)	September, Additional intake in April for Leadership and Management (including associated pathways)

Institutions delivering the course

This course is delivered by Cranfield Defence and Security where the research interests include:

Armour systems, CBRN, Counter IED, Computing, Simulation and Modelling, Digital Forensics, Defence Information Systems, Defence Manufacturing, Defence Sensors, Defence Systems Engineering, Test and Evaluation, Defence Training Analysis, Gun Technologies, Vehicle Engineering and Mobility and Weapons Engineering

Cranfield University interacts with the following institutions and in the following ways:

- As part of the course is delivered at the Defence Academy, students have access to the facilities onsite and to current serving MOD military and civilian staff.
- Students can arrange to make visits to a number of military venues.
- All of our industrial students are sponsored by their employers, who provide direct support to the course in the form of informal input to theses and provision of information to support coursework and projects

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is not accredited by any external bodies.

2. What are the aims of the course?

- Cranfield University offers the three degree courses with additional pathways to provide blended, flexible education suitable for a range of learners engaged in the complex, evolving defence and security environment.

- It enables tailored learning pathways with extensive elective choices to meet the demands of learners across their career as well as meeting varying employer requirements.

- All courses and pathways have common core modules providing essential professional competencies. Each course and pathway further provides depth in specialist topics aligned with their relevant range of disciplines

This programme is intended for the following range of students:

- Recent graduates wishing to extend their knowledge and skill within the domains of technology, engineering and leadership and management
- Experienced and or qualified engineers, scientists, managers or leaders wishing to extend their skills or apply them in new areas

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. **Postgraduate Certificate in Defence and Security (Engineering) including the Aero Systems pathway**

Postgraduate Certificate in Defence and Security (Leadership and Management) including the Leadership and Security pathway

Postgraduate Certificate in Defence and Security (Technology)

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Analyse the principal influences and constraints on the modern Defence and Security environment.
ILO 2. Assess the impact management and leadership approaches have on the success of the Defence and Security enterprise, including resilience to change.
ILO 3. Construct a range of models to support decision making within complex Defence and Security problems at multiple levels of abstraction.
ILO 4. Evaluate the relationship between organisational; behaviour and stakeholder management.
ILO 5. Develop Solutions appropriate to Defence and Security as a complex adaptive system

B. **Postgraduate Diploma in Defence and Security (Engineering) including the Aero Systems pathway**

In addition to the intended learning outcomes outlined in the Certificate, a diligent student would also be expected to:

ILO 6. Evaluate the Application of engineering concepts to a range of defence engineering challenges.
ILO 7. Apply appropriate engineering analysis methods for solving complex defence engineering problems.
ILO 8. Develop innovative designs for defence products, systems, components or processes.
ILO 9. Analyse new and emerging technologies to address current and future defence needs.
ILO 10. Assess the ethical and regulatory requirements of engineering within a defence context.

C. **Postgraduate Diploma in Defence and Security (Leadership and Management) including the Leadership and Security pathway**

In addition to the intended learning outcomes outlined in the Certificate, a diligent student would also be expected to:

ILO 11. Evaluate the application of management and leadership concepts to a range of complex Defence and Security challenges.
ILO 12. Apply appropriate analysis methods and tools and techniques for solving complex problems.
ILO 13. Assess risk and uncertainty in complex systems proposing mitigation strategies where possible.
ILO 14. Develop innovative solutions to current and future Defence and Security challenges.

D. Postgraduate Diploma in Defence and Security (Technology)

In addition to the intended learning outcomes outlined in the Certificate, a diligent student would also be expected to:

ILO 15. Analyse new and emerging technologies to address current and future Defence and Security needs.
ILO 16. Apply a range of models and tools to aid decision making for dynamically complex Defence and Security problems; at multiple levels of distraction.
ILO 17. Assess risk and uncertainty in complex systems, proposing mitigation strategies where possible.
ILO 18. Develop innovative solutions for Defence and Security products, systems, components or processes.

E. MSc in Defence and Security (Engineering) including the Aero Systems pathway

MSc in Defence and Security (Leadership and Management) including the Leadership and Security pathway

MSc in Defence and Security (Technology)

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 19. Acquire, organise, discuss and assess knowledge associated with complex Defence and Security problems
ILO 20. Plan, organise and undertake a piece of research with appropriate supervision.
ILO 21. Apply appropriate methods, tools techniques and knowledge to a complex problem.
ILO 22. Gather and critically appraise data, and to utilise it within the appropriate academic and practical context.
ILO 23. Prepare a written submission to effectively communicate findings.

4. How is the course taught?

Students will be supported in their learning and personal development by:

Our education philosophy is led by the basic principles of:

- Research led teaching through a course team that are active practitioners and researchers
- Technology enhanced learning to maximise the student learning experience
- Learning through a mixture of formative and summative feedback and assessment using a variety of methods

The programme provides innovation in the concept and delivery. Four of the five core common modules are delivered entirely at a distance providing flexibility for the learner. Core common modules have assessment tailored to the specific course or pathway with the virtual learning environment supporting intra and inter stream forums and interaction.

Dedicated support by Learning Services ensures adoption of consistent online learning design using a robust suite of developed tools and interactions. This is supplemented with an induction and learner support online package focussing on study skills and independent learning.

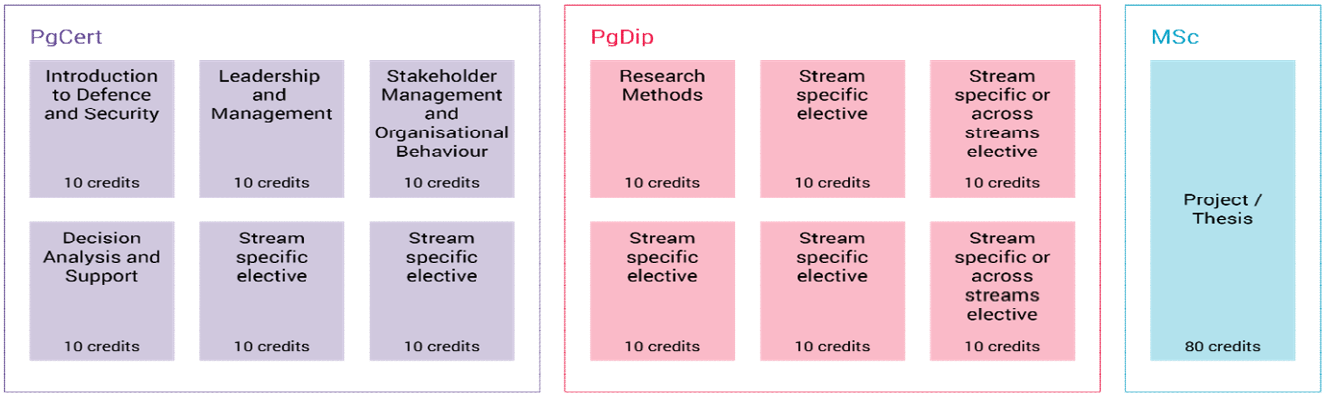
Many of the elective modules and the Introduction to Defence and Security are delivered as residential modules. These combine face to face lecturing, workshops and group work with use of our facilities including laboratories, simulation labs, and computer labs as examples. The Leadership and Security pathway is delivered fully online and all learning is supported through online resources and tools.

Direct access to the library to supplement the online catalogue and face-to face discussions with staff are all benefits of this blended approach to learning.

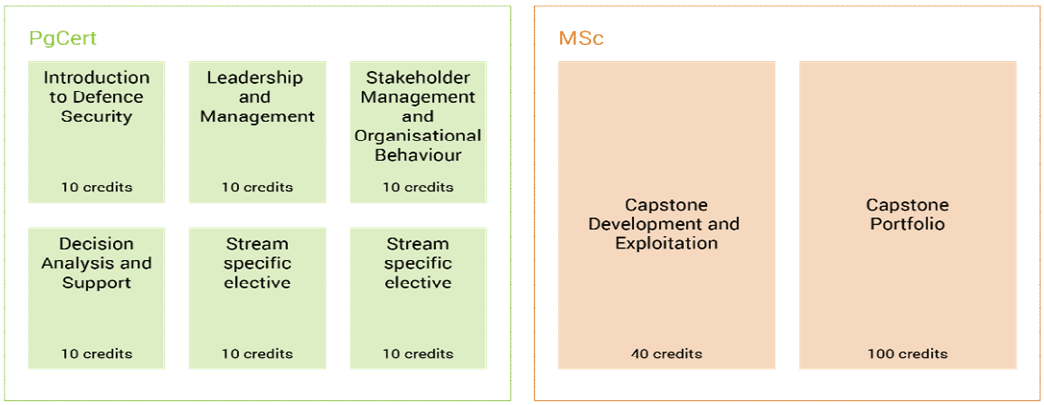
In addition, students will be supported in their learning and personal development:

- The provision of an academic mentor who is available to support and advise the student on academic issues
- Access to a Flexible Education Coordinator for pastoral care and to help in navigating and choosing modules to ensure appropriate progression. This will include checks for suitability where learners are taking modules from different streams.

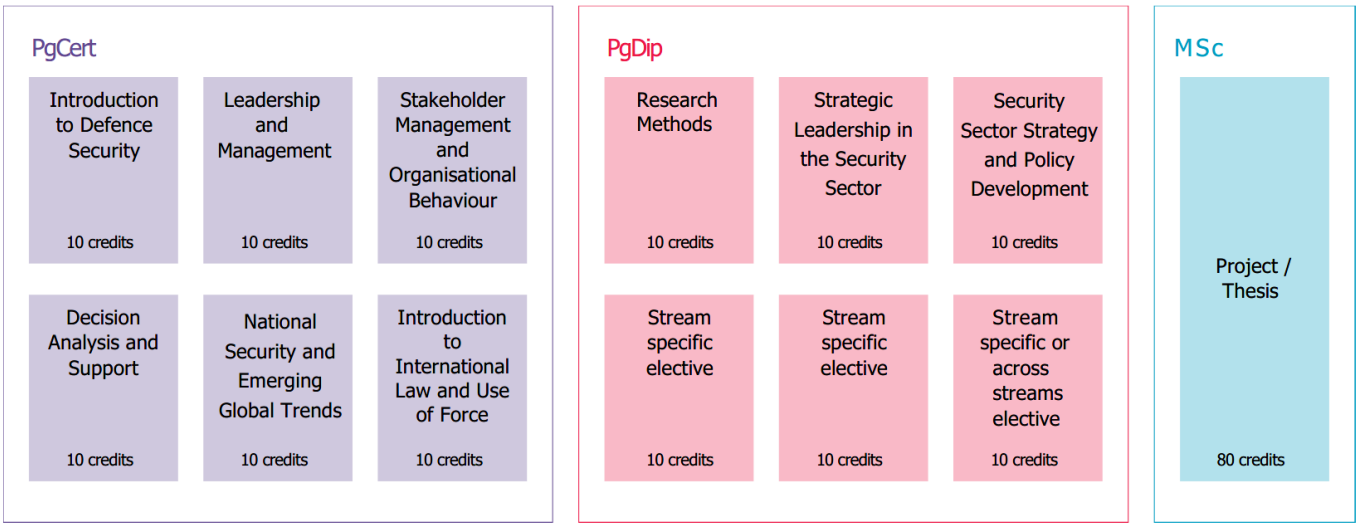
MSc Route (excludes pathways): MSc in Defence and Security (Engineering), MSc in Defence and Security (Leadership and Management), MSc in Defence and Security (Technology)



Capstone Route (excludes pathways): MSc in Defence and Security (Engineering), MSc in Defence and Security (Leadership and Management), MSc in Defence and Security (Technology)



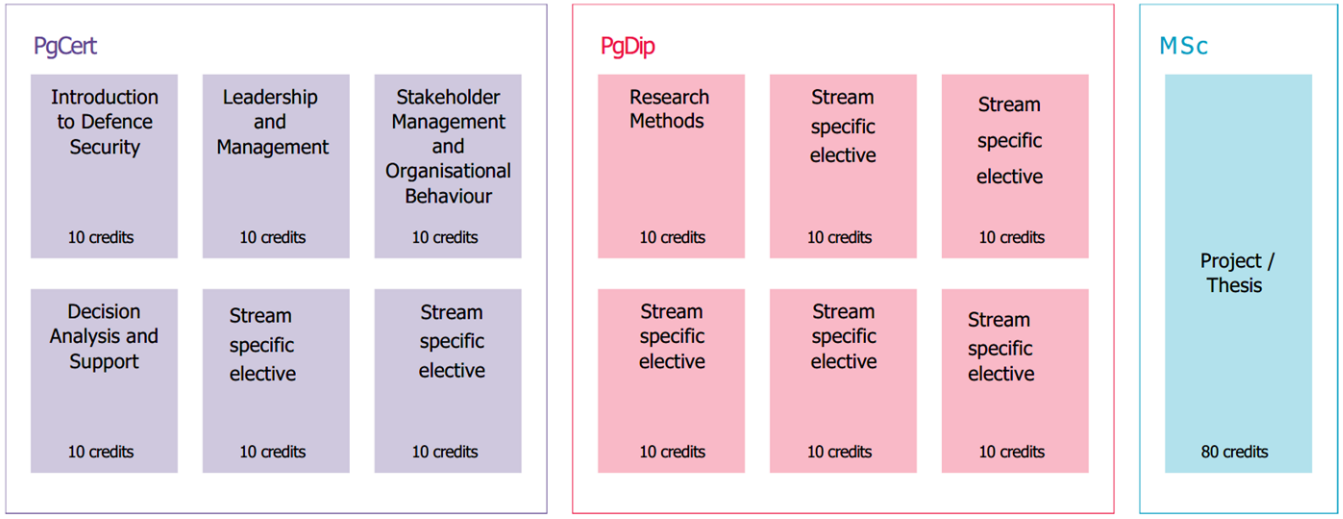
Leadership and Security pathway of the MSc in Defence and Security (Leadership and Management)



Notes:

- *Only fully online across stream elective modules may be taken.*

Aero Systems pathway of the MSc in Defence and Security (Engineering)



5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate in Defence and Security (Engineering), and Defence and Security (Technology)

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	

Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour	0 10 10 10 10
ELECTIVE MODULES:	
20 credits from the relevant stream Modules 6 - 62	20
TOTAL:	**60**

B. Postgraduate Diploma in Defence and Security (Engineering), and Defence and Security (Technology)

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	**Credits**
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour Research Methods	0 10 10 10 10 10
ELECTIVE MODULES:	
50 credits from the relevant stream and 20 credits from any stream Modules 6 – 62	70
TOTAL:	**120**

C. MSc Taught in Defence and Security (Engineering), and Defence and Security (Technology)

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	**Credits**
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour Research Methods Thesis	0 10 10 10 10 10 80
ELECTIVE MODULES:	
50 credits from the relevant stream and 20 credits from any stream Modules 6 - 62	70
TOTAL:	**200**

D. MSc Capstone in Defence and Security (Engineering), Defence and Security (Leadership and Management) and Defence and Security (Technology)

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisation Behaviour Capstone Development and Exploitation Capstone Portfolio	0 10 10 10 10 40 100
ELECTIVE MODULES:	
20 credits from the relevant stream Modules 6 - 62	20
TOTAL:	**200**

E. Postgraduate Certificate in Defence and Security (Leadership and Management)
The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour	0 10 10 10 10
ELECTIVE MODULES:	
20 credits from Modules 23 – 41, 63 - 75	20
TOTAL:	**60**

F. Postgraduate Diploma in Defence and Security (Leadership and Management)
The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour Research Methods	0 10 10 10 10 10
ELECTIVE MODULES:	
50 credits from Modules 23 – 41, 63 – 75 20 credits from any stream Modules 6 – 75	70
TOTAL:	**120**

G. MSc Taught in Defence and Security (Leadership and Management)
In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour Research Methods Thesis	0 10 10 10 10 10 80
ELECTIVE MODULES:	
50 credits from Modules 23 – 41, 63 – 75 20 credits from any stream Modules 6 – 75	70
TOTAL:	**200**

H. Postgraduate Certificate in Defence and Security (Leadership and Management) - Leadership and Security pathway

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour National Security and Emerging Global Trends Introduction to International Law and Use of Force	0 10 10 10 10 10 10
ELECTIVE MODULES:	
There are no Elective Modules at the PgCert in L&S Stream	0
TOTAL:	**60**

I. Postgraduate Diploma in Defence and Security (Leadership and Management) - Leadership and Security pathway

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour National Security and Emerging Global Trends Introduction to International Law and Use of Force Research Methods Strategic Leadership in the Security Sector Security Sector Strategy and Policy Development	0 10 10 10 10 10 10 10 10 10

ELECTIVE MODULES:	
Elective 1: Any module from Modules, 29, 34, and 67 - 70 Elective 2: Any module from Modules 27, 37, 38, 71 - 75 Elective 3: Any fully online module from Modules 23 – 29, 31, 34-41, 43 - 47 and 67-75 (as agreed with Flexible Education Co-ordinator)	10 10 10
TOTAL:	**120**

J. MSc in Defence and Security (Leadership and Management) - Leadership and Security pathway

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour National Security and Emerging Global Trends Introduction to International Law and Use of Force Research Methods Strategic Leadership in the Security Sector Security Sector Strategy and Policy Development Thesis	0 10 10 10 10 10 10 10 10 10 80
ELECTIVE MODULES:	
Elective 1: Any module from Modules, 29, 34, and 67 - 70 Elective 2: Any module from Modules 27, 37, 38, 71 - 75 Elective 3: Any fully online module from Modules 23 – 29, 31, 34 - 41, 43 - 47 and 67 - 75 (as agreed with Flexible Education Co-ordinator)	10 10 10
TOTAL:	**200**

K. Postgraduate Certificate Defence and Security (Engineering) - Aero Systems pathway

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour	0 10 10 10 10
ELECTIVE MODULES:	
10 credits from Modules 14, 87, 88 10 credits from Modules 49, 76, 78, 79, 86	10 10
TOTAL:	**60**

L. Postgraduate Diploma Defence and Security (Engineering) - Aero Systems pathway

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour Research Methods	0 10 10 10 10 10
ELECTIVE MODULES:	
20 credits from Modules 14, 87, 88 30 credits from Modules 77, 80, 81, 82, 83, 84, 85 20 credits from Modules 49, 76, 78, 79, 86	20 30 20
TOTAL:	**120**

M. MSc Defence and Security (Engineering) - Aero Systems pathway)

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Induction Introduction to Defence and Security Leadership and Management Decision Analysis and Support Stakeholder Management and Organisational Behaviour Research Methods Thesis	0 10 10 10 10 10 80
ELECTIVE MODULES:	
20 credits from Modules 14, 87, 88 30 credits from Modules 77, 80, 81, 82, 83, 84, 85 20 credits from Modules 49, 76, 78, 79, 86	20 30 20
TOTAL:	**200**

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of

your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]

- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Courses within the Defence and Security Programme are structured as Part-time. Students register for the course in September and are expected to complete the course within 1-3 years for the PgCert, PgDip and MSc.

The induction module is a pre-requisite for the following modules:

- Introduction to Defence and Security
- Leadership and Management
- Decision Analysis and Support
- Stakeholder Management and Organisational Behaviour

This means that students must undertake the induction module first.

The majority of core common modules are distance delivery over a period of 15 weeks including assessment. This enables elective modules to be taken in parallel when necessary. See course pathways above.

The majority of 10 credit elective modules comprise pre-reading at a distance. For all courses and pathways, less Leadership and Security pathway, the teaching is delivered through up to one week residential and then assessment at a distance. Teaching on the Leadership and Security pathway is delivered online and spread over two to three weeks followed by assessment at distance.

A 10 credit module has an indicative requirement for 100 hours of study in total.

7. Course Level Assessment Strategy[4]

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

This course aims to develop Defence and Security Practitioner skills and behaviours in addition to the academic focus of a Master's level qualification. These skills require proficiency in written communication and in the practical application of systems methods though facilitated workshops.

This degree includes modules from across a broad spectrum of subjects, from engineering, technology management, to leadership. There are, consequently, an array of assessment approaches used in order to ensure students are able to appropriately demonstrate their grasp of key topics, theories and analytical frameworks, and provide adapted feedback in a focused and timely way. Assessment will include formative assessment on the selection of methods for problem resolution, design of interventions and workshops and on presentation skills. Such feedback will be given immediately after the presentations by the tutor and peers. Summative assessment will include the preparation of reports, reflection on the application of methods, examinations, workshops, presentations and essays to demonstrate knowledge of the underlying theory and practices relevant to the Defence and Security sector.

The assessment tasks are challenging and enable students to demonstrate a full range of skills and attributes in line with their described pathway's learning objectives. The core common modules (Introduction to Defence and Security, Leadership and Management, Stakeholder Management and Organisational Behaviour, and Decision Analysis and Support) will introduce students to the core principles, theories, approaches and methods required to integrate and contextualise the pathway specific content presented later. This learning will be assessed through a variety of methods which will be clearly stated within the module descriptors.

Modules are supported by a number of formative tasks including group discussion, case studies, oral presentations. Formative feedback is given verbally within the classroom following discussions, via a written summary for case studies from the module leader and oral feedback provided by the tutor and peers for presentations. During on-line modules, students will engage with interactive learning activities which incorporate formative feedback.

The taught components precede the research element, so assessment can be used to develop skills required for the individual research projects or dissertations. Students are generally expected to be more self-directed in their learning during the research phase of their studies, and guidance will be provided through the Research Methods or Capstone modules as appropriate.

The role of every module has been mapped to the relevant ILOs that it is intended to support ensuring consistent academic development for all students.

Course modules

The following modules outline all parts of the programme leading to **MSc**. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
0	R-DSP-I	Induction[12] **	Henrietta Campbell	3.5		0	N	A: 07/09/20 B: 19/04/21	07/09/20 19/04/21	11/09/20 23/04/21	N/A	AO						
1	R-DSP-IDS	Introduction to Defence and Security **	Anicee Van Engeland	20	0	10	N	A: 07/09/20 B:19/04/21	07/09/20 19/04/21	11/09/20 23/04/21	50	ICW	100				19/10/20 01/06/21	Next available opportunity

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education.
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear andragogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.
** Denotes distance learning module
[12] Further occurrences may potentially run to accommodate students who register at different points throughout the year
** Denotes distance learning module

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
2	R-DSP-LM	Leadership and Management **	Dr I Zaidi	5		10	N	26/10/20	26/10/20	08/02/21	50	ICW	100				08/02/21	Next available opportunity
3	R-DSP-DAS	Decision Analysis and Support **	Dr K McNaught	10	0	10	N	08/02/21	08/02/21	24/05/21	50	ICW	100				24/05/21	Next available opportunity
4	R-DSP-SMOB	Stakeholder Management and Organisational Behaviour **	Dr John McCormack	10	0	10	N	17/05/21	17/05/21	31/08/21	50	ICW	100				31/08/21	Next available opportunity
5	R-DSP-RM	Research Methods **	Dr T Ferris	10	0	10	N	26/04/21	01/06/21	04/06/21	50	ICW	100				15/06/21	Next available opportunity
Engineering Stream																		
6	R-FP-FEI	Fires, Explosions and their Investigation	Mr Stephen Johnson	28	0	10	Y	01/03/21	01/03/21	05/03/21	40	ICW	100				19/04/21	Next available opportunity
7	R-FP-FIEED	Forensic Investigation of Explosives and Explosive Devices	Nathalie Mai	30	0	10	Y	11/01/21	11/01/21	15/01/21	40	ICW	100				01/03/21	Next available opportunity

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
8	R-FP-IFIFB	Introduction to Firearms Investigations and Forensic Ballistics	Katherine Hewins	32	0	10	Y	30/11/20	30/11/20	04/12/20	40	ICW	100				27/01/21	Next available opportunity
9	N-SAI-ISMS	Aviation Safety Management	Dr Simon Mitchell/Dr David Barry	30	0	10	Y	22/03/21 B20	22/03/21	26/03/21	40	ICW	100				24/05/21	Next available opportunity
10	R-MAA-IHF	Introduction to Human Factors	Miss Laura Lacey	40	0	10	Y	28/06/21	28/06/21	02/07/21	40	ICW	100				23/08/21	Next available opportunity
11	N-AW-MIGT	Mechanical Integrity of Gas Turbines	Dr Panagiotis Laskaridis	30	0	10	Y	19/04/21	19/04/21	23/04/21	40	ICW	100				21/06/21	Next available opportunity
12	R-MAA-MAS	Military Aircraft Systems	Dr John Economou	35	0	10	Y	14/06/21	14/06/21	18/06/21	40 40	EX ICW	50 50				12/07/21 02/08/21	Next available opportunity
13	N-AW-RA	Practical Reliability	Dr Simon Place	30	10	10	Y	18/01/21	18/01/21	22/01/21	40	ICW	100				22/03/21	Next available opportunity

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

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14	R-MAA-GW	Guided Weapons	Dr Derek Bray	32	0	10	Y	18/01/21 A20 26/04/21 B20	18/01/21 26/04/21	22/01/21 30/04/21	40 40	ICW ICW	100 100				22/03/21 30/07/21	Next available opportunity
15	R-ESD-ED	Element Design	Dave Simner	35	0	10	Y	14/12/20	14/12/20	18/12/20	50	ICW	100				15/03/21	By individual arrangement
16	R-ESD-FB	Fundamentals of Ballistics	Clare Knock	33	0	10	Y	05/10/20	05/10/20	09/10/20	40	EX	100				10/12/20	By individual arrangement
17	R-ESD-MVPD	Military Vehicle Propulsion and Dynamics	Dave Simner	32	0	10	Y	11/01/21	11/01/21	15/01/21	50	ICW	100				22/02/21	By individual arrangement
18	R-ESD-MSC	Modelling, Simulation and Control	Thiru Thirulogasingam	35	0	10	Y	21/09/20	21/09/20	25/09/20	50 50	ICW OR	75 25				19/10/20 30/11/20	By individual arrangement
19	R-ESD-RSE	Reliability and Systems Effectiveness	Dr Aimee Helliker	31	0	10	Y	08/02/21	08/02/21	12/02/21	50	ICW	100				22/03/21	By individual arrangement
20	R-ESD-SURV	Survivability	Dr Gareth Appleby-Thomas	35	0	10	Y	30/11/20	30/11/20	04/12/20	50	ICW	100				01/03/21	By individual arrangement
21	R-ESD-VSI	Vehicle Systems Integration	David Diskett	32	0	10	Y	01/02/21	01/02/21	05/02/21	50	ICW	100				29/03/21	By individual arrangement

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22	R-ESD-WST	Weapon Systems Technology	Dr Hugh Goyder	30	0	10	Y	28/09/20	28/09/20	02/10/20	40	ICW	100				23/11/20	By individual arrangement
Leadership and Management Stream																		
23	R-DAM-IDDA	The International Dimensions of Defence Acquisition	Dr P Ito	30	0	10	Y	21/12/20	25/01/21	28/01/21	40	ICW	100				08/03/21	Next available opportunity
24	R-DAM-MAC	Managing Acquisition Change	Edith Wilkinson	30	0	10	N	22/03/21	26/04/21	29/04/21	40	ICW	100				07/06/21	Next available opportunity
25	R-DAM-FA	Financing Acquisition	Dr I Ansari	30	0	10	Y	26/02/21	08/03/21	12/03/21	40 40	EX GPRES	70 30				13/04/21 12/03/21	Next available opportunity
26	R-DAM-SD	Sustainability in Defence	Mr Rich Fisher	30	0	10	Y	05/10/20 A20 11/10/21 A21	09/11/20 15/11/21	13/11/20 19/11/21	40	ICW	100				21/12/20 27/12/21	Next available opportunity
27	R-DL-DSOB	Defence Sector and Organisational Behaviour	Dr Robby Allen	20	0	10	Y	18/10/21	18/10/21	20/10/21	40	ICW	100				03/12/21	Next available opportunity

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28	R-DL-GSCC	Global Security; Culture and Complexity	Anicee Van England	20	1	10	Y	16/05/21	16/05/21	18/05/21	40	ICW	100				02/07/21	Next available opportunity
29	R-DL-GSEC	Global Security; Emerging Challenges	Dr Anastasia Filippidou	20	0	10	Y	19/05/21	19/05/21	21/05/21	40	ICW	100				13/08/21	Next available opportunity
30	R-DL-LSCM	Leadership Studies Classical and Modern	Dr Bryan Watters	20	2	10	Y	13/01/21	13/01/21	15/01/21	50	ICW	100				09/04/21	Next available opportunity
31	R-DL-NSRC	National Security: Resilience and Crisis	Dr Bryan Watters	20	4	10	Y	10/02/21	10/02/21	12/02/21	40	ICW	100				07/05/21	Next available opportunity
32	R-DL ILCR	International Law and Command Responsibility	David Turns	20	0	10	Y	21/10/21	21/10/21	23/10/21	40%	ICW	100				14/01/21	Next available opportunity
33	R-DL-PL	The Psychology of Leadership	Bryan Watters	20	0	10	Y	12/05/21	12/05/21	14/05/21	50	ICW	100				06/08/21	Next available opportunity
34	R-DL-SMD	Strategic Management in Defence	Dr Ifti Zaidi	20	2	10	Y	09/05/21	09/05/21	11/05/21	50	ICW	100				25/06/21	Next available opportunity

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35	R-IDS-TCT	Counter Terrorism and Intelligence	Dr Anastasia Filippidou	20	0	10	Y	15/02/21	15/02/21	19/02/21	40	ICW	100				06/04/21	Next available opportunity
36	R-IDS-D21C	Defence in the 21st Century	Gemma Collantes Celador	20	0	10	N	23/01/23 A22	23/01/23	08/05/23	40	ICW	100				08/05/23	Next available opportunity
37	R-IDS-GVAC	Gender, Violence and Armed Conflict	Anicee Van Engeland	20	0	10	N	14/11/22 A22	14/11/22	27/02/23	40	ICW	100				27/02/23	Next available opportunity
38	R-IDS-RR	Risk, Crisis and Resilience	Mrs Edith Wilkinson	25	0	10	Y	23/11/20	23/11/20	27/11/20	40	ICW	100				20/01/21	Next available opportunity
39	R-DMR-DSO	Defence and Security Offset	Prof Ron Matthews	21	0	10	Y	28/06/21	05/07/21	07/07/21	40	ICW	100				13/09/21	Next available opportunity
40	R-DMR-LEPDSF	Legal, Ethical and Political Defence and Security Frameworks	Anicee Van Engeland	21	2	10	Y	19/01/21	19/01/21	21/01/21	40	ICW	100				15/03/21	Next available opportunity
41	R-DMR-N	Negotiations	Dr R Allen	21	0	10	Y	03/05/21	10/05/21	12/05/21	40	ICW	100				05/07/21	Next available opportunity

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Technology Stream																		
42	R-AMOR-IS	Intelligent Systems	Dr V Sastry	30	0	10	Y	25/01/21	25/01/21	29/01/21	40	ICW	100				08/03/21	26/07/21
43	R-AMOR-WGC	War Gaming & Combat Modelling A War Gaming & Combat Modelling B, C and D **	Mr J D Smith	30	0	10	Y	26/10/20 A20 12/10/20 B20 8/01/21 C20 24/05/21 D20	26/10/20 12/10/20 18/01/21 24/05/21	30/10/20 18/12/20 19/03/21 30/07/21	40	ICW	100				07/12/20 21/12/20 22/03/21 02/08/21	26/07/21 B, C, D: Next 10-week VLE module block.
44	R-DEFCY-FMC	Foundations of Cyber	Dr Nikki Williams	30	0	10	Y	07/09/20	17/09/20	11/07/20	40	ICW	100				05/10/20	AY21/22
45	R-DEFCY-ST	Social Technologies	Robert Black	72	0	10	Y	25/01/21	15/02/21	19/02/21	40	ICW	100				15/03/21	AY21/22

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46	R-DEFCY-HD	The Human Dimension	Antoinette Caird-Daley	30	0	10	Y	28/09/20 A20 15/02/21 B20	19/10/20 08/03/21	23/10/20 13/03/21	40	ICW	100				16/11/20 07/04/21	AY21/22
47	R-SISD-DLDS	Data Led Decision Support & Artificial Intelligence	Adam Zagorecki	30	0	10	Y	25/01/21	15/02/21	19/02/21	40	ICW	100%				15/03/21	AY21/22
48	R-AMOR-RTG	Real Time Graphics A Real Time Graphics B, C and D **	Mr J M Hoggard	32	0	10	Y	12/10/20 A20 12/10/20 B20 18/01/21 C20 24/05/21 D20	12/10/20 12/10/20 18/01/21 24/05/21	16/10/20 18/12/20 19/03/21 30/07/21	40	ICW	100				23/11/20 21/12/20 22/03/21 02/08/21	26/07/21 B, C, D: Next 10-week VLE module block.
49	R-AMOR FMS	Foundations of Modelling & Simulation A & B	Mr J M Hoggard	32	0	10	Y	14/09/20 A20 18/01/21 B20	14/09/20 18/01/21	18/09/20 22/01/21	40	ICW	100				26/10/20 01/03/21	26/07/21 26/07/21

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50	R-SISD-ETM	Emerging Technology Monitoring	Ian Owens	7	0	10	Y	11/01/21	1 day residential 03/03/21	15/05/21 end of online module	40	ICW	100				14/05/21	AY21/22
51	R-SISD-MT	Methods and Tools for Information Systems Development	Ian Owens	30		10	Y	19/10/20	09/11/20	13/11/20	40	GPRES ICW	25 75				13/11/20 07/12/20	AY 21/22
52	R-SISD-STOV	Systems Thinking for Organisational Viability	Jeremy Hilton	35		10	Y	14/09/20 A20 08/03/21 B20	05/10/20 29/03/21	09/10/20 02/04/21	40	ICW	100				02/11/20 28/04/21	AY 21/22 AY21/22
53	R-SISD-PM	Programme and Project Management for Information Systems	Simon Renfry	30		10	Y	07/09/19	28/09/20	02/10/20	40	ICW	100				26/10/20	AY 21/22
54	R-SISD-SE	Software Engineering	Pathmeswaran Raju	30		10	Y	28/09/20	19/10/20	23/10/20	40 40	GCW ICW	25 75				23/10/20 16/11/20	AY 21/22
55	R-AMOR-IORT	Introduction to Operational Research Techniques	Mr J D Smith	30	0	10	Y	14/09/20	14/09/20	18/09/20	40	EX	100				11/12/20	08/04/21

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56	R-AMOR-LM	Logistics Modelling A Logistics Modelling B, C & D**	Dr J D Salt	30	0	10	Y	22/02/21 A20 12/10/20 B20 18/01/21 C20 24/05/21 D20	22/02/21 12/10/20 18/01/21 24/05/21	26/02/21 18/12/20 19/03/21 30/07/21	40	ICW	100				05/04/21 21/12/20 22/03/21 02/08/21	26/07/21 B, C, D: Next 10-week VLE module block.
57	R-AMOR-SAT	Statistical Analysis and Trials	Dr T J Ringrose	30	0	10	Y	11/01/21	11/01/21	15/01/21	40	EX	100				08/04/21	04/06/21
58	R-SEE-ISSE	Introduction to Systems & Systems Engineering	Mr Sean Price	30		10	Y	07/09/20 (Sept 20 intake)	07/10/20	08/10/20 01/01/21 (Module end date)	50	ICW	100				04/01/21	Next available opportunity
59	R-SEE-EM	Enterprise Management	Mr Matthew Summers	25		10	Y	04/01/21 (Sept 20 intake)	04/02/21	06/02/21 23/04/21 (Module End Date)	50	ICW	100				26/04/21	Next available opportunity

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60	R-SEE-PASD	Problem Analysis and System Definition	Mr Richard Adcock	25		10	Y	19/10/20 (Sept 20 intake)	25/11/20	26/11/20 01/01/21 (Module End Date)	50	ICW	100				04/01/21	Next available opportunity
61	R-SEE-SDR	System Design and Realisation	Dr Tim Ferris	25		10	Y	07/09/20 A20 (Jan 20 intake) 26/04/21 B20 (Sept 20 intake)	09/10/20 A20 28/05/21 B20	10/10/20 01/01/21 (Module End Date) 29/05/21 13/08/21 (Module End Date)	50	ICW	100	N/A	N/A	N/A	04/01/21 16/08/21	Next available opportunity
62	R-SEDC-SEWN	Systems Engineering Workshop	Raju Pathmeswaran	37		10	Y	14/12/20	11/01/21	15/01/21	40	 ICW	 70	30	GPRES GCW	10 20	15/01/21 15/01/21 22/02/21	Next available opportunity

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Leadership and Management: Leadership and Security Pathway																		
63	R-DSP-NSEGT	National Security & Emerging Global Trends	Dr G Collantes-Celador	20	0	10	N	11/01/21	11/01/21	05/03/21	50	ICW	100				05/03/21	Next available opportunity
64	R-DSP-IILUF	Introduction to International Law and the Use of Force	Mr D Turns	20	0	10	N	14/06/21	14/06/21	13/09/21	50	ICW	100				13/09/21	Next available opportunity
65	R-DSP-SL	Strategic Leadership in the Security Sector	Dr B Watters	20	0	10	N	24/01/22 A21	24/01/22	18/03/22	40	ICW	100				18/03/22	Next available opportunity
66	R-DSP-SPD	Security Sector Strategy and Policy Development	Dr I Zaidi	20	0	10	N	28/03/22 A21	28/03/22	27/05/22	40	ICW	100				27/05/22	
67	R-DSP-GRL	Governance and Rule of Law	Dr Anicee Van England	20	0	10	N	05/09/22 A22	05/09/22	28/10/22	40	ICW	100				28/10/22	Next available opportunity

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68	R-DSP-LMC	Leading and Managing Change in Security Sector Organisations	Dr I Zaidi	20	0	10	N	05/09/22 A22	05/09/22	28/10/22	40	ICW	100				28/10/22	Next available opportunity
69	R-DSP-IP	Instructional Practice	Dr Robby Allen & Ifti Zaidi	20	0	10	N	05/09/22 A22	05/09/22	28/10/22	40	ICW	100				28/10/22	Next available opportunity
70	R-DSP-IHLCR	International Humanitarian Law and Command Responsibility	Mr David Turns	20	0	10	N	04/07/22 A21	04/07/22	02/09/22	40	ICW	100				02/09/22	Next available opportunity
71	R-DSP-FES	Financial and Economic Security	Dr Irfan Ansari	20	0	10	N	07/11/22 A22	07/11/22	06/01/23	40	ICW	100				06/01/23	Next available opportunity
72	R-DSP-MSRC	Managing Security in a Regional Context	Dr Anicee Van England	20	0	10	N	07/11/22 A22	07/11/22	06/01/23	40	ICW	100				06/01/23	Next available opportunity
73	R-DSP-CIS	Cyber and Informational Security	Dr N Williams	20	0	10	N	07/11/22 A22	07/11/22	06/01/23	40	ICW	100				06/01/23	Next available opportunity

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												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
74	R-DSP-BIPS	Building Integrity in the Public Sector	Dr R Allen & Dr I Zaid	20	0	10	N	07/11/22 A22	07/11/22	06/01/23	40	ICW	100				06/01/23	Next available opportunity
75	R-DSP-MPPI	Managing Post-conflict Peace Interventions	Dr G Collantes-Celador	20	0	10	N	07/11/22 A22	07/11/22	06/01/23	40	ICW	100				06/01/23	Next available opportunity
Engineering: Aero Systems Pathway																		
76	R-MES-EPD	Electromagnetic Propagation and Devices	Dr I L Morrow	32	0	10	N	07/09/20	07/09/20	18/09/20	50	ICW	100				16/10/20	TBC
77	R-MES-SPSA	Signal Processing Statistics and Analysis	Dr P Barker	30	0	10	Y	12/10/20	12/10/20	16/10/20	50	ICW	100				13/11/20	TBC
78	R-MES-CP	Communication Principles	Dr P Barker	30	0	10	Y	16/11/20	16/11/20	20/11/20	50	ICW	100				21/12/20	TBC
79	R-MES-CS	Communications Systems	Dr P Barker	30	0	10	Y	30/11/20	30/11/20	04/12/20	50	ICW	100				04/01/21	TBC
80	R-MES-RP	Radar Principles	Dr A Baller	30	0	10	Y	02/11/120	02/11/20	06/11/20	50	ICW	100				04/12/20	TBC

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
81	R-MES-REW	Radar Electronic Warfare	Mr I Vagias	30	0	10	Y	01/02/21	01/02/21	05/02/21	50	ICW	100				05/03/21	TBC
82	R-MES-EOIS1	Electro-optics and Infrared Systems 1	Dr D B James	32	0	10	Y	28/09/20	28/09/20	02/10/20	50	EX	100				18/12/20	TBC
83	R-MES-EOIS2	Electro-optics and Infrared Systems 2	Dr D B James	32	0	10	Y	11/01/21	11/01/21	15/01/21	50	ICW	100				12/02/21	TBC
84	R-MES-ASDP	Advanced Sensor Data Processing	Dr V S Sastry	30	0	10	Y	22/03/21	22/03/21	26/03/21	40	ICW	100				23/04/21	TBC
85	R-MES-AR	Advanced Radar	Dr D Andre	30	0	10	Y	08/03/21	08/03/21	12/03/21	40	ICW	100				09/04/21	TBC
86	R-MES-IN	Information Networks	Dr P Nobles	30	0	10	N	15/03/21	15/03/21	19/03/21	40	ICW	100				16/04/21	TBC
87	R-MAA-MA	Military Avionics STA Communications and Navigation	Dr Alessio Balleri	32		10	N	25/01/21	25/01/21	29/01/21	40	ICW	100				23/03/21	AY20/21

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
88	R-MAA-UAS	Uninhabited Aircraft Systems	Dr John Economou	35		10	Y	17/05/21	17/05/21	21/05/21	50	GCW	100				12/07/21	AY21/22
Further Defence and Security Modules																		
89	R-DSP-CDE	Capstone Development and Exploitation **	Mr M Summers	50		40	N	06/09/21 A21	06/09/21	24/07/23	50 50 50	ICW 1 IPRES ICW 2	40 30 30				24/07/23	
90	R-DSP-THESIS	Thesis	Dr John Economou	30	0	80	N	15/06/21	15/06/21	14/06/22	50	THESIS	100				14/06/22	
91	R-DSP-CP	Capstone Portfolio	Mr John McCormack	50		100	N	06/09/21 A21	06/09/21	24/07/23	50	IPROJ	100				24/07/23	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	**Module title**	**Course that owns the module**	**Other course(s)/ programme(s) that use the module**
R-FP-FEI	Fires, Explosions and their Investigation	Forensic Programme	
R-FP-FIEED	Forensic Investigation of Explosives and Explosive Devices	Forensic Programme	
R-FP-IFIFB	Introduction to Firearms Investigations and Forensic Ballistics	Forensic Programme	
N-SAI-ISMS	Aviation Safety Management	Safety Accident and Investigation	Airworthiness, Military Aerospace and Airworthiness, Air Transport Management, Safety and Human Factors in Aviation
R-MAA-IHF	Introduction to Human Factors	Military Aerospace and Airworthiness	
N-AW-MIGT	Mechanical Integrity of Gas Turbines	Airworthiness	Military Aerospace and Airworthiness
R-MAA-MAS	Military Aircraft Systems	Military Aerospace and Airworthiness	Airworthiness
N-AW-RA	Practical Reliability	Airworthiness	Military Aerospace and Airworthiness
R-MAA-GW	Guided Weapons	Military Aerospace and Airworthiness	Weapons and Vehicle Systems
R-ESD-ED	Element Design	Weapons and Vehicle Systems Programme	
R-ESD-FB	Fundamentals of Ballistics	Weapons and Vehicle Systems Programme	
R-ESD-MVPD	Military Vehicle Propulsion and Dynamics	Weapons and Vehicle Systems Programme	
R-ESD-MSC	Modelling, Simulation and Control	Weapons and Vehicle Systems Programme	
R-ESD-RSE	Reliability and Systems Effectiveness	Weapons and Vehicle Systems Programme	
R-ESD-SURV	Survivability	Weapons and Vehicle Systems Programme	
R-ESD-VSI	Vehicle Systems Integration	Weapons and Vehicle Systems Programme	
R-ESD-WST	Weapon Systems Technology	Weapons and Vehicle Systems Programme	
R-DAM-CEF	Cost Estimation and Planning	Defence Acquisition Management	

R-DAM-IDDA	The International Dimensions of Defence Acquisition	Defence Acquisition Management	Systems Engineering for Defence Capability
R-DAM-FA	Financing Acquisition	Defence Acquisition Management	
R-DAM-MAC	Managing Acquisition Change	Defence Acquisition Management	
R-DAM-SD	Sustainability in Defence	Defence Acquisition Management	
R-DL-DSOB	Defence Sector and Organisational Behaviour	Defence Leadership	
R-DL-GSCC	Global Security; Culture and Complexity	Defence Leadership	
R-DL-GSEC	Global Security; Emerging Challenges	Defence Leadership	
R-DL-LSCM	Leadership Studies Classical and Modern	Defence Leadership	
R-DL-NSRC	National Security: Resilience and Crisis	Defence Leadership	
R-DL-ILCR	International Law and Command Responsibility	Defence Leadership	
R-DL-PL	The Psychology of Leadership	Defence Leadership	
R-DL-SMD	Strategic Management in Defence	Defence Leadership	
R-DMR-DSO	Defence and Security Offset	Defence & Security Export	MBA(Defence Export)
R-DMR-LEPDSF	Legal, Ethical and Political Defence and Security Frameworks	Defence & Security Export	MBA(Defence Export)
R-DMR-N	Negotiation	Defence & Security Export	
R-AMOR-IS	Intelligent Systems	Applied Mathematics and Operational Research Programme	
R-AMOR-WGC	War Gaming and Combat Modelling	Applied Mathematics and Operational Research Programme	
R-DEFCY-FMC	Foundations: Management of Cyber	Defence Cyber Masters Programme	
R-DEFCY-ST	Social Technologies	Defence Cyber Masters Programme	
R-DEFCY-HD	The Human Dimension	Defence Cyber Masters Programme	

R-SISD-DLDS	Data Led Decision Support	Information Capability Management	Defence Cyber Masters Programme
R-AMOR-CG	Computer Graphics	Defence Simulation and Modelling	
R-AMOR FMS	Foundations of Modelling and Simulation	Defence Simulation and Modelling	Military Electronic Systems Engineering
F-FCO-FP	Digital Crime and Investigation	Forensic Programme	Defence and Security Programme
R-SISD-ETM	Emerging Technology Monitoring	Information Capability Management	
R-SISD-MT	Methods and Tools for Information Systems Development	Information Capability Management	
R-SISD-STOV	Systems Thinking for Organisational Viability	Information Capability Management	
R-SISD-PM	Programme and Project Management for Information Systems	Information Capability Management	
R-SISD-SE	Software Engineering	Information Capability Management	
R-AMOR-IORT	Introduction to Operational Research Techniques	Military Operational Research	
R-AMOR-LM	Logistics Modelling	Military Operational Research	
R-AMOR-SAT	Statistical Analysis and Trials	Military Operational Research	
R-SEE-ISSE	Introduction to Systems & Systems Engineering	Systems Engineering	
R-SEE-EM	Enterprise Management	Systems Engineering	
R-SEE-PASD	Problem Analysis and System Definition	Systems Engineering	
R-SEE-SDR	Systems Design and Realisation	Systems Engineering	
R-IDS-RR	Risk, Crisis and Resilience	Counterterrorism	
R-IDS-TCT	Counterterrorism and Intelligence	Counterterrorism	
R-MES-EPD	Electromagnetic Propagation and Devices	Military Electronic Systems Engineering	Pg Cert Communications Electronic Warfare AP Pg Cert Sensors Electronic Warfare AP Pg Cert Military Electronic Systems Engineering Foundations
R-MES-SPSA	Signal Processing Statistics and Analysis	Military Electronic Systems Engineering	Pg Cert Communications Electronic Warfare AP

			Pg Cert Sensors Electronic Warfare AP Pg Cert Military Electronic Systems Engineering Foundations AP Guided Weapon Systems AP compulsory for Mc and Pgip and elective PGCert
R-MES-CP	Communication Principles	Military Electronic Systems Engineering	
R-MES-CS	Communications Systems	Military Electronic Systems Engineering	Pg Cert Communications Electronic Warfare AP Pg Cert Military Electronic Systems Engineering Foundations
R-MES-RP	Radar Principles	Military Electronic Systems Engineering	Pg Cert Communications Electronic Warfare AP Pg Cert Sensors Electronic Warfare AP Pg Cert Military Electronic Systems Engineering Foundations AP Guided Weapon Systems AP compulsory
R-MES-REW	Radar Electronic Warfare	Military Electronic Systems Engineering	Pg Cert Sensors Electronic Warfare AP Guided Weapon Systems
R-MES-EOIS1	Electro-optics and Infrared Systems 1	Military Electronic Systems Engineering	Sensors Electronic Warfare AP Pg Cert Military Electronic Systems Engineering Foundations AP And Guided Weapon Systems AP
R-MES-EOIS2	Electro-optics and Infrared Systems 2	Military Electronic Systems Engineering	Ensors Electronic Warfare compulsory Guided Weapon Systems AP Compulsory: MSc, PgDip Elective: PgCert
R-MES-ASDP	Advanced Sensor Data Processing	Military Electronic Systems Engineering	
R-MES-AR	Advanced Radar	Military Electronic Systems Engineering	
R-MES-IN	Information Networks	Military Electronic Systems Engineering	Communications Electronic Warfare
R MAA MA	Military Avionics STA Communications and Navigation	Military Aerospace and Airworthiness	
R-MAA-UAS	Uninhabited Aircraft Systems	Military Aerospace and Airworthiness	

8. How are the ILOs assessed?

The following assessment types are utilised:

Formative Assessment

Across distance and residential modules students will be provided with feedback on a range of activities in order to grow their confidence ahead of summative assessment tasks. Formative assessment may take the form of peer review by fellow students, lecturers and module leaders with a variety of approaches being utilised.

Summative Assessment

The course uses a range of assessment methods including exams, essays, literature reviews, and application of concepts to real world case studies:

This approach has been adopted because:

The breadth of assessment methods are intended to cater for differing learning styles ensuring inclusion across the student cohort and minimising any potential disadvantage from limiting assessment types. For students completing the MSc, the individual thesis also requires students to be assessed on their written presentation skills.

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11	ILO 12	ILO 13	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20	ILO 21	ILO 22	ILO 23
1	ICW								ICW						ICW								
2		ICW								ICW	ICW							ICW					
3			ICW		ICW							ICW					ICW						
4				ICW								ICW	ICW			ICW							
5	ICW					ICW	ICW	ICW			ICW	ICW		ICW		ICW			ICW				ICW
6			ICW			ICW	ICW																
7	ICW					ICW				ICW													
8	ICW					ICW				ICW													
9	ICW		ICW			ICW		ICW		ICW													
10	ICW		ICW				ICW			ICW													
11					ICW		ICW	ICW															
12	ICW/ EX					ICW/ EX				ICW/ EX													
13			ICW				ICW																
14					ICW		ICW	ICW	ICW														
15	ICW		ICW		ICW			ICW															
16	EX				EX	EX																	
17	ICW					ICW	ICW																
18			ICW				ICW/ OR																
19	ICW				ICW		ICW																
20	ICW					ICW	ICW																
21					ICW	ICW		ICW	ICW														
22					ICW				ICW														
23	ICW			ICW							ICW												
24	ICW	ICW	ICW	ICW	ICW																		

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11	ILO 12	ILO 13	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20	ILO 21	ILO 22	ILO 23
25	GPRES	EX	EX/ GPRES																				
26	ICW												ICW										
27	ICW			ICW							ICW												
28	ICW			ICW								ICW		ICW									
29	ICW												ICW										
30		ICW									ICW												
31	ICW										ICW												
32												ICW		ICW									
33	ICW	ICW											ICW										
34	ICW										ICW												
35	ICW												ICW	ICW									
36	ICW																						
37	ICW		ICW									ICW											
38	ICW											ICW	ICW										
39					ICW							ICW	ICW										
40	ICW												ICW										
41					ICW								ICW										
42					ICW											ICW							
43			ICW													ICW							
44		ICW		ICW																			
45				ICW																			
46	ICW																ICW						
47			ICW	ICW	ICW																		
48			ICW																				
49			ICW												ICW								
50	ICW														ICW			ICW					
51					ICW/ GPRES										ICW/ GPRES	ICW/ GPRES							

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11	ILO 12	ILO 13	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20	ILO 21	ILO 22	ILO 23
52				ICW														ICW					
53			ICW												ICW								
54			ICW/ GCW		ICW/ GCW													ICW/ GCW					
55			EX													EX							
56	ICW		ICW														ICW						
57			EX													EX							
58	ICW			ICW	ICW											ICW		ICW					
59			ICW													ICW	ICW	ICW					
60	ICW		ICW													ICW							
61	ICW				ICW										ICW			ICW					
62		ICW/ GCW		ICW/ GCW		ICW/ GCW		ICW	ICW			ICW		ICW/ GCW		ICW		ICW/ GCW	ICW				
63	ICW	ICW	ICW	ICW																			
64	ICW		ICW		ICW																		
65											ICW			ICW									
66												ICW	ICW	ICW									
67											ICW	ICW	ICW	ICW									
68											ICW	ICW	ICW	ICW									
69												ICW		ICW									
70											ICW		ICW										
71												ICW	ICW										
72												ICW	ICW	ICW									
73											ICW	ICW	ICW										
74											ICW	ICW	ICW	ICW									
75											ICW		ICW	ICW									
76	ICW		ICW		ICW			ICW							ICW								
77					ICW			ICW	ICW						ICW	ICW							
78	ICW		ICW		ICW	ICW	ICW								ICW	ICW							
79	ICW		ICW		ICW		ICW	ICW	ICW						ICW	ICW							
80					ICW	ICW	ICW		ICW						ICW			ICW					
81					ICW		ICW	ICW							ICW			ICW					
82					EX	EX		EX	EX						EX	EX							
83					ICW	ICW	ICW		ICW						ICW			ICW					

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11	ILO 12	ILO 13	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20	ILO 21	ILO 22	ILO 23
84					ICW	ICW	ICW		ICW						ICW			ICW					
85					ICW		ICW	ICW	ICW						ICW	ICW		ICW					
86	ICW		ICW		ICW	ICW		ICW	ICW						ICW			ICW					
87	ICW		ICW		ICW	ICW			ICW						ICW	ICW		ICW					
88	GCW		GCW		GCW		GCW		GCW						GCW			GCW					
89	ICW1 IPRES ICW2				IPRES ICW2														ICW1 IPRES ICW2	ICW1	ICW1 ICW2	ICW1 IPRES ICW2	ICW1 IPRES ICW2
90																			THESIS	THESIS	THESIS	THESIS	THESIS
91																			IPROJ	IPROJ	IPROJ	IPROJ	IPROJ

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

The course aims to ensure that graduates are better prepared to tackle the current and emerging demands of defence and security. Given the rapidly changing nature of this environment the education will allow graduates to recognise emerging trends and respond effectively and proactively. As the course ties together a broad technical and business base and is supported by a wide range of public and private sector organisations the qualification will be noteworthy on the CV's of those wishing to move into strategic and operational positions in the defence and security sector.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: June 2020

1. What is the course?

Course information

Course Title	Defence Leadership
Course code	MSDLSPTR – PDDLSPTR – PCDLSPTR - SPDLSPTR
Academic Year	20/21
Valid entry routes	PgCert, PgDip, MSc
Additional exit routes	PgCert, PgDip
Mode of delivery	Part-time
Location(s)[1] of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Leadership and Management
Centre	Centre for Defence Leadership and Management
Course Director	Dr Bryan Watters
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	Yes
Is this course offered as a Cranfield Mastership?	N/A
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A
Teaching Institution	Cranfield University

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FEHQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	3 Years MSc, 2 Years PG Dip, 2 Years PG Cert
Course Start Month(s)	January

Institutions delivering the course

This course is delivered by Centre for Defence Management and Leadership within the Cranfield School of Defence and Security where the research interests include:

Innovations in Leadership Development, Personal Construct Theory, Toxic Leadership, Leadership and Gender, Insurgent and Non-formal Leadership, and Developments in Leadership Theory.

Cranfield University interacts with the following institutions and in the following ways:

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

Students will be invited to take up Student Membership of the Institute of Leadership and Management the cost for this additional professional award is borne by the student. Upon successful completion of the Postgraduate Diploma stage, students who registered with ILM will also be awarded the ILM Level 7 Diploma in Leadership and Management. Students exiting on completing the Postgraduate Certificate would be eligible for ILM Level 7 Award in Leadership and Management.

2. What are the aims of the course?

The aims of the PgCert are for students: to develop a broad and critical understanding of the variety of approaches and trends in leadership (including their own) within the defence sector; and to understand the causes of leadership success and failure, including leading organisational change.

In addition the aims of the PgDip are for students: to develop practical knowledge and skills to be able to reflect on, and analyse critically, a wide range of contexts and situations in the defence sector; to develop the capability to appraise and develop leadership in others in the defence sector; and to develop the ability to analyse critically contemporary defence leadership theory and practice.

In addition, the aims of the MSc are for students: to develop competence in appropriate social science research methods and philosophies that underpin the current academic conceptualisations of leadership and leadership in defence; and to be able to design, conduct and evaluate a research project that appraises and applies relevant theories and concepts relating to defence leadership.

This programme is intended for the following range of students:

Who will be able to add real value to the examination of defence leadership in general and to their subsequent appointments in defence ministries, procurement and logistics agencies, the Armed Forces or defence industry.

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. **Postgraduate Certificate in Defence Leadership**

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Demonstrate a systematic knowledge of the relationship between leadership theory, practice and context and describe the trends which have shaped the relationship.

ILO 2. Create an awareness and knowledge of their own and others leadership styles, behaviours, preferences in different contexts.

ILO 3. Critically appraise examples of leadership failure and success in the defence sector.

ILO 4. Critically analyse the application of leadership ideas, theories and concepts to a specific defence context.

B. **Postgraduate Diploma in Defence Leadership**

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 5. Demonstrate awareness of the critical role of contexts and situations in the success and failure of leadership in the defence sector.

ILO 6. Critically evaluate leadership development needs and formulate associated criteria for leadership styles and behaviours for different situations in the defence sector.

ILO 7. Develop a thorough awareness of contemporary theories and models of leadership in the defence sector.

ILO 8. Evaluate contemporary developments in the academic conceptualisation of leadership in the defence sector.

C. **MSc in Defence Leadership**

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 9. Critically compare the underpinning academic subject matter relating to leadership in the defence sector.

ILO 10. Design and conduct an individual research project based on sound social science to address defence leadership issues.

4. How is the course taught?

Students will be supported in their learning and personal development by:

Cranfield University provides the teaching staff with support from external practitioners and the military Directing Staff at the Defence Academy where appropriate. The Defence Leadership academic team comprises permanently appointed members of Cranfield University, complemented by military staff who serve for a term of duty normally lasting between two and three years. The latter always have practical leadership experience. This provides the right blend of stability and continuity, whereby the expertise of the academic staff is complemented by an input of fresh user experience necessary in a dynamic field of social science.

The external contributors to the course are all experienced and accomplished practitioners of, or researchers into, leadership. They are drawn from industry, academia, the Armed Forces and MOD.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

	Credits
COMPULSORY MODULES:	
Modules 1-6	10 credits per module
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	**Credits**
COMPULSORY MODULES:	
1-12	10 credits per module
ELECTIVE MODULES:	
N/A	
TOTAL:	**120**

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	**Credits**
COMPULSORY MODULES:	
Modules:1-12 13: R-DL-RM 14: R-DL-THESIS	120 10 70
ELECTIVE MODULES:	
N/A	
TOTAL:	**200**

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria
The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Part-time students register for the course in January and are expected to complete the course within 3 years.

The course consists of a taught phase and, in the case of the MSc, an individual research thesis. Modules employ a range of learning styles. These may involve staff supervision and self-directed study. Prior to attending the explicitly timetabled sessions, the student may be required to undertake some directed study. The normal duration of timetabled sessions is one week (Sunday to Friday inclusive) covering two modules; 3 days per module.

For the first two years there are six modules taught each year, requiring three weeks attendance per year. The periods between modules allow time for independent learning, reflection and the completion of written assignments. The third year has one taught module (Research Methods) preceding the production of a research based thesis.

MSc Students register for the course in January and are expected to complete the course within a period of three years. This period is prescribed because of the fast development of the Leadership discipline. It also enables early delivery of benefit to the student's sponsor/employer.

PgCert Students register for the course in January; this is normally completed in one year.

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

PgDip Students also register for the course in January; this variant is normally completed in two years.

7. Course Level Assessment Strategy[4]

This degree includes modules from across a broad spectrum of subjects, from leadership and management theories to the challenging context of defence and the wider security sector. The assessments are challenging and enable students to demonstrate relevant skills and attributes including critical analysis of theories and analytical frameworks. Modules are supported by a number of formative tasks including group discussions, example case studies and problem solving. These formative tasks and their feedback develop critical discourse, presentation and listening skills relevant to professional practice. Feedback will be given immediately after the discussions and presentations by the tutor and peers. Summative assessment for each module will be a written assignment of between 2,500 and 3,000 words. These individual written assignments involve a range of assessments including: critical evaluation of a journal article, critical evaluation of theory, evaluating the contextualisation of theory in practice, reflective portfolios, a case study analysis and a research proposal. These assessments demonstrate knowledge of the underlying theory and practices of leadership relevant to the Defence and Security sector. Detailed feedback will be provided by the Module Leader within 20 working days, enabling the feedback to inform the student's next assessment and continuing academic development. The assessment tasks enable students to demonstrate a full range of skills and attributes in line with the learning objectives. Students will also engage with an interactive learning activity in module 12 incorporating formative tutor and peer feedback. Throughout the degree students are encouraged to support each other by observation, comment and questions/answers on the VLE forum.

The taught components precede the research element in the third year, so assessment can be used to develop skills required for the dissertation. Students are generally expected to be more self-directed in their learning during the research phase of their studies, guidance and dissertation supervisors will be provided during the Research Methods Module. During the dissertation supervisors provide formative feedback on draft chapters at the request of the student.

The role of every module has been mapped to the relevant ILOs that it is intended to support ensuring consistent academic development for all students.

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Course modules

The following modules outline all parts of the programme leading to **MSc.**. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar				Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	R-DL-IS	Introductory Studies & Critical Thinking	Gemma Collantes Celdor	20		10	N	10/01/21	10/01/21	12/01/21	50	ICW	100				26/02/21	Next assess-ment opportunity
2	R-DL-LSCM	Leadership Studies - Classical & Modern	Bryan Watters	20	2	10	Y	13/01/21	13/01/21	15/01/21	50	ICW	100				09/04/21	Next assess-ment opportunity

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar				Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	R-DL-SMD	Strategic Management in Defence	Ifti Zaidi	20	2	10	Y	09/05/21	09/05/21	11/05/21	50	ICW	100				25/06/21	Next assess-ment opportunity
4	R-DL-PL	Psychology of Leadership	Bryan Watters	20	0	10	Y	12/05/21	12/05/21	14/05/21	50	ICW	100				06/08/21	Next assess-ment opportunity
5	R-DL-DSOB	Defence Sector & Organisational Behaviour	Robby Allen	20	0	10	Y	18/10/21	18/10/21	20/10/21	50	ICW	100				03/12/21	Next assess-ment opportunity
6	R-DL ILCR	International Law and Command Responsibility	David Turns	20	0	10	YN	21/10/21	21/10/21	23/10/21	40	ICW	100				14/01/22	Next assess-ment opportunity
7	R-DL-LCI	Leading Change and Innovation	Ifti Zaidi	20	2	10	N	07/02/21	07/02/21	09/02/21	40	ICW	100				26/03/21	Next assess-ment opportunity
8	R-DL-NSRC	National Security: Resilience and Crisis	Bryan Watters	20	4	10	Y	10/02/21	10/02/21	12/02/21	40	ICW	100				07/05/21	Next assess-ment opportunity

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar				Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates		
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
9	R-DL-GSCC	Global Security: Culture and Complexity	Anicee Van England	20	1	10	Y	16/05/21	16/05/21	18/05/21	40	ICW	100				02/07/21	Next assess-ment opportunity
10	R-DL-GSEC	Global Security: Emerging Challenges	Anastasia Filippidou	20	0	10	Y	19/05/21	19/05/21	21/05/21	40	ICW	100				13/08/21	Next assess-ment opportunity
11	R-DL-LDD	Leadership Development in Defence	Ifti Zaidi	20	12	10	N	14/11/21	14/11/21	16/11/21	40	ICW	100				10/01/22	Next assess-ment opportunity
12	R-DL-CDLS	Contemporary Defence Leadership Studies	Bryan Watters	20	6	10	N	17/11/21	17/11/21	19/11/21	40	ICW	100				11/02/22	Next assess-ment opportunity
13	R-DL-RM	Research Methods	Ifti Zaidi	20	0	10	N	18/01/21	18/01/21	22/01/21	50	ICW	100				05/02/21	
14	R-DL-THESIS	Thesis	Bryan Watters	30	0	70	N	22/01/21	N/A	N/A	50	THESIS	100				28/01/22	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
R-DL-DSOB	Defence Sector and Organisational Behaviour	Defence Leadership	Defence and Security Programme
R-DL-GSCC	Global Security; Culture and Complexity	Defence Leadership	Defence and Security Programme
R-DL-GSEC	Global Security; Emerging Challenges	Defence Leadership	Defence and Security Programme
R-DL-LSCM	Leadership Studies – Classical and Modern	Defence Leadership	Defence and Security Programme
R-DL-NSRC	National Security: Resilience and Crisis	Defence Leadership	Defence and Security Programme
R-DL-PL	Psychology of Leadership	Defence Leadership	Defence and Security Programme
R-DL-SMD	Strategic Management in Defence	Defence Leadership	Defence and Security Programme

8. How are the ILOs assessed?

The following assessment types are utilised:

Formative Assessment: in class including posed questions, discussion, peer reviewed presentations, Quizzes. Summative Assessment: Individual Course Work. The Individual Course Work comprises a range of assessments: Critical Reviews of Theory, Contextualisation of Theory in the work place, Reflective Review, Case Study Analysis and Dissertation Proposal.

This approach has been adopted because:

As a part time course the students undertake their eighty house of self-directed learning, including Summative Assessment at home balancing work and domestic commitments. The use of Individual Course Work has variety in subject areas and enables the student to balance the pace of their learning and assessment with work, domestic and study commitments.

Assessment and ILO Mapping

A. Postgraduate Certificate in Defence Leadership

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5
1: IS			ICW	ICW	ICW
2: LSCM	ICW		ICW	ICW	ICW
3: SMD				ICW	ICW
4: PL	ICW	ICW		ICW	ICW
5: DSOB	ICW			ICW	ICW

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5
6: PPM	ICW	ICW	ICW	ICW	ICW

B. Postgraduate Diploma in Defence Leadership

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 6	ILO 7	ILO 8	ILO 09	ILO 10	ILO 11
7: LCI	ICW	ICW	ICW	ICW	ICW	
8: NSRC	ICW			ICW	ICW	
9: GSCC	ICW	ICW		ICW	ICW	
10: GSEC	ICW	ICW		ICW	ICW	
11: LDD		ICW		ICW	ICW	
12: CDLS	ICW			ICW	ICW	ICW

C. MSc

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 12	ILO 13	ILO 14	ILO 15	ILO 16
13: RM	ICW		ICW	ICW	ICW
14: Thesis	THESIS	THESIS	THESIS	THESIS	THESIS

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)
N/A			

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

This course gives students a thorough understanding of defence leadership in its widest setting, within and beyond the defence sector in theory and in practice. The qualification is recognised as career enhancing by the MoD.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: 06/03/2020

1. What is the course?

Course information

Course Title	Design of Rotating Machines
Course code	MSDRMFTC, MSDRMPTC, PDDRMFTC, PDDRMPTC, PCDRMFTC, PCDRMPTC
Academic Year	2020/21 - No new entries, teach out only
Valid entry routes	MSc
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Energy & Power
Centre	Centre for Power Engineering
Course Director	Dr Joao Amaral Teixeira
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	No
Is the Degree apprenticeship integrated or non-integrated?	No
Is the Mastership offered as an open and/or closed course?	No

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc - one year, Part-time MSc - up to three years
Course Start Month(s)	October

Institutions delivering the course

This course is delivered by Centre for Power Engineering Centre for Thermal Energy Systems where the research interests include:

Design and engineering of advanced power system components, electrical power and drives, materials, component life prediction and process/component monitoring.

Cranfield University interacts with the following institutions and in the following ways:

The connections of the course with industry operate on different levels. This course has a long established Industrial Advisory Board, whose function is to provide an industrial perspective on the relevance of the curriculum to industry and to advise on current and future needs. The Board in composed of a number of engineers and scientists who occupy prominent positions in industry and includes alumni of the Design of Rotating Machines MSc course.

Thesis projects are often carried out in collaboration with an industrial partner enabling the students to interact with professional engineers. This experience offers the students opportunities to develop presentation and interpersonal skills that are invaluable in the working environment.

In addition a number of lectures or courses are delivered by experienced engineers. This offers the students a beneficial opportunity to understand current industrial practices.
The course has also built strong double-degree partnerships with academic institutions in France, Spain and Italy. Similar arrangements are either in place or being developed with institutions in other countries including Poland, Libya and Nigeria.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited by the Institution of Mechanical Engineers (IMechE) and the Royal Aeronautical Society *(*RAeS) until 2019*.*

2. What are the aims of the course?

The aim of the course is to train suitable candidates in the design of modern rotating machinery in a teaching and research environment. Emphasis is placed on a creative and imaginative approach to design, balanced against a company's requirement for profitable manufacture, quality assurance and global marketability.

The growing complexity of designing machinery for a competitive market has stimulated an industrial awareness of the vital role which the design engineer plays in the manufacturing process. In particular, the availability of new materials, tighter financial controls over manufacturing costs, increased product sophistication and more stringent standards have placed a greater emphasis on the technical merits of design. Consequently, the range of computational and testing skills required by the student lies beyond the scope of a first degree in mechanical engineering.

The MSc course therefore seeks to provide accelerated training, which will permit the graduate to readily accept the additional responsibilities provided by the requirement for a more productive role in industry.

A feature of the course is that it offers a unique opportunity for the student to undertake a complete design exercise of a machine component using computer aided draughting, together with solid modelling. This is followed by an extensive stress and vibration analysis using a comprehensive range of Finite Element software.

Training is also provided in the use of the more conventional hand tabulation techniques in order to validate computer modelling and also to provide design procedures in a cost effective manner.

The taught part of the course aims to furnish students with the necessary theoretical knowledge in the areas of stress and vibration analysis, machine noise, manufacturing, computer aided engineering, project management. Theoretical aspects of the taught course are further put into practice by means of design case studies contemplating real engineering problems. Students are given the opportunity to prepare design specifications, carry out conceptual design, develop mathematical models for the solution of design problems, carry out structural integrity assessments and if appropriate build and test their own designs.

The course aims to provide students with expertise in the development of state-of-the-art engineering design aids. Computer aided engineering tools based upon the finite element methods can be used for the analysis and solution of many engineering problems in two and three dimensions including fatigue and fracture, composite materials, thermo elasticity, plasticity and structural dynamics.

It is generally accepted that the design process does not begin and end on the drawing board. Many occasions arise where designs need further development, or complementary knowledge is required before the design exercise may be completed. Engineers are required to perform field tests and trials in order to verify or prove a design. The course aims to train students in the use of modern theoretical and experimental methods for stress, vibration, noise, condition monitoring and general structural integrity assessment, as a means of developing their skills in addressing the solution of real engineering problems and enhance the student's ability to undertake design research and development tasks.

This programme is intended for the following range of students:

• Graduates with science or related engineering degrees keen to pursue careers in the field of design or management and monitoring of rotating machines
• Graduates currently in employment who wish to extend their technical qualifications or pursue a career change
• Candidates with other educational qualifications but who possess considerable relevant experience

3. <u>What should students expect to achieve in completing the course?</u>

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate in Design of Rotating Machines

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Recognize and perform the selection and design of common rotating machinery devices and components for specific industrial applications.

ILO 2. Critically analyse the stability of a range of rotating machines and be able to suggest remedial solutions in cases of potential or actual instability.

ILO 3. Apply effectively structural analysis techniques and theories in support of the design and evaluation of rotating equipment and its components.

ILO 4. Conduct critical analysis of the operational condition of rotating equipment by reference to vibration and other condition monitoring data and to refer this information to common failure conditions.

ILO 5. Effectively apply theories and software to the evaluation and determination of fatigue and fracture mechanics of engineering materials and structures.

ILO 6. Demonstrate knowledge of some key structural analysis techniques, including numerical methods and effectively apply these to analyse a range of structural problems.

B. Postgraduate Diploma in Design of Rotating Machines

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 7. Apply effectively mechanical transmission techniques and theories in support of the selection, design and evaluation of a range of technically significant gearing equipment.

ILO 8. Apply and critically evaluate key technical management principles, including project management, people management, technology marketing, product development and finance.

ILO 9. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. MSc in Design of Rotating Machines

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 10. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought

ILO 11. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences

4. How is the course taught?

Students will be supported in their learning and personal development by:

The taught elements of the course comprising lectures, assignments and other forms of coursework are delivered and concluded in the first half of the academic year. Lecture programmes are assessed by continuous assessment (project reports, assignments, etc.) and/or formal written examinations.

The thesis can be analytical, numerical, experimental or a combination of these. A list of projects is issued to all students who should make a selection. Students are encouraged to discuss the projects with the appropriate member of academic staff.

Part-time students can propose research projects to be carried out in collaboration with their employers. For in-company projects, the student will work within his own company and will address a company problem, guided by both academic and industrial supervisors and making use of Cranfield facilities and expertise where appropriate. Guidelines will be provided to both the student and the industrial supervisor on the procedure and format for such a scheme. For part-time students selecting non-company projects, a project selection list will be made available.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
N-DRM-BD Bearing Design	10
N-DRM-RD Rotor Dynamics	10
N-AME-SI Structural Integrity	10
N-DRM-RESS Rotating Equipment Systems and Selection	10
N-DRM-VDM Vibration and Diagnostics of Rotating Machines	10
N-AME-ESA Engineering Stress Analysis: Theory and Simulations	10
N-DRM-SARMC Stress Analysis of Rotating Machines	0
ELECTIVE MODULES:	
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
N-DRM-BD Bearing Design	10
N-DRM-GD Gear Design	10
N-DRM-RD Rotor Dynamics	10
G-MTI Management for Technology	10
N-AME-SI Structural Integrity	10
N-DRM-RESS Rotating Equipment Systems and Selection	10
N-DRM-VDM Vibration and Diagnostics of Rotating Machines	10
N-AME-ESA Engineering Stress Analysis: Theory and Simulations	10
N-DRM-SARMC Stress Analysis of Rotating Machines	0
Group Project (Compulsory for full time students)*	40

ELECTIVE MODULES:	
*Dissertation in place of group project (for part time students)	40
TOTAL:	120

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
N-DRM-BD Bearing Design	10
N-DRM-GD Gear Design	10
N-DRM-RD Rotor Dynamics	10
G-MTI Management for Technology	10
N-AME-SI Structural Integrity	10
N-DRM-RESS Rotating Equipment Systems and Selection	10
N-DRM-VDM Vibration and Diagnostics of Rotating Machines	10
N-AME-ESA Engineering Stress Analysis: Theory and Simulations	10
N-DRM-SARMC Stress Analysis of Rotating Machines	0
Group Project (Compulsory for full time students)	40
Individual research project	80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

- if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
- if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
- it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.

- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in October and are expected to complete the course within 12 calendar months.

Part-time students can register at any point during the taught phase of the course although it is suggested that they do so within the initial months of the academic year.

Each module is generally delivered over one or two weeks, with time allowed for more independent learning and reflection Part-time students select which modules to take in a given academic year as function of their registration date, professional commitments and advice from the Course Tutor. Part-time students are not required to take the modules in a prescribed sequence.

7. Course Level Assessment Strategy[4]

N/A

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Course modules

The following modules outline all parts of the programme leading to **MSc**. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment								
												Independent Assessment		Multi-part Assessment			Submission dates		
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-ENE-DISS Occ C	Dissertation (Part-Time option only)	G Drew	10		40	Y		05/10/20	24/09/21	50	IPROJ IPRES	80 20				24/09//21 W/C 20/09/21		
2	I-ENE-THESIS Occ C	Energy Individual Research Project	G Drew	20		80	Y		05/10/20	10/09/21	50 50	OR THESIS	10 90				23/08/21-30/08/21 06/09/21		

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

8. How are the ILOs assessed?

The following assessment types are utilised:

The MSc in Design of Rotating Machines is available as either a one year full-time or a two /three year part-time course. As part of the course students have to attend formal lectures, take part and submit a report on a Group Project, or a Dissertation for part-time students, and submit a thesis related to the individual research project. The taught part of the course contributes 40% towards the MSc. This element consists of lectures, assessments, technical seminars and projects, which are composed of the mandatory core modules. The Group Project or the Dissertation contributes 20% towards the MSc.

The other 40% of the course comprises the Individual Research Project. The project can be analytical, numerical, experimental or a combination of these. Projects may be selected from a list of projects offered from the academic staff, usually in areas in which a larger research project is undertaken. Alternatively, it could arise from a problem or particular interest to the student or his / her sponsor.

The course uses a range of assessment types, written examinations, and assessment by course work. In addition a number of Project presentations are also assessed.

This approach has been adopted in order to assess the knowledge of students using methods appropriate to the nature of the subject area and to help students to improve their technical writing and oral presentation skills.

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

A. Postgraduate Certificate

Award ILOs / Module No.	ILO 1.	1LO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.

B. Postgraduate Diploma

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 7.	ILO 8.	ILO 9.
1		IPROJ	IPROJ

Award ILOs / Module No.	ILO 7.	ILO 8.	ILO 9.
		IPRES	IPRES

C. MSc

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 10.	ILO 11.
2	THESIS OR	THESIS OR

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

Graduates from the course will be equipped with the academic skills and requirements to successfully pursue a career in a Mechanical Engineering discipline whether this is technical, management or research. The employment prospects of course graduates are very good based on surveys of alumni. Graduates of the course find employment in a range of industries, renewable, power generation (including land based and aerospace applications), electrical, automotive, oil industry, etc. A small number continue their studies with a view to following an academic career.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

COURSE TITLE: Design Thinking

Date of first publication/latest revision: 20.03.2018/May 2020

1. What is the course?

Course information

Course Title	Design Thinking
Course code	MNDETFTC, MNDETPTC, PDDETFTC, PDDETPTC, PCDETFTC, PCDETPTC
Academic Year	2020-21
Valid entry routes	MDes, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full time, Part time
Location(s)[1] of Study	Cranfield campus
School(s)	SWEE
Theme	Water
Centre	Centre for Competitive Creative Design (C4D)
Course Director	Mr Paul Lighterness
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	N/A
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	MSc: 1 Year FT 3 Years PT
Course Start Month(s)	Full time: October, Part time: typically an October start

Institutions delivering the course

This course is delivered by Centre for Competitive Creative Design (C4D) where the research interests include:

- development of design-led thinking and open innovation within engineering and management sectors
- innovation in the development of areas of social responsibility,
- evaluation of design effectiveness and methods and applications of design futures.

Communities of practise include:
- Break-through Innovation
- Materials Innovation
- Circular Innovation
- Data Driven Innovation

Cranfield University interacts with the following institutions and in the following ways:

C4D has a range of industrial associates and this group is normally expected to be among sponsors for group and individual thesis projects. This group of industrial partners currently includes Ford, Procter and Gamble, Cisco, Herman-Miller and Royal Mail, and design companies including Imagination Ltd. All group and individual thesis projects are normally expected to be sponsored by a private or public sector partner, although some projects are carried out internally where internal collaborations or particular subject areas are in development.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited formally by Chartered Society of Designers until 31 July 2022.

2. What are the aims of the course?

This course aims to:
- Equip learners, from a range of design related backgrounds, with the necessary technical and transferable skills, theoretical knowledge, tools and techniques to appreciate the value of design thinking and its application to industrially focused challenges,
- Provide learners with the opportunity to demonstrate and evaluate their new knowledge across a range of different consultancy and research based problems,
- Ensure learners are able to effectively communicate the value of design thinking and its application across industry sectors to inform a diversity of career choices.

This programme is intended for the following range of students:

- Graduates with a high class undergraduate degree in a design related subject who are motivated to develop expertise in the application of design thinking,
- Industry professionals, with a high class undergraduate degree or equivalent industrial experience, who wish to accelerate their career, change career or develop their own business venture through the application of design thinking.

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate in Design Thinking

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Apply state-of-the-art design tools and processes, to create product and/ or service innovations.

ILO 2. Evaluate the role of design thinking to make formative decisions for industrial competitiveness.

ILO 3. Analyse and deconstruct complex innovation challenges, through best practice design methodologies, to problem solve and facilitate product, service or other innovations.

B. Postgraduate Diploma in Design Thinking

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 4. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problems diagnoses, designs or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. Master of Design in Design Thinking

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 5. Define research questions, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 6. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

Students will be supported in their learning and personal development by:

Course delivery will be the responsibility of SWEE. A combination of one and two week module delivery will be shared between SWEE and the School of Management (SoM). Learners are encouraged to reflect on the experience of this learning at the C4D within the creative modules, the group project, and specifically organised sessions.

There are three phases that make up the course- taught modules, group project/ dissertation and individual thesis project. Learners will be assigned a personal mentor to support their learning and specialism as they progress through the course.

The course applies creative learning methods to provide and to foster an applied design thinking learning experience.

The curriculum will be delivered through the development of a reflective learning and action based approach to maximise the benefit of the multi-disciplinary and applied nature of the course. To support this approach, all phases of the course incorporate formative methods of assessment and feedback in addition to summative assessment and feedback.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction week Consumer Trends Design, Technology & Prototyping	0 20 20
ELECTIVE MODULES:	
Any of the following modules adding up to an additional 20 credits: Whole System Design Creative Enterprise & Entrepreneurship Project Management	 10 20 10
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Week Consumer Trends Design, Technology & Prototyping Whole System Design Creative Enterprise & Entrepreneurship Project Management Group Project (Full Time Students)	0 20 20 10 20 10 40
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	120

C. Master of Design

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Induction Week	0
Consumer Trends	20
Design, Technology & Prototyping	20
Whole System Design	10
Creative Enterprise & Entrepreneurship	20
Project Management	10
Group Project (Full Time Students)	40
Individual Thesis Project	80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
    - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in October and are expected to complete the MDES course within 12 calendar months.

Part-time students register for the course in October and are expected to complete the MDES course within 3 years.

The full time course is structured in three phases:

The taught phase between October and February taking five compulsory modules;
The group project phase runs between February and May;
The thesis project phase runs between May and September.

The part time course is structured in three phases:

The taught phase between October and February taking five compulsory modules (typically within the registration period) over years one and two;

The dissertation phase is organised with a supervisor and typically delivered between years one and two.

The thesis project phase is delivered with a supervisor during year three.

7. Course Level Assessment Strategy[4]

Students on this course will be assessed by a variety of assessments during modules, group project and thesis period. The summative assessment plan for the taught modules owned by the course are outlined in the table below. For the four taught modules, a combination of individual and group coursework, an individual practical, a group presentation and an individual reflective portfolio will be used to assess the modules. The assessments have been mapped against the course level ILOs to ensure they cover the core learning across the course. Summative assessment will be complimented by on-going formative assessment and feedback within modules.

Module	***Assessment Details***	***Course Level ILOs***
Consumer Trends	Group Presentation (40%) – Professional face to face 30 minute presentation of the research process and concepts to the course tutor and client using appropriate multi-media i.e. power point, graphics and animation. Participation by all team members is required.	ILO1, ILO2, ILO3

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

	Reflective Portfolio (60%) - demonstrate using examples of the work conducted as a group, the active learning to get qualitative data and the analytical skills to get consumer insights. Individual reflection on the success of the project including project outcomes, team dynamics and personal contribution. The self-reflection written report should be no more than 1500 words (excluding diagrams, tables and references).	
Design, Technology & Prototyping	Individual Practical (40%) – Individual high fidelity 'proof-of-concept'. Building upon concepts generated during the first week of the module. Learners will be required to demonstrate prototyping skills and techniques to develop their idea and prototype a solution. The prototypes will be assessed by C4D's internal innovation and prototyping experts, across a number of criteria, such as novelty, functionality and visual appeal. Individual Course Work (60%) - Breakthrough Innovation proposition via an individual report. To be based upon the individual's innovation proposition developed during the modules second week preparation phase. (2000 words max). 1) The breakthrough innovation proposition should be radical in nature and based upon a combination of at least two of the advanced materials or processes covered in the second module week. 2) The new innovation proposal should be discussed in a scholarly manner and supported by extensive use of technical literature to provide a robust and convincing proposition.	ILO1, ILO2, ILO3
Whole System Design	Individual Course Work - Produce an e-portfolio to document the design process that has been undertaken and present solutions (e-Portfolio Maximum 3000 words using photos and diagrams where appropriate)	ILO1, ILO2, ILO3
Creative Enterprise and Entrepreneurship	Group Course Work (40%) – Each learning team will be expected to deliver their proposed business plan. and landing page for a crowdfunding campaign based on a novel entrepreneurial idea generated by the team. (40% of overall module mark) Individual Course Work (60%) - 1500 word, Individual report detailing the entrepreneurial process undertaken in developing their ideas including reflection on their role within the team and contribution to the group deliverables. (60% of overall module mark)	ILO1, ILO2, ILO3
Project Management	This is a group multi part assessment and includes performance on the simulation and also the project workbook which captures their approach to the management of the project. MULTI 100% - Group work element is made up of a multi-part assessment: 1. The simulation will compute a Stakeholder Satisfaction Score (GPRAC 40%). 2. You will be required to complete and submit a workbook; enabling you to reflect on your decisions throughout the project (GCW 60%).	ILO1, ILO3
Group Project	Group and Individual Course Work - The students work in small consultancy teams typically on a client sponsored project for a period of 10 weeks. The students are responsible for interpreting the brief, developing a project plan, selecting and implementing a methodology, deriving results, analysing the results and	ILO 4

	drawing conclusions in alignment with the aims and objectives. All students participate in a peer review activity providing them with the opportunity to reflect on the practices of their colleagues as well as their own. Peer review feedback is provided individually by an independent member of academic staff. A single group report is produced and the project is presented orally at the concluding Exhibition Day, both elements are summatively assessed by independent markers and a group mark is assigned for each element. Individual assessment is derived from supervisor observation and meeting minute actions and an individual reflective report where the students reflect on the development of three soft skill competencies based on objectives that they set for themselves. The team working competency is mandatory as one of the three skills for each student.	
Dissertation (Part-time students only)	Individual Course Work - Part time students are not required to complete the Group Project undertaken by the full time registered students on a SWEE MSc course. An alternative assignment takes the form of a dissertation or design project which in most situations will be based around a topic relevant to the work of the part-time student. It is evident that some aspects of the Group Project experience that the work-based dissertation replaces – for example the client interaction and group dynamics components will not directly replicated by undertaking this assignment. It is expected that these experiences would normally be a part of the normal working life of the part-time student. It is expected that the dissertation will normally consist of the following elements: Abstract, Background context, Introduction to the theme(s) addressed within the dissertation, setting out the issues that will be covered, Methodology, In depth analysis/discussion of the topics discussed, Concluding remarks, References, Appendices (if relevant). Two supervisors are allocated to the dissertation and supervision follows the model used for the independent research project. The student will submit a 6,000 word report and will give an oral presentation of their work. Both elements of assessment will be marked by independent assessors.	ILO 4
Individual Thesis Project	Individual Course Work -The individual research project requires students to further develop problem definition, hypothesis setting, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions in the context of research questions relevant to the course followed by a student. The student is required to communicate their findings successfully via a thesis, written in the style of a scientific paper and an oral presentation based around a poster. The projects are designed to integrate knowledge, the taught modules, and apply understanding and skills from the group project, to deliver a high quality written thesis and oral presentation. The individual research project/thesis is typically delivered through collaboration with an industrial sponsor, or it may be an ‘internal’ project reflecting the research interests of the School.	ILO 5 and 6

Course modules

The following modules outline all parts of the programme leading to the **MDes** in Design Thinking. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-DES-INWK	Induction week	A Encinas-Oropesa	30		0	N	05/10/20	05/10/20	09/10/20	N/A	AO	N/A				N/A	N/A
2	I-DSL-A1021	Consumer Trends	A Encinas-Oropesa	70		20	N	12/10/20	12/10/20	23/10/20	40	GPRES RP	40 60				FT & PT 23/10/20 FT - 31/10/20 PT – 14/11/20	May 2021

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	I-DES-DTP	Design, Technology & Prototyping	P Lighterness	70		20	N	02/11/20	02/11/20	13/11/20	40	IPRAC ICW	40 60				FT/PT 13/11/20 FT - 30/11/20 PT – 12/12/20	May 2021
4	I-DFS-A1028	Whole System Design	E Unal	37		10	Y	30/11/20	30/11/20	04/12/20	40	ICW	100				FT - 12/12/20 PT – 05/01/21	May 2021
5	I-ICI-A1009	Creative Enterprise & Entrepreneurship	T Hieu Tran	80		20	N	11/01/21	11/01/21	22/01/21	40	GCW ICW	40 60				FT/PT – 30/01/21 FT - 06/02/21 PT – 20/02/21	May 2021
6	M-L/PMI	Project Management	D Julien	20		10	Y	08/02/21	08/02/21	10/02/21	40			100	GPRAC GCW	25 75	FT/PT – 10/02/21	May 2021
7	I-DES-GRPP	Group Project	A Encinas Oropesa	16		40	N	22/02/21	22/02/21	07/05/21	50 50	GCW GPRES	64 16				30/04/21 - 16.00hrs 04/05/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
												ICW RP	10 10				08/05/21 08/05/21	
8	I-DES-DISS	Dissertation (PT students only)	A Encinas Oropesa	10		40	N	22/02/21	22/02/21	24/09/21	50	IPROJ IPRES	80 20				24/09/21 Week commencing 20/09/21	
9	I-DES-THESIS	Individual Thesis Project	A Encinas-Oropesa	20		80	N	10/05/21	10/05/21	10/09/21	50	THESIS OR	90 10				06/09/21 – 16.00hrs Week commencing 24/08/21 and 31/08/21	Sept 2022

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	**Module title**	**Course that owns the module**	**Other course(s)/ programme(s) that use the module**
M- L-PMI	Project Management	Logistics and Supply Chain Management	Design Thinking Procurement and Supply Chain Management Exec Logistics and Supply Chain Management
I-DFS-A1028	Whole System Design	Design Thinking	Sustainable Materials and Manufacturing MSc as part of EngD in Sustainable Materials and Manufacturing

8. How are the ILOs assessed?

The following assessment types are utilised:

Group Presentations, Individual Presentations, Reflective Portfolios, Group Practical's, Individual Practical's, Individual Coursework, Group Coursework, Group Project, Individual Thesis, Formative Assessments

This approach has been adopted because:

This approach has been adopted to reflect the multidisciplinary, multiple output nature of design in industry. The approach will provide learners with the opportunity to communicate their ideas, development, understanding and evaluation in multiple formats to various audiences and give them experiences of working as an individual and as part of a team. Formative assessment and feedback throughout the course will provide learners with guidance and clarify their understanding as they work towards their summative assessments.

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

A. Postgraduate Certificate in Design Thinking

Award ILOs / **Module No.**	ILO1	ILO2	ILO3
2	GPRES RP	GPRES RP	GPRES RP
3	IPRAC	ICW	IPRAC
4	ICW	ICW	ICW
5	GCW ICW	GCW ICW	GCW ICW
6	GCW		GCW

Award ILOs / Module No.	ILO1	ILO2	ILO3
	GPRAC		GPRAC

B. Postgraduate Diploma in Design Thinking

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO4	ILO2	ILO3	ILO4
7				GCW GPRES ICW RP
8				IPROJ IPRES

C. Master of Design in Design Thinking

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO5	ILO6
9	THESIS OR	THESIS OR

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

The course and C4D produce post -graduates who are able to take leadership positions in the private and public sectors, embedding creative and innovation techniques into all areas. Students will get the opportunity to develop specialisms depending upon their interests, training requirements and desired career paths. They will have ample opportunity to develop their own academic and industrial networks through joining one of C4D's communities of practice in areas such as Breakthrough Innovation, Materials Innovation, Data Driven Innovation or Circular Innovation. Graduates are expected to leave C4D with a

strong idea of their future career goals and an active network of peers, academics and industrialists through which to pursue them.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: 06/03/2020

1. What is the course?

Course information

Course Title	Energy from Waste
Course code	MSEFWFTC, MSEFWPTC, PDEFWFTC, PDEFWPTC, PCEFWFTC, PCEFWPTC
Academic Year	2020/21 - No new entries, teach out only
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy & Environment
Theme	Energy & Power
Centre	Centre for Bioenergy and Resource Management
Course Director	Dr Stuart Wagland
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	No
Is the Degree apprenticeship integrated or non-integrated?	No

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Is the Mastership offered as an open and/or closed course?	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Candidates must possess, or be expected to achieve, a 1st or 2nd class UK Honours degree in a relevant engineering or science-based discipline, or the international equivalent of these UK qualifications. Other relevant qualifications together with industrial experience may be considered. If you are an international student you will need to provide evidence that you have achieved a satisfactory test result in an English qualification. The minimum standard expected from a number of accepted courses are as follows: IELTS - 6.5, TOEFL – 92, Pearson PTE Academic – 65, Cambridge English Scale – 180, Cambridge English: Advanced – C, Cambridge English: Proficiency - C
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc, PgDip and PgCert - one year Part-time MSc, PgDip and PgCert - up to three years
Course Start Month(s)	October

Institutions delivering the course

This course is delivered by Centre for Bioenergy and Resource Management where the research interests include biochemical and thermochemical processes for the recovery of energy from waste and biomass, waste treatment processes and resource management.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited formally by the Chartered Institution of Wastes Management (CIWM) until 2018.

2. What are the aims of the course?

This course has been developed recognising an industry need for graduates with the motivation and knowledge to work in the energy from waste sector. Therefore this course will:
-Provide structured training on the thermal energy recovery technologies for solid fuels, including waste, biomass and conventional fuels;
-Explore methods of managing wastes including the recovery of recyclable materials and production of waste-derived fuels;
-Assess methods of the conversion of wastes to energy, including biochemical and thermal processes;
-Critically assess the role of energy from waste in sustainable waste management and clean energy production, allowing students to compare and contrast energy from waste technologies with renewable energy technologies (solar, wind etc) available.

This programme is intended for the following range of students:

Physical and biochemical sciences and engineering graduates, or those with substantial experience in the waste management industry.

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate in Energy from Waste

In completing this course, and achieving the associated award, a diligent student should be able to:

- ILO 1. Demonstrate a systematic understanding of the main principles, terminology and key issues related to the management of urban and complementary wastes
- ILO 2. Critically evaluate the main options available in recovering energy from waste including mechanical methods of processing wastes to recover recyclable material and/or produce waste-derived fuels
- ILO 3. Develop a comprehensive understanding of the methods of characterising waste as a fuel and evaluate the renewable energy potential of waste-derived fuels
- ILO 4. Apply knowledge of the waste sector, policies and properties of waste materials to assess the operational challenges of EfW systems including the management of emissions and residues
- ILO 5. Critically analyse relevant energy engineering problems and design novel solutions taking account of social, environmental, technical, regulatory and commercial constraints
- ILO 6. Critically evaluate and discuss the role of waste as a source of energy as part of an overall energy mix. Compare EfW with alternative sustainable/renewable energy technologies
- ILO 7. Effectively communicate work via oral and written presentations and reports.

B. Postgraduate Diploma in Energy from Waste

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

- ILO 8. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. MSc in Energy from Waste

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 9. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 10. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

Student-directed learning is incorporated into the taught modules to encourage independent thinking. Students are exposed to industrial contacts through sponsored projects, invited lectures and a number of site visits throughout the academic year.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Energy from Waste Operations	0 10
ELECTIVE MODULES:	
Any five chosen from modules (to the value of 50 credits): Environmental Risks: Hazard, Assessment and Management Circular Waste Management: Recycle, Recover and Dispose Energy from Biomass and Waste: Thermochemical Processes Renewable Energy Technologies: Design case studies Management for Technology Pilot Plant Operations	 10 20 10 10 10 10
TOTAL:	**60**

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Energy from Waste Operations	0 10

Environmental Risks: Hazard, Assessment and Management	10
Circular Waste Management: Recycle, Recover and Dispose	20
Energy from Biomass and Waste: Thermochemical Processes	10
Renewable Energy Technologies: Design case studies	10
Management for Technology	10
Pilot Plant Operations	10
Group Project (Full time students)	40
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	**120**

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	**Credits**
COMPULSORY MODULES:	
Induction	0
Energy from Waste Operations	10
Environmental Risks: Hazard, Assessment and Management	10
Circular Waste Management: Recycle, Recover and Dispose	20
Energy from Biomass and Waste: Thermochemical Processes	10
Renewable Energy Technologies: Design case studies	10
Management for Technology	10
Pilot Plant Operations	10
Group Project (Full time students)	40
Thesis Project	80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	**200**

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[3] [4]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in October and are expected to complete the course within 12 calendar months.

Part-time students register for the course throughout the academic year and are expected to complete the course within 2-3 years.

7. Course Level Assessment Strategy[5]

N/A

[3] For students who were registered before 1 August 2015, the requirement to obtain a minimum mark for a taught assessment will not apply for taught assessment taken before 31 August 2015 (unless the assessment was designated as a "key assessment" under the previous Assessment Rules).

[4] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

[5] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Course modules

The following modules outline all parts of the programme leading to MSc. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[8] - 40% or 50%	Type of Assessment	Weighting within module[9] (%) of Independent assessments	Weighting within module of multi-part assessments[10](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
1	I-ENE-DISS	Dissertation (PT)	G Drew	10		40	Y		05/10/20	24/09/21	50	IPROJ IPRES	80 20				24/09//21 W/C 20/09/21	
2	I-ENE-THESIS	Individual thesis project	G Drew	20		80	Y		05/10/20	10/09/21	50 50	THESIS OR	90 10				06/09/21 23/08/21-30/08/21	

[6] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[7] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[8] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[9] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[10] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[11] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[12] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

8. How are the ILOs assessed?

The following assessment types are utilised:

Individual coursework is used throughout, with the exception of module 5 which is assessed by examination. Coursework type varies between modules, with critical literature reviews, business cases and laboratory reports being applied to match the ILOs of the specific module.

This approach has been adopted because:

This allows a broad range of assignment types which caters for a variety of learning styles.

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

A. Postgraduate Certificate

Award ILOs / Module No.	1	2	3	4	5	6	7
2	ICW			ICW			ICW
3	ICW	ICW	ICW				ICW
4		EX	EX	EX	EX		EX
5			ICW	ICW			
6	GPRES/ IW	GPRES/ ICW	GPRES/ ICW	GPRES/ ICW		GPRES/ ICW	GPRES/ ICW
7		GCW ICW			GCW ICW	GCW ICW	GCW ICW
8				EX GCW	EX GCW		EX GCW

B. Postgraduate Diploma

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	8
9	GPROJ ICW
10	IPROJ IPRES

C. MSc

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	09	10
11	THESIS OR	THESIS OR

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student

Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

Students completing this course will gain a broad appreciation of the technical, economic and environmental challenges that face the energy from waste industry. It is anticipated that students completing this course will be employed by waste management companies, energy companies and the engineering sector dealing with waste, in both technical, engineering consultancy and management roles

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: 09/03/2020

1. What is the course?

Course information

Course Title	Energy Systems and Thermal Processes
Course code	MSESPFTC, MSESPPTC, PDESPFTC, PDESPPTC, PCESPFTC, PCESPPTC (UK) MSESOFTC, MSESOPTC (Muscat)
Academic Year	2020/21
Valid entry routes	Cranfield - MSc, PgDip PgCert Muscat – MSc,
Additional exit routes	Muscat - PgDip, PgCert
Mode of delivery	Full-Time, Part-Time
Location(s)[1] of Study	Cranfield and Muscat
School(s)	School of Water, Energy and Environment
Theme	Energy & Power
Centre	Centre for Thermal Energy Systems and Materials
Course Director	Dr Kumar Patchigolla
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	No
Is the Degree apprenticeship integrated or non-integrated?	No
Is the Mastership offered as an open and/or closed course?	No

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	Not Applicable
Registration Period(s) available	1 year Full-Time, 3 years Part-time
Course Start Month(s)	October at Cranfield September in Muscat

Institutions delivering the course

This course is delivered by the School of Water, Energy and Environment, Energy & Power Theme, Centre for Thermal Energy Systems and Materials where the research interests include:

- Process and Thermal Energy Systems Design, Thermodynamics, Simulation and Optimisation
- Multi-Phase Flow and Processes
- Process Flow Measurement and Control
- Technical and Economic Viability Assessments of Conventional and Renewable Energy Systems
- Environmental Protection

Teaching and/or assessment is also provided by the School of Management of Cranfield University.

The course is also delivered at the Muscat University, Oman.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited by the Institute of Mechanical Engineers (IMechE) and the course has recently been approved for accreditation by the Energy Institute.

2. What are the aims of the course?

Cranfield University offers this course in response to the growing concerns about the need for the conservation of energy and for combating the increasing environmental degradation. The course, established in 1972, was the first of its type to be instituted in Europe, and remains the most prestigious degree in technical energy management in the UK. Achieving energy efficiency and reducing environmental pollution are increasingly important aspects of professional engineering. The course is designed to equip graduates and practicing engineers with an in-depth understanding of the fundamental issues of energy thrift and environmental consequences of irrational use of energy resources in the industrial and commercial sectors. It furnishes students with the up to date technical knowledge and skills required for achieving the better management of energy, designing of energy efficient systems and processes and the reduction and control of pollution cost-effectively. This knowledge can be directly applied to help various sectors of the economy in improving their competitiveness in the face of dwindling resources, probable substantial increases in unit energy costs and the urgent requirement to comply with the increasingly-restrictive pollution-control standards. The course prepares students for a successful career as energy professionals in a wide range of industries, consultancies, research organisations and local and central government departments. The course has evolved over the past 38 years from discussions with Industrial Advisory Panels, employers, sponsors and previous students. The content of

the programme of study is up-dated regularly to reflect changes arising from technical advances, economic factors and changes in legislation, regulations and standards.

Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) exit routes are provided for students who wish to access only parts of the course provided.

This programme is intended for the following range of students:

- Engineering and applied science graduates and practicing engineers interested in thermal energy and its efficient utilisation in industrial and commercial applications.
- Applicants are required to have at least a UK 2nd class honours degree or its equivalent. Applications from candidates with lesser qualifications but with considerable relevant working experience will be considered.

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate in Energy Systems and Thermal Processes

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Critically evaluate the current concepts and theories governing energy flows, heat transfer and energy conversion.

ILO 2. Debate the technical, economic and environmental issues involved in power generation, the management of energy in industry and commerce and the design of energy-efficient systems and processes.

ILO 3. Effectively analyse complicated energy systems/thermal processes and in order to achieve a cost-effective conservation of energy.

ILO 4. Design and implement appropriate modelling studies using a range of software employed in fluid flow and heat transfer analyses, system and process modelling, the design of process-control systems and energy management.

ILO 5. Demonstrate an ability to apply and critically evaluate key technical management principles, including project management, people management, technology marketing, product development and finance.

B. Postgraduate Diploma in Energy Systems and Thermal Processes

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 6. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. MSc in Energy Systems and Thermal Processes

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 7. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 8. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

Students will be supported in their learning and personal development by:

- A dedicated electronic Virtual Learning Site
- One-day workshop in MATLAB training including online tutorial videos
- Arrangement of attendance of relevant modules offered by other MSc programmes

The taught programme is generally delivered from October to February and is divided into 4 core and 4 applied modules. Each core module is generally delivered over one week, whereas each applied module is delivered over two weeks at Cranfield. Each module is allocated two weeks on the timetable and will be delivered flexible during this time, using a combination of online and face to face interactions. The modules will be assessed by either an exam or an assignment.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate (PgCert)
The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction	0
Industrial Thermal Operations	10
Thermal Energy Systems	10
Advanced Heat Exchanger Design	10
Computational Fluid Dynamics for Industrial Processes	10
Applied Thermal Energy Systems	10
Management for Technology	10
TOTAL:	60

B. Postgraduate Diploma (PgDip)
The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction	0
Industrial Thermal Operations	10
Thermal Energy Systems	10
Advanced Heat Exchanger Design	10
Computational Fluid Dynamics for Industrial Processes	10
Applied thermal energy systems	10
Management for Technology	10
Process Design and Simulation	10
Advanced Control Systems	10
Group Project	40

ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	120

C. MSc (at Cranfield)

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Induction Industrial Thermal Operations Thermal Energy Systems Advanced Heat Exchanger Design Computational Fluid Dynamics for Industrial Processes Applied thermal energy systems Management for Technology Process Design and Simulation Advanced Control Systems Group Project Individual research project	0 10 10 10 10 10 10 10 10 40 80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	200

D. MSc (in Muscat)

An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES	
Induction Heat Transfer Heat and Power Generation Systems Computational Fluid Dynamics for Industrial Processes Advanced Control Systems Thermal Systems Operation and Design Process Measurement Systems Management for Technology Energy Systems Case Studies Group project (Compulsory for full time students) Individual Research Project	0 10 10 10 10 10 10 10 10 40 80
ELECTIVE MODULES	
Part Time Students:	

Group Project OR Dissertation	40 40
TOTAL	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria
The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in September (Muscat) and in October (Cranfield) and are expected to complete the course within 12 calendar months.

This course is also offered on a part-time basis. Students would instead attend the required modules of the taught component according to the schedule agreed with the course director. Part time students typically elect to complete the individual dissertation instead of the group project. The dissertation and the MSc research projects are commonly undertaken in collaboration with the candidate's place of work.

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

The taught programme is generally delivered from October to February and is divided into core and applied modules. Each core module is generally delivered over one week, whereas each applied module is delivered over two weeks at Cranfield. At Muscat, all modules are delivered over one week.

7. Course Level Assessment Strategy[4]

Taught modules:
These high quality taught modules are delivered by experienced academics to enable student's requirements and reliably assessed to meet the module and course level ILOs. The taught modules are assessed through a combination of six assignments and two exams, and the full details of these requirements and standards are provided to students well in advance before start of these modules. This is designed to test student's ability to perform in a number of different situations. Formative assessments tests several skills including group work, presentations and practical skills (lab and modelling). Most of the assignments will be summative and scores of these assignments will make up students overall marks. Each module assessment strategy is accessible via module descriptors page, and will inform the category each assignment falls into. For exam modules, a summative assessment is followed where an exam is used to identify a lack of understanding in a particular area of taught lectures. Through core modules students can acquire advanced knowledge in theory behind the engineering technologies, design and evaluate the efficient energy systems. For applied modules, students are expected to demonstrate "theory to practice" and their applicability to real world problems. The above assessments are designed in a way to provide necessary feedback throughout their studies. The quality of each these modules are reviewed annually by module managers, course director, programme manager, education director including external examiners to improve any potential course content.

Group Project:
The group project provides the students with the opportunity to gain professional skills expected of the workplace. In addition to technical skill practice, students develop a range of soft skills such as team working, problem solving, communication skills and reflective practice. The students work in small consultancy teams typically on a client sponsored project for a period of 10 weeks. Many teams will be made up of students from different courses giving the students the opportunity of working in an interdisciplinary team. The students are responsible for interpreting the brief, developing a project plan, selecting and implementing a methodology, deriving results, analysing the results and drawing conclusions in alignment with the aims and objectives. All students participate in a peer review activity providing them with the opportunity to reflect on the practices of their colleagues as well as their own. Peer review feedback is provided individually by an independent member of academic staff. A single group report is produced and the project is presented orally at the concluding Exhibition Day, both elements are summatively assessed by independent markers and a group mark is assigned for element. Individual assessment is derived from supervisor observation and meeting minute actions and an individual reflective report where the students reflect on the development of three soft skill competencies based on objectives that they set for themselves. The team working competency is mandatory as one of the three skills for each student.

Dissertation:
Part time students are not required to complete the Group Project undertaken by the full time registered students on a SWEE MSc course. An alternative assignment takes the form of a dissertation or design project which in most situations will be based around a topic relevant to the work of the part-time student. It is evident that some aspects of the Group Project experience that the work-based dissertation replaces – for example the client interaction and group dynamics components will not directly replicated by undertaking this assignment. It is expected that these experiences would normally be a part of the normal working life of the part-time student.

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

It is expected that the dissertation will normally consist of the following elements: Abstract, Background context, Introduction to the theme(s) addressed within the dissertation, setting out the issues that will be covered, Methodology, In depth analysis/discussion of the topics discussed, Concluding remarks, References, Appendices (if relevant). Two supervisors are allocated to the dissertation and supervision follows the model used for the independent research project. The student will submit a 6000 word report and will give an oral presentation of their work. Both elements of assessment will be marked by independent assessors.

Individual Research Project/Thesis:
The individual research project requires students to further develop problem definition, hypothesis setting, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions in the context of research questions relevant to the course followed by a student. The student is required to communicate their findings successfully via a thesis, written in the style of a scientific paper (Agrifood, Design, Environment, Water) or standard thesis (Energy), and an oral presentation based around a poster. The projects are designed to integrate knowledge, the taught modules, and apply understanding and skills from the group project, to deliver a high quality written thesis and oral presentation. The individual research project/thesis is typically delivered through collaboration with an industrial sponsor, or it may be an 'internal' project reflecting the research interests of the School.

Course modules

The following modules outline all parts of the programme leading to **MSc** in Cranfield. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-ENE-INWK Occ A	Induction	Gill Drew	24		0	Y		05/10/20	09/10/20		AO					N/A	
2	N-ESP-TES	Thermal Energy Systems	Kranthi Jonnalagadda	30		10	N		12/10/20	23/10/20	50	EX	100				Exam week 2 4-8/01/21	05/21

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	N-ESP-ITO	Industrial Thermal Operations	Kumar Patchigolla	30		10	N		26/10/20	06/11/20	50	ICW	100				FT 07/11/20 PT 21/11/20	05/21
4	N-PSE-CETIP Occ A	Computational Fluid Dynamics for Industrial Processes	Patrick Verdin	30		10	Y		09/11/20	20/11/20	50	ICW	100				FT 21/11/20 PT 05/12/20	05/21
5	N-PSE-ACS Occ A	Advanced Control Systems	Liyun Lao	30		10	Y		23/11/20	04/12/20	50	ICW	100				FT 05/12/20 PT 19/12/20	05/21
6	N-ESP-ATES	Applied Thermal Energy Systems	Kranthi Jonnalagadda	30		10	N		07/12/20	18/12/20	50	ICW	100				FT 19/12/20 PT 02/01/21	05/21
7	N-PSE-PSD	Process Design and Simulation	Dawid Hanak	25		10	Y		25/01/21	05/02/21	50	ICW	100				FT 06/02/21 PT 20/02/21	05/21
8	N-ESP-AHE	Advanced Heat Exchanger Design	Kumar Patchigolla	30		10	Y		08/02/21	19/02/21	50	ICW	100				FT 20/02/21 PT 06/03/21	05/21
9	G-MTI Occ A	Management for Technology	Richard Adams	27		10	Y		22/02/21	26/02/21	40	EX	100				Exam week 4 22-26/3/21	
10	I-ENE-GRPP Occ A	Group Project	Gill Drew	16		40			01/03/21	07/05/21	50 50	GCW GPRES ICW RP	64 16 10 10				05/05/21 30/04/21 08/05/21 NA	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
11	I-ENE-DISS Occ A	Dissertation for part time students	Gill Drew	10		40			01/03/21	24/09/21	50	IPROJ IPRES	80 20				24/09//21 w/c 20/09/21	
12	I-ENE-THESIS Occ A	Energy Individual Research Project (IRP)	Gill Drew	20		80			10/05/21	10/09/21	50 50	OR THESIS	10 90				23/08/21-30/08/21 06/09/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

The following modules outline all parts of the programme leading to **MSc** in Muscat. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent assessments	Weighting within module of multi-part assessments[16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
1	N-ESP-TES	Thermal Energy Systems	Kranthi Jonnalagadda	30		10	N		12/10/20	23/10/20	50	EX	100				Exam week 2 4-8/01/21	
2	N-PSE-CETIP Occ A	Computational Fluid Dynamics for Industrial Processes	Patrick Verdin	30		10	Y		09/11/20	20/11/20	50	ICW	100				PT 05/12/20	
3	N-PSE-ACS Occ A	Advanced Control Systems	Liyun Lao	30		10	Y		23/11/20	04/12/20	50	ICW	100				PT 19/12/20	05/21

[12] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[13] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[14] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[15] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[16] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[17] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[18] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent assessments	Weighting within module of multi-part assessments[16] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
4	N-OFF-ESCS Occ B	Energy Systems Case Studies	Xin Zhang	32		10	Y		08/02/21	19/02/21	50			100% MULTI	ICW GPRES	75% 25%	PT 06/03/21 19/02/21	05/21
5	I-ENE-DISS Occ B	Dissertation for part time students	Gill Drew	10		40			01/03/21	24/09/21	50	IPROJ IPRES	80 20				24/09//21 w/c 20/09/21	
6	I-ENE-THESIS Occ B	Energy Individual Research Project (IRP)	Gill Drew	20		80			10/05/21	10/09/21	50 50	OR THESIS	10 90				23/08/21-30/08/21 06/09/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	**Module title**	**Course that owns the module**	**Other course(s)/ programme(s) that use the module**
N-PSE-ACS	Advanced Control Systems	Advanced Process Engineering	• Energy Systems and Thermal Processes • Energy Systems and Thermal Processes (Muscat) • Process Systems Engineering (Muscat) • Advanced Process Engineering • REMS EngD • WiRe CDT
N-PSE-CETIP	Computational Fluid Dynamics for Industrial Processes	Advanced Process Engineering	• Advanced Chemical Engineering (general route) • Advanced Chemical Engineering (Biorefining route) • Energy Systems and Thermal Processes • Energy Systems and Thermal Processes (Muscat) • Advanced Process Engineering • Process Systems Engineering (Muscat)
N-PSE-PMS	Process Measurement Systems	Process Systems Engineering	• Energy Systems and Thermal Processes (Muscat) • Process Systems Engineering (Muscat)
N-PSE-TSOD	Thermal Systems Operation and Design	Advanced Process Engineering	• Energy Systems and Thermal Processes (Muscat) • Advanced Chemical Engineering (General Route) • Process Systems Engineering (Muscat) • Advanced Process Engineering
N-OFF-ESCS	Energy Systems Case Studies	Offshore Engineering	• Energy Systems and Thermal Processes (Muscat) • Renewable Energy (Engineering route)

			• Renewable Energy (Management route) • Advanced Digital Energy Systems • Offshore Engineering (Management route)
G-MTI	Management for Technology	School of Management	• Advanced Mechanical Engineering • REMS EngD • Offshore Engineering (Engineering route) • Offshore Engineering (Management route) • Energy Systems and Thermal Processes • Energy Systems and Thermal Processes (Muscat) • Process Systems Engineering (Muscat) • Advanced Chemical Engineering (general route) • Advanced Chemical Engineering (Biorefining route) • Thermal Power • Computational Techniques in Engineering

8. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types. Students can expect to have 2 written examinations, 6 pieces of assessment by submitted work and 2 elements of assessment by presentation or viva.

This approach has been adopted because:

- Assess the knowledge of the students using methods appropriate to the nature of the subject area
- Help the students to improve their technical writing and oral presentation skills

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

A. Postgraduate Certificate in Energy Systems and Thermal Processes

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO5
2	EX	EX	EX		
3	ICW	ICW	ICW		
4	ICW	ICW	ICW	ICW	
6	ICW	ICW	ICW	ICW	
8	ICW	ICW	ICW	ICW	
9					EX

B. Postgraduate Diploma in Energy Systems and Thermal Processes

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.
5		ICW		ICW		
7	ICW		ICW	ICW		
10						GCW GPRES ICW RP
11						IPROJ IPRES

C. MSc in Energy Systems and Thermal Processes (Cranfield)

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 7.	ILO 8.
12	THESIS OR	THESIS OR

D. MSc in Energy Systems and Thermal Processes (Muscat)

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO 8.
2	ICW	ICW	ICW	ICW				
3	ICW	ICW	ICW	ICW				
4	ICW	ICW	ICW					
5	ICW	ICW	ICW					

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO 8.
6	ICW	ICW	ICW					
7	ICW	ICW	ICW	ICW				
8	ICW	ICW	ICW	ICW				
9					EX			
10						GCW GPRES ICW RP		
11						IPROJ IPRES		
12							THESIS OR	THESIS OR

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

Graduates of the course have been successful in gaining employment in:

- Energy, environmental and engineering consultancies and design practices
- Industry
- Research organisations
- Central government departments
- Local governments
- Academic institutions

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: August 2020

1. What is the course?

Course information

Course Title	MSc in Engineering and Management of Manufacturing Systems
Course code	MSEMMFTC, MSEMMPTC, PDEMMFTC, PDEMMPTC, PCEMMFTC, PCEMMPTC
Academic Year	2020/21
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield University
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Manufacturing
Centre	Sustainable Manufacturing Systems Centre
Course Director	Mr John Patsavellas
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A
Teaching Institution	Cranfield University
Admissions body	Cranfield University

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	Not Applicable
Registration Period(s) available	Full-time MSc - one year, Part-time MSc - up to three years, Full-time PgDip - one year, Part-time PgDip - two years, Full-time PgCert - one year, Part-time PgCert - two years
Course Start Month(s)	Full-time: October and March. Part-time: throughout the year

Institutions delivering the course

This course is delivered by The School of Aerospace, Transport and Manufacturing, Manufacturing Theme, Sustainable Manufacturing Systems Centre where the research interests include:

- Manufacturing Systems Engineering
- Product-Service Systems
- Supply Chain Management
- Simulation and Modelling
- Innovation Management

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited formally by Institution of Mechanical Engineers (IMechE) up to and including Academic year 2019-20, Institution of Engineering and Technology (IET) up to and including Academic year 2019-20 and Royal Aeronautical Society (RAeS) up to and including Academic year 2019-20.

2. What are the aims of the course?

The aim of this course is to further develop suitably trained and qualified individuals by providing them with the knowledge and skills necessary to make an immediate contribution to a company's manufacturing performance and operations.

Cranfield University offers this course in order to:

- To prepare graduates for a role in manufacturing engineering with an understanding of business functions and strategies.
- To engage students in independent and critical evaluation of the use of operations management concepts, issues and tools to address manufacturing industry problems.
- To provide students with an appreciation of manufacturing technologies and concepts.
- To equip students in transferable skills such as analytical, management and interpersonal skills needed for the creative and effective application of knowledge to address operations management problems in industry.
- To develop general and personal management skills needed to implement and influence change.
- To enhance a student's career in the manufacturing and related sectors.

Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) exit routes are provided for students who wish to access only parts of the course provided.

This programme is intended for the following range of students:

- Those wishing to work nationally or internationally with manufacturing companies that need to address manufacturing systems problems.

- Those wishing to work in manufacturing and operations management consultancy.
- Those wishing to work in the public/government sector on industry competitiveness and productivity issues.

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Develop and demonstrate a systematic understanding and critical awareness of a manufacturing enterprise functions including manufacturing systems, management accounting, human resource management, and strategy development.

ILO 2. Demonstrate a comprehensive of understanding of techniques needed for credible manufacturing system design and improvement projects.

ILO 3. Show originality in application of in-depth knowledge of manufacturing operations development and critically evaluate the appropriate applications of methodologies.

ILO 4. Critically evaluate theories for the analysis and design tools and their application to (a) solve manufacturing problems in terms of technology and/or organisations and (b) increase the effectiveness of manufacturing systems.

ILO 5. Demonstrate transferable skills including, personal responsibility, complex decision making and independence for further learning.

ILO 6. Develop a sound theoretical approach to critically evaluate data and information, undertaking a critical appraisal of technical and/or commercial literature.

ILO 7. Demonstrate the ability to apply practical and rigorous approaches to identify projects, develop engineering solutions and evaluate their effectiveness.

ILO 8. Propose and bring about improvements to appropriate business standards.

B. Postgraduate Diploma

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 9. Deal with complex problems and communicate effectively the results of group project/ dissertation to specialist and non-specialist audiences, both orally and in writing.

ILO 10. Demonstrate ability to provide technical and commercial leadership through planning industrial/research projects (budgets, people, tasks) and contributing to teams delivering under time pressures individually and as a team member.

C. MSc

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 11. Demonstrate independent and original research on a subject relevant to manufacturing system development and management involving project planning, development of new skills, critical evaluation of results and discussion of findings using methodologies that show further knowledge and understanding in future work.

ILO 12. Engage in innovative developments to select appropriate technologies and methodologies to suit particular projects.

4. How is the course taught?

The MSc course has three components: taught modules (40%), group projects (20%), and an individual research project (40%). The taught modules are typically delivered in one-week block between October and February (for October intake) and March and July (for the March intake).

The teaching methods include lectures, case studies, group exercises, field visits, seminar and computer-based demonstrations and exercises. All students attend a week of introductory lectures (given during the first week of the course). Within this induction week, students will be introduced to personal development planning and asked to reflect on their transferable skills and to take ownership of their personal development during the course. Induction is followed by 8 weeks of assessed modules.

All PgDip and MSc students undertake a Group Project. The Group projects are group-based activities typically undertaken for 12 weeks between February and April (August and October for March intake). The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation. The Group Project will typically involve a team of students between 5 and 8, working to investigate a manufacturing opportunity or solve a manufacturing problem. Part-time Students are encouraged to take the Group Project component and only in exceptional circumstances, and with approval from the Group Project Co-ordinator, will be permitted to replace the Group Project with an individual dissertation.. The topic is to be agreed between the University and the student.

All MSc students will undertake a research projects (thesis project) under the supervision of a member of academic staff. For the individual research project, each student is allocated a supervisor. Guidance sessions are provided as to what is required from the thesis and oral presentation.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 2, 5 and 6	30
ELECTIVE MODULES:	
Modules 3, 4, 7, 8 and 9 (Select 3)	30
RECOMMENDED MODULE:	
Induction	0
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

FULL TIME STUDENTS

Description	Credits
COMPULSORY MODULES:	
Modules 2-9 Group Project (10a)	80 40
ELECTIVE MODULES:	
None	

RECOMMENDED MODULE:	
Induction	0
TOTAL:	120

PART TIME STUDENTS

Description	**Credits**
COMPULSORY MODULES:	
Modules 2-9	80
ELECTIVE MODULES:	
Group Project (10a) or Dissertation (10b)	40
RECOMMENDED MODULE:	
Induction	0
TOTAL:	120

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

FULL TIME STUDENTS

Description	**Credits**
COMPULSORY MODULES:	
Modules 2-9 Group Project (10a) Individual Research Project (11)	80 40 80
ELECTIVE MODULES:	
None	0
RECOMMENDED MODULE:	
Induction	0
TOTAL:	200

PART TIME STUDENTS

Description	**Credits**
COMPULSORY MODULES:	
Modules 2-9 Individual Research Project (11)	80 80
ELECTIVE MODULES:	
Group Project (10a) or Dissertation (10b)	40
RECOMMENDED MODULE:	
Induction	0
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in October or March and are expected to complete the course within 12 calendar months.

This course is also offered on a part-time basis. In such a situation, students typically complete the various components of the course over two or three years. Typical case is to complete four taught modules plus a Group Project/Dissertation in year 1 and the remainder of the modules plus the Thesis in year two and/or year 3.

7. Course Level Assessment Strategy[4]

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Course modules

The following modules outline all parts of the programme leading to **MSc.** Other awards associated with the course include some or all of these modules.

October (Full-time + Part-time) Intake

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-MAN-INWK	Induction	Prof Konstantinos Salonitis	18		0	Y	28/09/2020	28/09/20 Occ A	02/10/2020	N/A	AO	N/A				N/A	
2	I-MNU-A1034 Occ A	Operations Management	Mr John Patsavellas	32		10	Y	05/10/20	05/10/20 Stream 1 12/10/20 Stream 2 Occ A	09/10/20 Stream 1 16/10/20 Stream 2	40	EX	100				14/12/20	Manufacturing resit exams will be during week commencing: 17/05/21

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear andragogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	I-MNU-A1031 Occ A	Enterprise Systems	Dr Essam Shehab	32		10	Y	19/10/20	19/10/20 Occ A	23/10/20	40				GCW GPRES	90 10	30/11/20 16/11/20	Re-assessment date to be set by agreement of the Module Leader as/when required
4	I-MNU-A1029 Occ A	Operations Analysis	Prof Konstantinos Salonitis	32	8	10	Y	26/10/20	26/10/20 Occ A	30/10/20	40	EX	100				18/12/20	Manufacturing resit exams will be during week commencing: 17/05/21
5	I-MNU-A1018 Occ A	General Management	Mr Matthew Caffrey	32		10	Y	30/11/20	30/11/20 Occ A	04/12/20	40	EX	100				08/01/21	Manufacturing resit exams will be during week commencing: 17/05/21
6	I-MNU-A1027 Occ A	Manufacturing Systems Engineering	Dr Emanuele Pagone	32		10	Y	09/11/20	09/11/20 Occ A	13/11/20	40	ICW	100				18/01/21	Re-assessment date to be set by agreement of the Module Leader as/when required
7	I-MNU-A1048 Occ A	Internet of Things	Dr Christos Emmanouilidis	35		10	Y	23/11/20	23/11/20 Occ A	27/11/20	40	ICW	100				11/01/21	Re-assessment date to be set

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
																		by agreement of the Module Leader as/when required
8	I-MNU-A1038 Occ A	Supply Chain Management	Dr Ahmed Al-Ashaab	32		10	Y	11/01/21	11/01/21 Occ A	15/01/21	40	GCW	100				08/02/2021	Re-assessment date to be set by agreement of the Module Leader as/when required
9	I-MNU-A1019 Occ A	Manufacturing Strategy	Dr Patrick McLaughlin	35		10	Y	25/01/21	25/01/21 Occ A	29/01/21	40			100 MULTI	GPRES GCW ICW	30 50 20	29/01/21 29/01/21 15/02/21	Re-assessment date to be set by agreement of the Module Leader as/when required
10a	I-MAT-GRPP	Group Project	Dr David Ayre	20		40	Y	01/02/21	01/02/21 Occ A FT	27/04/21 FT	50	GCW ICW	80 20		GPRES GPROJ ICW Observed behaviour	20 80 50 50	27/04/21 04/05/21 04/05/21 04/05/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
			Dr Supriyo Ganguly						01/02/21 Occ B PT	27/08/21 PT	50	GCW ICW	80 20		GPRES GPROJ ICW Observed behaviour	20 80 50 50	27/08/21 01/09/21 01/09/21 01/09/21	
10b	I-MAT-DISS	Dissertation for Part Time Students	Dr Sue Impey/ Dr David Ayre	20		40	Y	08/02/21	08/02/21	31/08/21	50	ICW	100				27/08/21	
11	I-MNU-THESIS	Individual Research Project	Dr Muhammad Khan	20		80	Y	08/02/21	Occ A = PT 08/02/21	PT 27/08/21	50	THESIS OR	90 10				27/08/21 01/09/21	
			Dr Muhammad Khan					30/04/21	Occ B = FT 30/04/21	FT 27/08/21	50	THESIS OR	90 10				27/08/21 01/09/20	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

March (Full-time) Intake

Module Number		Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of	Weighting within module of multi-part assessments	Type of Assessment	Weighting of individual elements of multi-part assessment[16][17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
1		I-MAN-INWK Occ B	Induction	Prof Konstantinos Salonitis	18		0	Y	04/03/21	04/03/21 Occ B	05/03/21	N/A	AO	N/A				N/A	
2		I-MNU-A1034 Occ B	Operations Management	Mr John Patsavellas	32		10	Y	08/03/21	08/03/21 Occ B	12/03/21	40	EX	100				17/05/21	Resit exams will be with 2021/22 cohort in December 2021
3		I-MNU-A1031 Occ B	Enterprise Systems	Dr Essam Shehab	32		10	Y	22/03/21	22/03/21 Occ B	26/03/21	40				GCW GPRES	90 10	19/05/21 26/03/21	Resit exams will be with 2021/22 cohort in December 2021
4		I-MNU-A1029 Occ B	Operations Analysis	Prof Konstantinos Salonitis	32	8	10	Y	12/04/21	12/04/21 Occ B	16/04/21	40	EX	100				21/05/21	Resit exams will be with 2021/22 cohort in December 2021

[12] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[13] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[14] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%. This will be at the Board of Examiners discretion.
[15] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[16] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[17] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[18] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module15 (%) of	Weighting within module of multi-part assessments	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
5		I-MNU-A1018 Occ B	General Management	Mr Matthew Caffrey	32		10	Y	24/05/21	24/05/21 Occ B	28/05/21	40	EX	100				25/06/21	Resit exams will be with 2021/22 cohort in December 2021
6		I-MNU-A1027 Occ B	Manufacturing Systems Engineering	Dr Emanuele Pagone	32		10	Y	26/04/21	26/04/21 Occ B	30/04/21	40	ICW	100				14/06/21	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required.
7		I-MNU-A1048 Occ B	Internet of Things	Dr Christos Emmanouilidis	35		10	Y	07/06/21	07/06/21 Occ B	11/06//21	40	ICW	100				05/07/21	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required.
8		I-MNU-A1038 Occ B	Supply Chain Management	Dr Ahmed Al-Ashaab	32		10	Y	10/05/21	10/05/21 Occ B	14/05/21	40	GCW	100				07/06/21	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required.
9		I-MNU-A1019	Manufacturing Strategy	Dr Patrick McLaughlin	35		10	Y	21/06/21	21/06/21	25/06/21	40			100 MULTI	GPRES GCW	30 50	25/06/21	Re-assessment date to be set

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	' Residential' Start Date	' Residential' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module15 (%) of	Weighting within module of multi-part assessments	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
		Occ B								Occ B						ICW	20	25/06/21 12/07/21	by agreement of Course Director and Module Leader as/when required.
10a		I-MAT-GRPP	Group Project	Dr David Ayre	20		40	Y	12/06/21	12/06/21 Occ C	29/10/21	50	GCW ICW	80 20		GPRES GPROJ ICW Observed behaviour	20 80 50 50	22/10/21 29/10/21 29/10/21 29/10/21	
10b		I-MAT-DISS	Dissertation for Part Time Students	Prof Konstantinos Salonitis					Not available for this intake									Not available for this intake	
11		I-MNU-THESIS	Individual Research Project	Dr Muhammed Khan	20		80	Y	02/11/21	02/11/21 Occ C	28/02/22	50	THESIS OR	90 10				25/02/22 28/02/22	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	**Module title**	**Course that owns the module**	**Other course(s)/ programme(s) that use the module**
I-MAN-INWK	Induction	Engineering and Management of Manufacturing Systems	Management and Information Systems, Aerospace Manufacturing, Global Product Development and Management, Cyber-Secure Manufacturing
I-MNU-A1034	Operations Management	Engineering and Management of Manufacturing Systems	Manufacturing Technology and Management, Global Product Development and Management, Management and Information Systems, Aerospace Manufacturing, Cyber-Secure Manufacturing, Engineering Competence
I-MNU-A1031	Enterprise Systems	Management and Information Systems	Management and Information Systems
I-MNU-A1029	Operations Analysis	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing, Manufacturing Technology and Management
I-MNU-A1018	General Management	Engineering and Management of Manufacturing Systems	Advanced Materials, Manufacturing Technology and Management, Global Product Development and Management, Management and Information Systems, Metal Additive Manufacturing, Engineering Competence
I-MNU-A1027	Manufacturing Systems Engineering	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing, Cyber-Secure Manufacturing, Engineering Competence
I-MNU-A1038	Supply Chain Management	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing, Global Product Development and Management, Management and Information Systems
I-MNU-A1019	Manufacturing Strategy	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing
I-MNU-A1048	Internet of Things	Engineering and Management of Manufacturing Systems	Computational and Software Techniques in Engineering
I-MAT-GRPP	Group Project	Advanced Materials	Aerospace Materials, Manufacturing Technology & Management, Management and Information Systems, Global Product Development and Management, Cyber-Secure Manufacturing, Welding Engineering, Metal Additive Manufacturing, Maintenance

			Engineering and Asset Management
I-MAT-DISS	Dissertation for Part Time Students	Advanced Materials	Aerospace Materials, Manufacturing Technology and Management, Aerospace Manufacturing, Global Product Development and Management, Management and Information Systems, Cyber-Secure Manufacturing, Welding Engineering, Metal Additive Manufacturing, Aerospace Management
I-MNU-THESIS	Individual Research Project	Aerospace Manufacturing	Management and Information Systems, Global Product Development and Management, Cyber-Secure Manufacturing, Aerospace Materials, Manufacturing Technology & Management, Welding Engineering, Metal Additive Manufacturing, Maintenance Engineering and Asset Management, Advanced Materials

8. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types. Students can expect to have four written examinations, four pieces of assessment by submitted work, one piece of group project work (including an assessment of personal contribution to group work), and one element assessed by a thesis and an oral presentation.

This approach has been adopted in order to perform formative and summative assessments of the students to demonstrate their ability in a range of contexts. Part time students will be assessed by dissertation in place of the group project.

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

A. Postgraduate Certificate

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO.8
1	Non-assessed							
2	EX				EX			
3	GCW GPRES	GCW GPRES						
4		EX	EX	EX	EX		EX	EX
5	EX				EX			

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO.8
6		ICW	ICW	ICW			ICW	ICW
7		ICW				ICW		
8	GCW				GCW	GCW		
9		ICW	ICW	ICW	ICW	ICW	ICW	ICW

B. Postgraduate Diploma

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 9.	ILO 10.
10a	GPRES GPROJ ICW	GPRES GPROJ ICW
10b	ICW	ICW

C. MSc

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 11.	ILO 12.
11	THESIS OR	THESIS OR

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. <u>What opportunities are graduates likely to have on completing the course?</u>

The intention of the course is to provide students with knowledge and understanding and associated transferrable skills to make a contribution to industry on graduation. Graduates will typically seek employment in manufacturing industry, consultancies or research institutions. Common starting roles are manufacturing engineer, industrial engineer, technical analyst, project manager and PhD researcher. With time (quicker for those with more background experience) graduates progress to senior positions with significant responsibility for people, budgets and projects.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: 01/09/2020

1. What is the course?

Course information

Course Title	Engineering Competence
Course code	MSECPPTC PDECPPTC
Academic Year	2020/2021
Valid entry routes	MSc, PgDip
Additional exit routes	PgCert
Mode of delivery	Part-time
Location(s)[1] of Study	Cranfield and/or distance learning
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Manufacturing
Centre	Sustainable Manufacturing Systems Centre
Course Director	Dr Konstantinos Salonitis
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	Yes
Apprenticeship Standard the course is mapped to	Postgraduate Engineer Level 7 Standard
Is the Degree apprenticeship integrated or non-integrated?	Non-Integrated
Is the Mastership offered as an open and/or closed course?	Open and Closed
Teaching Institution	Cranfield University
Admissions body	Cranfield University

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Entry requirements	Standard University Entry Requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	Since 2006, the engineering community has agreed that the academic standards expected of engineering graduates are the same as the learning outcomes for graduates of Engineering Council accredited degrees, as set out in the *Accreditation of Higher Education Programmes: UK Standard for Professional Engineering Competence*. For this reason a separate list of standards is not provided in this Benchmark Statement. Instead readers are referred to the *Accreditation of Higher Education Programmes: UK Standard for Professional Engineering Competence*.
Registration Period(s) available	3 years
Course Start Month(s)	January(open intake) October (closed intake)

Institutions delivering the course

This course is delivered by School of Aerospace, Transport and Manufacturing, Manufacturing Theme (SATM), the Sustainable Manufacturing Systems Centre and other collaborating centres where the research interests include:

• Operations Management
• Manufacturing Systems Engineering
• Product-Service Systems
• Supply Chain Management
• Simulation and Modelling

Cranfield University interacts with the following institutions and in the following ways:

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is not accredited by any external bodies.

2. What are the aims of the course?

Cranfield University offers this course to meet in full the qualification element of the published Level 7 Apprenticeship Standard for a Post Graduate Engineer. This course aims to prepare and develop the future manufacturing engineers and managers/leaders to be able to develop solutions to engineering problems, using new or existing technologies, through innovation, creativity and change and may have technical accountability for complex systems with their associated risks. Such individuals will work in an area that covers a wide range of generic engineering disciplines which could include for example: software, integrated systems, mechanical, electrical, electronic, electromechanical, fluid power components/systems.

The objectives of the course are to equip post graduate engineers with a set of core knowledge principles and skills.

Such core knowledge includes:

- the theoretical knowledge to solve problems in existing and emerging technologies, applying and developing analytical techniques
- understanding of business and commercial needs/constraints

- the knowledge and understanding of own competencies capabilities and limitations, the ability to work within these and highlight when work goes outside of these
- understanding of financial responsibilities and authorisation processes
- understanding of technical sign off responsibilities
- transferable skills such as analytical and interpersonal skills needed for the creative and effective application of knowledge to address aerospace manufacturing issues.

The skills that the students are expected to gain out of this course include:

- safe working practices, an understanding of technical governance and quality management
- compliance with legislation and codes, but be able to seek improvements
- practical competence to deliver innovative products and services
- technical responsibility for complex engineering systems
- accountability for project(s)/programme(s), finance and personnel management, management of trade-offs between technical and socio-economic factors
- the skill sets necessary to develop other technical staff

Postgraduate Certificate (PgCert) exit route is provided for students who wish to access only parts of the course provided.

This programme is intended for the following range of students:

- Talented UK students with a high grade BSc level.
- Ambitious high quality students with an international background.
- Early-career professionals who want to boost their career.
- Experienced and academically able engineers wishing to achieve a formal qualification

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Develop and assess analytical techniques for recommending engineering solutions.
ILO 2. Critically analyse and validate business and commercial needs and constraints.
ILO 3. Debate the requirements for ethics and sustainability in the Engineering Industry.
ILO 4. Recommend continuous process improvement (internal process and external factors).
ILO 5. Exhibit practical competence to deliver innovative products and services.
ILO 6. Validate technical responsibility for complex engineering systems.
ILO 7. Explain, justify and defend accountability for project(s)/programmes.

B. Postgraduate Diploma

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 8. Develop a sound theoretical approach to critically evaluate financial responsibilities and authorisations processes.
ILO 9. Judge and debate the management of trade-offs between technical and socio-economic factors.

C. MSc

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 10. Integrate knowledge in independent and original research on a subject relevant to manufacturing system development and management involving project planning,

development of new skills, critical evaluation of results and discussion of findings using methodologies that show further knowledge and understanding in future work.

ILO 11. Develop and select appropriate technologies and methodologies to suit particular projects.

4. How is the course taught?

Students will be supported in their learning and personal development by:

The teaching methods include lectures, case studies, group working, tutorial study interactive and computer-based demonstrations and exercises. The Course will be presented on-line and/or face to face at Cranfield University. The taught modules are typically delivered in 32 hours across 4 or 5 days during a one week period during the two years of study.

The engineer apprentices will be grouped to conduct their challenging but life changing group projects. The group project will be conducted at the employers site or Cranfield whichever is the most appropriate with regular (every two weeks) voice/video meetings with their academic mentor as part of the assessment process.

All MSc students will undertake a research project (thesis project) under the supervision of Cranfield academic staff, there will also be regular (fortnightly) audio, video or face to face meetings with their academic supervisor.

Both Group projects and individual research projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation.

Used of library resources: The students will be further supported through the use of the on-line resource available to students/apprentices both whilst they are a student of Cranfield University and through their continuing lifelong learning as an Alumnus of Cranfield.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
None	
ELECTIVE MODULES:	
60 credits from modules 2 - 9	10 credits each module
RECOMMENDED MODULE:	
Induction	0
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 2 – 9 Group project (10)	80 40
ELECTIVE MODULES:	
None	
RECOMMENDED MODULE:	
Induction	0
TOTAL:	120

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Modules 2-9 Group Project (10) Individual research project (11)	80 40 80
ELECTIVE MODULES:	
None	
RECOMMENDED MODULE:	
Induction	0
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Part-time MSc students are expected to complete the course within three years. The MSc course has three components: 8 taught modules (80 credits), a group project (40 credits), and an individual research project (80 credits). The group project will usually be undertaken during the second year and lasts six months. The individual research project follows and lasts for a year.

Part-time Apprenticeship students taking Pg Diploma are expected to complete the course within 2 years. The MSc course has two components: 8 taught modules (80 credits), and a group project (40 credits). The group project will usually be undertaken during the second year and lasts six months.

7. Course Level Assessment Strategy[4]

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Course modules

The following modules outline all parts of the programme leading to **MSc**. Other awards associated with the course include some or all of these modules.

Closed Cohort, Online Delivery – October 2018 Intake (BAE Systems)

All other modules completed in previous Academic Years

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery' Start Date	' Module Delivery' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module8 (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1 1	I-ECP-THESIS-20-A20	Individual Research Project (EC)	Professor Konstantinos Salonitis	20		80	N	04/01//21	04/01/21	01/09/21	50 50	THESIS OR	90 10				01/09/21 26/08/21	At the next available opportunity which may not be until the course runs the following year

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Closed Cohort, Online Delivery – October 2019 Intake (Thales)

All other modules completed in previous Academic Years

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	' Module Delivery ' Start Date	' Module Delivery ' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module15 (%) of Independent assessments	Weighting within module of multi-part assessments[16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
4	I-ECP-DDI - 20-A20	Design Driven Innovation Processes (EC)	Dr Ahmed Al-Ashaab	32		10	N	23/11/20	07/12/20	10/12/20	40	GCW	100				18/01/21	At the next available opportunity which may not be until the course runs the following year
6	I-ECP-PD – 20-A20	Product Development (EC)	Dr Ahmed Al-Ashaab	32		10	N	11/01/21	25/01/21	28/01/21	40	GCW	100				08/03/21	At the next available opportunity which may not be until the course runs the following year
8	I-ECP-CE - 20-A20	Optimising Whole Life Cost and Performance Management (EC)	Dr Leigh Kirkwood	32		10	N	01/03/21	15/03/21	18/03/21	40	ICW	100				03/05/21	At the next available opportunity which may not be until

[12] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[13] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[14] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[15] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[16] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[17] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[18] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

																		the course runs the following year
9	I-ECP-MSE – 20-A20	Manufacturing Systems Engineering (EC)	Dr Emanuele Pagone	32		10	N	12/10/20	26/10/20	29/10/20	40	ICW	100				30/11/20	At the next available opportunity which may not be until the course runs the following year
11	I-ECP-THESIS 20-B20	Individual Research Project (EC)	Professor Konstantinos Salonitis	20		80	N	01/02/21	01/02/21	01/09/21	50 50	THESIS OR	90 10				01/09/21 27/08/21	N/A

Open Cohort, Face to Face Delivery – October 2018 Intake

All other modules completed in previous Academic Years

odule Number	Module code	Title	Module Leader	Contact hours[19]	Total hours delivered by Visiting Lecturers [20]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	' Module Delivery ' Start Date	' Module Delivery ' End Date	Minimum Mark[21] - 40% or 50%	Type of Assessment	Weighting within module22 (%) of Independent assessments	Weighting within module of multi-part assessments [23](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[24]	Assessment	Assessment / Exam Retake date
4	I-KME-A1022-20-A20	Design Driven Innovation Processes	Dr Ahmed Al-Ashaab	32		10	Y	05/10/20	19/10/2020	23/10/2020	40	GCW	100				07/12/2020	At the next available opportunity which may not be until the course runs the following year
11	I-ECP-THESIS-20-C20	Individual Research Project (EC)	Professor Konstantinos Salonitis	20		80	N	01/02/21	01/02/21	01/09/21	50 50	THESIS OR	90 10				01/09/21 27/08/21	At the next available opportunity which may not be until the course runs the following year

[19] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[20] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[21] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[22] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[23] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[24] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*).* If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[25] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Open Cohort, Face to Face Delivery – January 2020 Intake

All other modules completed in previous Academic Years

Module Number	Module code	Title	Module Leader	Contact hours[26]	Total hours delivered by Visiting Lecturers[27]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	' Module Delivery' Start Date	' Module Delivery' End Date	Minimum Mark[28] - 40% or 50%	Type of Assessment	Weighting within module[29] (%) of Independent assessments	Weighting within module of multi-part assessments [30](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[31]	Assessment Submission and/or	Assessment / Exam Retake date
2	I-MNU-A1018 – 20-A20	General Management	Mr Matthew Caffrey	32		10	Y	11/01/21	18/01/21	22/01/21	40	EX	100				01/03/21	At the next available opportunity which may not be until the course runs the following year
3	I-MNU-A1037 – 20-A20	Project and Programme Management	Dr Ip-Shing Fan	32		10	Y	22/02/21	01/03/21	05/03/21	40	ICW	100				06/04/21	At the next available opportunity which may not be until the course runs the following year

[26] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[27] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[28] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[29] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[30] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[31] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[32] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Module Number	Module code	Title	Module Leader	Contact hours[26]	Total hours delivered by Visiting Lecturers[27]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	' Module Delivery' Start Date	' Module Delivery' End Date	Minimum Mark[28] - 40% or 50%	Type of Assessment	Weighting within module29 (%) of Independent assessments	Weighting within module of multi-part assessments [30](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[31]	Assessment Submission and/or	Assessment / Exam Retake date
4	I-KME-A1022 – 20-A20	Design Driven Innovation Processes	Dr Ahmed Al-Ashaab	32		10	Y	12/04/21	19/04/21	23/04/21	40	GCW	100				25/05/21	At the next available opportunity which may not be until the course runs the following year
8	I-TLS-CENG – 20 - B20	Optimising Whole Life Cost and Performance Management	Dr Leigh Kirkwood	32		10	Y	31/05/21	07/06/21	11/06/21	40	ICW	100				12/07/21	At the next available opportunity which may not be until the course runs the following year
11	I-ECP-THESIS – 20-D20	Individual Research Project (EC)	ProfessorKonstantinos Salonitis	20		80	N	01/06/21	01/06/21	13/01/22	50 50	THESIS OR	90 10				10/01/22 13/01/22	At the next available opportunity which may not be until the course runs the following year

Closed Cohort, Online Delivery – November 2020 Intake

Module Number	Module code	Title	Module Leader	Contact hours[33]	Total hours delivered by Visiting Lecturers[34]	Credits	Is the module shared? Y/N	Calendar			Assessment								
												Independent Assessment		Multi-part Assessment			Submission dates		
								Module Start Date (eg Pre-course task)	' Module Delivery' Start Date	' Module Delivery' End Date	Minimum Mark[35] - 40% or 50%	Type of Assessment	Weighting within module36 (%) of Independent assessments	Weighting within module of multi-part assessments [37](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[38]	Assessment Submission and/or	Assessment / Exam Retake date
1	I-ECP-IND – 20-N20	Induction (EC)	Professor Konstantinos Salonitis	10		0	N	02/11/20	02/11/20	02/11/20	N/A	AO	N/A					N/A
2	I-MNU-A1018 – 21-N21	General Management	Mr Matthew Caffrey	32		10	Y	04/10/21	11/10/21	14/10/21	40	EX	100				W/C 03/01/22	At the next available opportunity which may not be until the course runs the following year
3	I-MNU-A1037 – 21-N21	Project and Programme Management	Dr Ip-Shing Fan	32		10	N	31/11/21	06/12/21	09/12/21	40	ICW	100				01/02/22	At the next available opportunity which may not be until the course runs the following year

[33] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[34] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[35] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[36] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[37] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[38] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[39] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Module Number	Module code	Title	Module Leader	Contact hours[33]	Total hours delivered by Visiting Lecturers[34]	Credits	Is the module shared? Y/N	Calendar			Assessment								
												Independent Assessment		Multi-part Assessment			Submission dates		
								Module Start Date (eg Pre-course task)	' Module Delivery' Start Date	' Module Delivery' End Date	Minimum Mark[35] - 40% or 50%	Type of Assessment	Weighting within module36 (%) of Independent assessments	Weighting within module of multi-part assessments [37](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[38]	Assessment Submission and/or	Assessment / Exam Retake date
4	I-KME-A1022 – 20-N20	Design Driven Innovation Processes	Dr Ahmed Al-Ashaab	32		10	Y	22/02/21	01/03/21	04/03/21	40	GCW	100				13/04/21	At the next available opportunity which may not be until the course runs the following year
5	I-MNU-A1074 – 20-N20	Business Process Analysis and Engineering	Dr Ip-Shing Fan	32		10	Y	04/01/21	11/01/21	14/01/21	40	ICW	100				22/02/21	At the next available opportunity which may not be until the course runs the following year
6	I-GPD-A1505 – 21-N21	Lean Product Development	Dr Ahmed Al-Ashaab	32		10	Y	24/01/22	31/01/22	03/02/22	40	GCW	100				14/03/22	At the next available opportunity which may not be until the course runs the following year
7	I-MNU-A1034-20-N20	Operations Management	Mr John Patsavellas	32		10	Y	02/11/20	09/11/20	12/11/20	40	EX	100				W/C 04/01/21	At the next available opportunity which may not be until the course runs the following year

Module Number	Module code	Title	Module Leader	Contact hours[33]	Total hours delivered by Visiting Lecturers[34]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	' Module Delivery' Start Date	' Module Delivery' End Date	Minimum Mark[35] - 40% or 50%	Type of Assessment	Weighting within module36 (%) of Independent assessments	Weighting within module of multi-part assessments [37](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[38]	Assessment Submission and/or	Assessment / Exam Retake date
8	I-TLS-CENG – 21-N21	Optimising Whole Life Cost and Performance Management	Dr Leigh Kirkwood	32		10	Y	14/03/22	21/03/22	24/03/22	40	ICW	100				03/05/22	At the next available opportunity which may not be until the course runs the following year
9	I-MNU-A1027 – 20-N20	Manufacturing Systems Engineering	Dr Emanuele Pagone	32		10	Y	19/04/21	26/04/21	29/04/21	40	ICW	100				09/06/21	At the next available opportunity which may not be until the course runs the following year
10	I-ECP-GRPP-20-N20	Group Project (EC)	Professor Konstantinos Salonitis	20		40	N	01/04/21	01/04/21	01/10//21	50 50	GCW ICW	80 20	GPRES GPROJ ICW observed behaviour	20 80 50 50		27/09/21 29/09/21 01/10/21	At the next available opportunity which may not be until the course runs the following year
11	I-ECP-THESIS – 21-N21	Individual Research Project (EC)	Professor Konstantinos Salonitis	20		80	N	07/02/22	07/02/22	15/08//22	50 50	THESIS OR	90 10				15/08/22 10/08/22	At the next available opportunity which may not be until the course runs the following year

Open cohort, face-to-face delivery, January 2021 (Intake deferred)

Please list all modules that are used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-MNU-A1018	General Management	Engineering and Management of Manufacturing Systems	Advanced Materials, Global Product Development and Management, Management and Information Systems, Manufacturing Technology and Management
I-KME-A1022	Design Driven Innovation Processes	Global Product Development and Management	None
I-MNU-A1074	Business Process Analysis and Engineering	Management and Information Systems	None
I-GPD-A1505	Lean Product Development	Global Product Development and Management	Manufacturing Technology and Management, MRes in Manufacturing
I-MNU-A1034	Operations Management	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing, Cyber-Secure Manufacturing, Global Product Development and Management, Management and Information Systems and Manufacturing Technology and Management
I-TLS-CENG	Optimising Whole Life Cost and Performance Management	Through Life Systems Sustainment	None
I-MNU-A1027	Manufacturing Systems Engineering	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing

8. How are the ILOs assessed?

The following assessment types are utilised:

All modules are assessed through the submission of written assignments (either individual or group ones).

The group project is assessed with through a group assessment (including an assessment of personal contribution to group work).

The individual research project will be assessed by a thesis and an oral presentation.

This approach has been adopted because:

This approach has been adopted in order to perform formative and summative assessments of the students to demonstrate their ability in a range of contexts.

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

A. Postgraduate Diploma

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO 8.	ILO 9.
2		ICW/EX	ICW/EX			ICW/EX	ICW/EX	ICW/EX	
3					ICW	ICW	ICW		
4	GCW			GCW	GCW	GCW	GCW		
5	ICW			ICW			ICW		
6	GCW		GCW	GCW	GCW		GCW		GCW
7	ICW/EX	ICW/EX	ICW/EX	ICW/EX		ICW/EX			ICW/EX
8		ICW	ICW	ICW			ICW	ICW	
9	ICW					ICW			
10	GPRES GPROJ ICW	GPRES GPROJ ICW	GPRES GPROJ ICW	GPRES GPROJ ICW	GPRES GPROJ ICW	GPRES GPROJ ICW	GPRES GPROJ ICW	GPRES GPROJ ICW	GPRES GPROJ ICW

B. MSc

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 10	ILO 11
11	THESIS OR	THESIS OR

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

The students that will be enrolled in the present course will be already employed by engineering employers. The intention of the course is to provide students with knowledge and understanding and associated transferrable skills to make a contribution to the industry they are coming from on graduation.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: 06/07/21

1. What is the course?

Course information

Course Title	Environmental Engineering
Course code	MSEENFTC, MSEENPTC, PDEENFTC, PDEENPTC, PCEENFTC, PCEENPTC
Academic Year	2020/21
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield Campus
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Centre for Environmental and Agricultural Informatics
Course Director	Dr Mark Pawlett
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	1st or 2nd class UK honours degree or equivalent; in a science or engineering subject; Candidates with other qualifications will be considered according to experience; Where applicable minimum IELTS score of 6.5 or TOEFL 580
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc - one year, Part-time MSc - up to three years, Full-time PgCert - one year, Part-time PgCert - two years, Full-time PgDip - one year, Part-time PgDip - two years
Course Start Month(s)	Full-time: October Part-time: October

Institutions delivering the course

This course is delivered by School of Water, Energy and Environment where the research interests include:

Municipal and hazardous waste management, process emissions, contaminated land, water, wastewater treatment and waste disposal.

Cranfield University actively seeks sponsorship and support for individual thesis projects from water and resource sector employers to provide professional experience and development opportunities for students. Thesis sponsors and supporters include: Waste Resources Action Programme (WRAP), Viridor, Chartered Institution of Waste Management (CIWM), Environment Agency, Department for Environment, Food and Rural Affairs (Defra), Severn Trent Water, Anglian Water, Golder Associates, RSK, Arup, Mott MacDonald, Unilever, FutureBiogas, Aquatrols.

Cranfield University has agreements with a number of top quality European higher education institutions through its European Partnership Programme (EPP). Within these agreements students from partner institutions have the opportunity to take a Master of Science (MSc) at Cranfield University as an alternative to the final year of their home university programme.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited formally by the Chartered Institution of Water and Environmental Management (CIWEM) until September 2023 and the Institution of Agricultural Engineers (IAgrE) until 2021. Students can gain membership for one year.

2. What are the aims of the course?

Cranfield University offers these courses in order to:

Cover the application of scientific and engineering principles for the protection and improvement of environmental quality alongside protecting and enhancing quality of human life at both local, landscape and global scales. Specifically, the MSc will equip students with a unique set of knowledge and skills which will enable them to solve a wide range of environmental engineering

problems including municipal and toxic waste management, process emissions, contaminated land and water and waste disposal. The programme will also address energy and resource recovery from waste materials.

On completion of the course an MSc graduate will be equipped to:

- Acquire an advanced theoretical and specialist understanding of processes and practices central to environmental engineering
- Select and apply appropriate existing and emerging technologies that can achieve lower environmental impact via an integrated and cross-disciplinary approach
- Enable the application of scientific, technical and engineering principles, economic consequences and risks of environmental management options as best practice
- Develop the capacity to undertake successful technical research projects using appropriate methods of critical analysis.

This programme is intended for the following range of students:

- graduates with science, engineering, geography or related degrees keen to pursue careers in environmental management or waste management
- graduates currently in employment keen to extend their qualifications or to pursue a career change
- individuals with other qualifications but who possess considerable relevant experience

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate in Environmental Engineering

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Evaluate the key processes operating in the natural environment and the general biological, physical and engineering principles that underpin relevant aspects of ecosystem function and natural environmental management.

ILO 2. Critically evaluate the principal sources, risk and environmental impact of waste and pollution generation along with the importance of pollution control and the principles of sustainable energy and materials use.

ILO 3. Critically evaluate sustainable environmental engineering concepts and principles in order to design practical environmental management solutions, taking into account social, environmental, technical, regulatory and commercial constraints to a range of industrial and commercial contexts.

B. Postgraduate Diploma in Environmental Engineering

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 4. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. MSc in Environmental Engineering

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 5. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 6. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

Students will be supported in their learning and personal development by:

The MSc course is taught in three sections: taught modules (40%), group projects (20%), and an individual research project (40%).

The taught programme, typically delivered between October and February, comprises a structured sequence of modules, each containing a series of lectures and other classroom-based teaching, supplemented by practical work. The taught modules are assessed by assignments and formal written examinations. Each module is taught over one week, usually followed by a week largely free of structured teaching to allow time for more independent learning and reflection.

The Group Projects are group-based research program typically undertaken between February and April. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation.

The thesis project, typically delivered between May and September, further develops research and project management skills that: provide the ability to think and work in an original way; contribute to knowledge; overcome genuine problems; and communicate through a thesis and oral exam. Each student is allocated a supervisor, who will guide and assess the student work.
Guidance sessions are provided as to what is required from thesis and oral presentation.

Within induction week, students will be introduced to personal development planning and asked to reflect on their transferable skills and to take ownership of their personal development during the course.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Week Environmental Risks: Hazard, Assessment and Management Pollution Prevention and Remediation Technologies	0 10 10

Waste Management in a Circular Economy: Recycle, Recover, and Dispose	10
Land Engineering Principles and Practices	10
Process Emissions and Control	10
Cleantech in Water-Energy Food Nexus	10
ELECTIVE MODULES:	
N/A	
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	**Credits**
COMPULSORY MODULES:	
Induction Week	0
Environmental Risks: Hazard, Assessment and Management	10
Modelling Environmental Processes	10
Pollution Prevention and Remediation Technologies	10
Waste Management in a Circular Economy: Recycle, Recover, and Dispose	10
Land Engineering Principles and Practices	10
Process Emissions and Control	10
Cleantech in Water-Energy Food Nexus	10
Catchment Management	10
Group Project (Full Time Students)	40
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	120

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	**Credits**
COMPULSORY MODULES:	
Induction Week	0
Environmental Risks: Hazard, Assessment and Management	10
Modelling Environmental Processes	10
Pollution Prevention and Remediation Technologies	10
Waste Management in a Circular Economy: Recycle, Recover, and Dispose	10
Land Engineering Principles and Practices	10
Process Emissions and Control	10
Cleantech in Water-Energy Food Nexus	10
Catchment Management	10
Group Project (Full Time Students)	40

Individual Thesis Project	80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria
The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in October and are expected to complete the course within 12 calendar months.

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

All options are also offered on a part-time basis and such students are expected to complete the course within 2 to 3 years. Part-time students are not restricted to starting in October. Instead they are offered individual guidance on the best sequence of study based on their prior knowledge and availability to attend.

Part time students would be strongly encouraged to join the course at the start of the new academic year to coincide with induction for full time students. If they however join in year then ad hoc induction sessions can be arranged as required.

7. Course Level Assessment Strategy[4]

Formative and summative assessments assist with the delivery of both the course and module level ILOs. Formative assessment for all modules assist the students with their summative assignments. Formative feedback sessions are organised to inform students regarding what they need to do for a good summative assignment, including what they have done well in the formative assessment, and what they need to improve for a good summative assignment.

Modules are organised chronologically so that the student can build on existing skills such that they can enter their chosen career with new skills attained. Both the Environmental Risks and the Modelling Environmental Processes are foundation modules, and as such are pre-requisite for other modules on the course.

There are various methods of formative assessment; all consist of instant feedback from peers as well as the module lead. For example, “Catchment Management” delivers formative assessment continually throughout the module, whereas “Environmental Risks: Hazard, Assessment and Management” delivers formative assessment at the end of the module in the style of group workshops. In the module “Land Engineering Engineering Principles and Practices” formative assessment is carried out in pairs guided by the module leader. The relevance of formative assessment to industry is enhanced by including industrial partners in discussions (for “Pollution Prevention and Remediation Technologies” and “Waste Management in a Circular Economy: Reuse, Recycle, Recover & Dispose”). In both of the modules “Land Engineering Principles and Practices” and “Catchment Management” formative assessment also includes a visit to a field site to ensure industrial relevance.

There are no exams within this course; all summative assessment is delivered through individual coursework. Exams would not reflect the skills that the students has attained, and do not reflect their ability to utilise resources to integrate knowledge for problem solving. Assignments include casework studies such that they can apply attained knowledge in real industrial scenarios while building on their experience from previous modules. Feedback from summative assessments is delivered to students within 20 working days.

Group Project: The group project provides the students with the opportunity to gain professional skills expected of the workplace. In addition to technical skill practice, students develop a range of soft skills such as team working, problem solving, communication skills and reflective practice. The students work in small consultancy teams typically on a client sponsored project for a period of 10 weeks. Many teams will be made up of students from different courses giving the students the opportunity of working in an interdisciplinary team. The students are responsible for interpreting the brief, developing a project plan, selecting and implementing a methodology, deriving results, analysing the results and drawing conclusions in alignment with the aims and objectives. All

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses
https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

students participate in a peer review activity providing them with the opportunity to reflect on the practices of their colleagues as well as their own. Peer review feedback is provided individually by an independent member of academic staff. A single group report is produced and the project is presented orally at the concluding Exhibition Day, both elements are summatively assessed by independent markers and a group mark is assigned for element. Individual assessment is derived from supervisor observation and meeting minute actions and an individual reflective report where the students reflect on the development of three soft skill competencies based on objectives that they set for themselves. The team working competency is mandatory as one of the three skills for each student.

Dissertation: Part time students are not required to complete the Group Project undertaken by the full time registered students on a SWEE MSc course. An alternative assignment takes the form of a dissertation or design project which in most situations will be based around a topic relevant to the work of the part-time student. It is evident that some aspects of the Group Project experience that the work-based dissertation replaces – for example the client interaction and group dynamics components will not directly replicated by undertaking this assignment. It is expected that these experiences would normally be a part of the normal working life of the part-time student.

It is expected that the dissertation will normally consist of the following elements: Abstract, Background context, Introduction to the theme(s) addressed within the dissertation, setting out the issues that will be covered, Methodology, In depth analysis/discussion of the topics discussed, Concluding remarks, References, Appendices (if relevant). Two supervisors are allocated to the dissertation and supervision follows the model used for the independent research project. The student will submit a 6000 word report and will give an oral presentation of their work. Both elements of assessment will be marked by independent assessors.

Individual Research Project/Thesis: The individual research project requires students to further develop problem definition, hypothesis setting, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions in the context of research questions relevant to the course followed by a student. The student is required to communicate their findings successfully via a thesis, written in the style of a scientific paper, and an oral presentation based around a poster. The projects are designed to integrate knowledge, the taught modules, and apply understanding and skills from the group project, to deliver a high quality written thesis and oral presentation. The individual research project/thesis is typically delivered through collaboration with an industrial sponsor, or it may be an ‘internal’ project reflecting the research interests of the School.

Course modules

The following modules outline all parts of the programme leading to **MSc.** Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-ENV-INWK	Induction	M Rivas Casado	33		0	Y		05/10/20	09/10/20	N/A	AO	N/A				N/A	
2	I-ERM-A2005	Environmental Risks: Hazard, Assessment and Management	S Jude	24.5		10	N		12/10/20	16/10/20	40	ICW	100				FT 24/10/20 PT 07/11/20	05/21

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%. This will be at the Board of Examiners discretion.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	I-EI-A1001	Modelling Environmental Processes	I Bortone	26		10	Y		26/10/20	30/10/20	40	ICW	100				FT 07/11/20 PT 21/11/20	05/21
4	I-IWM-A1061	Pollution Prevention and Remediation Technologies	F Coulon	29		10	N		09/11/20	13/11/20	40	ICW	100				FT 21/11/20 PT 05/12/20	05/21
5	I-WRM-CRM	Waste Management in a Circular Economy: Reuse, Recycle, Recover & Dispose	F Coulon	29		10	N		23/11/20	27/11/20	40	ICW	100				FT 05/12/20 PT 04/01/21	05/21
6	I-EI-A1004	Land Engineering Principles and Practices	L Deeks	35		10	N		07/12/20	11/12/20	40	ICW	100				FT 04/01/21 PT 25/01/21	05/21
7	I-IWM-A1500	Process Emissions and Control	I Mead	25		10	N		11/01/21	15/01/21	40	ICW	100				FT 23/01/21 PT 06/02/21	05/21
8	I-CTE-CWN	Cleantech in Water-Energy Food Nexus	F Coulon	30		10	N		25/01/21	29/01/21	40	ICW	100				FT 06/02/21 PT 20/02/21	05/21
9	I-EI-A1005	Catchment Management	R Simmons	40		10	N		08/02/21	12/02/21	40	ICW	100				FT 20/02/21 PT 06/03/21	05/21

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
10	I- ENV-GRPP	Group Project	Monica Rivas Casado	16		40	Y		01/03/20	07/05/21	50 50 50 50	GCW GPRES ICW RP	64 16 10 10				05/05/21 30/04/21 08/05/21 N/A	
11	I-ENV-DISS	Dissertation (for part time students)	Monica Rivas Casado	10		40	Y		01/03/21	24/09/21	50	IPROJ IPRES	80 20				24/09/21 20/09/21	
12	I-ENV-THESIS	Individual Research Project	Monica Rivas Casado	20		80	Y		10/05/21	10/09/21	50 50	THESIS OR	90 10				06/09/21 w/c 23/08/21-30/08/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-WRM-CRM	Waste Management in a Circular Economy: Reuse, Recycle, Recover & Dispose	Environmental Engineering	• EngD Sustainable Materials and Manufacturing
I- ERM-A2005	Environmental Risks: Hazard, Assessment and Management	Environmental Engineering	• WIRe CDT

8. How are the ILOs assessed?

The following assessment types are utilised:

- the taught modules (40%) are assessed by in-module assessment (including coursework, which focuses on application of principles studied knowledge) or examination in January;
- group projects (20%) are assessed by means of a written group report and presentations.
- the research project (40%), is assessed by a thesis and an oral examination

The overall assessment workload and type used for the course is balanced and appropriate; it covers well the ILOs set out for each module of the course and develops the type of skills required for the students for their future career

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

A. Postgraduate Certificate in Environmental Engineering

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.
I-ERM-A2005	ICW	ICW	ICW
I-WRM-CRM		ICW	ICW
I-IWM-A1061	ICW	ICW	ICW
I-EI-A1004	ICW	ICW	ICW
I-IWM-A1500		ICW	ICW
I-CTE-CWN		ICW	ICW

B. Postgraduate Diploma in Environmental Engineering

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 4.
I-EI-A1001	ICW
I-EI-A1005	ICW
I-ENV-GRPP	GPROJ ICW
I-ENV-DISS	IPROJ/IPRES

C. Master of Science in Environmental Engineering

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 5.	ILO 6.
I-ENV-THESIS	THESIS OR	THESIS OR

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

On completion, graduates have a broader network of global contacts, increased opportunities for individual opportunities and a wide range of careers as professional scientists and engineers in the environment sector.

Some of the employers over the last three years include:

- Golder Associates
- Arup
- Seche Environment
- EnvironTech Gmbh
- Deloitte
- BP
- Chevron
- WSP

- Jacobs
- Viridor
- Syngenta
- Schofield Lothian
- SOCOTEC UK
- McKinsey and Company
- Mondelēz International

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: 06/07/20

1. What is the course?

Course information

Course Title	Environmental Management for Business
Course code	MSEMBFTC, MSEMBPTC, PDEMBFTC, PDEMBPTC, PCEMBFTC, PCEMBPTC
Academic Year	2020/21
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Cranfield Institute for Resilient Futures
Course Director	Dr Kenisha Garnett
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	This course is suitable for graduates with science, engineering, social science or business related degrees keen to pursue careers in sustainability management; or graduates currently working in industry keen to extend their qualifications; or individuals with other qualifications who possess considerable relevant experience. If you are an international student you will need to provide evidence that you have achieved a satisfactory test result in an English qualification. The minimum standard expected from a number of accepted courses are as follows IELTS - 6.5, TOEFL – 92, Pearson PTE Academic – 65, Cambridge English Scale – 180, Cambridge English: Advanced – C, Cambridge English: Proficiency - C
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc - one year, Part-time MSc - up to three years, Full-time PgCert - one year, Part-time PgCert - two years, Full-time PgDip - one year, Part-time PgDip - two years
Course Start Month(s)	Full-time: October Part-time: October

Institutions delivering the course

This course is delivered by Cranfield Centre for Environmental and Agricultural Informatics, where the research interests include:

Environmental risk analysis, life cycle analysis, ecosystem service assessment, environmental modelling and institutional resilience

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited formally by the Chartered Institution of Water and Environmental Management (CIWEM) until September 2023 and the Institute of Environmental Management & Assessment (IEMA), renewed annually in October.

2. What are the aims of the course?

Cranfield University offers this course:

- To provide students with knowledge and understanding of environmental policies, the ability to develop strategies in response to those policies, and basic business management skills to enable them to communicate and implement their strategies.
- To develop an understanding of Sustainable Development and the knowledge of related international, national and local government policies and frameworks, with particular emphasis on natural resources and the environment.
- To develop the capacity to undertake successful technical research projects using appropriate methods of critical analysis.

Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) exit routes are provided for students who wish to access only parts of the course provided.

This programme is intended for the following range of students:

- Graduates with honours degree and equivalent ideally in a subject related to a component of the course.
- Graduates currently in employment keen to extend their qualifications or to pursue a career change.
- Individuals with other qualifications but who possess considerable relevant experience

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate in Environmental Management for Business

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Critically analyse environmental issues and contribute to strategic and policy decision making processes in the private, public and NGO sectors at all levels

ILO 2. Develop feasible environmentally and socially responsible strategies and policies based on scientific evidence within the appropriate economic, legal and political frameworks

ILO 3. Communicate and implement strategies within a business environment, through understanding of management decision making, leadership and financial processes.

ILO 4. Monitor and assess organisational practices and the outcomes of policies and strategies through the use of appropriate methods, such as environmental auditing

B. Postgraduate Diploma in Environmental Management for Business

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 5. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. MSc in Environmental Management for Business

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 6. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 7. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

Students will be supported in their learning and personal development by:

Teaching and learning methods aim to promote and develop the students as autonomous and reflective learners. This is achieved by providing a structured underpinning knowledge base which the students can test and expand by means of project and case study coursework, individually and in groups. The

learning outcomes of the course are pursued by designing lecture and assessment material around practical problems and interaction with the economic and policy sectors of relevance to their studies. Personal Development Planning is explicitly and implicitly developed during the course, including topics such as communication, time-management, team work, learning strategies and project management. Additional training and self-study materials are available for students to develop appropriate IT skills, supported by academic staff in a pre-sessional IT course and during the programme.

Technical English and foreign language training is available in a structured programme in addition to the academic course.

In addition the full-time PgDip and MSc students carry out a group project, in which they work with students from other courses, usually on a project sponsored by an external customer to produce a technical report. This enables them to develop their skills of individual and team working, including project management, time management and written and oral communication. Part-time students write a review of available information around a relevant topic including academic literature, presentation of ideas and analysis and the development of conclusions.

MSc students undertake an individual thesis project, such as the written analysis of an environmental case. This develops and tests their ability to plan and carry out a piece of research, their ability to apply theoretical knowledge and their critical thinking. Continual assessment and feedback on performance and personal development is given to students with suggested further study if required.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Module Principles of Sustainability Leading Corporate Sustainability	0 10 10
ELECTIVE MODULES:	
Choose 4: Economic Valuation and Appraisal Evaluating Environmental Sustainability Environmental Policy and Risk Governance Environmental Innovation Strategic Foresight Risk Communication and Perception	 10 10 10 10 10 10
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Principles of Sustainability	10
Leading Corporate Sustainability	10
Economic Valuation and Appraisal	10
Evaluating Environmental Sustainability	10
Environmental Policy and Risk Governance	10
Environmental Innovation	10
Strategic Foresight	10
Risk Communication and Perception	10
Group Project (Full Time Students)	40
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	120

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Principles of Sustainability	10
Leading Corporate Sustainability	10
Economic Valuation and Appraisal	10
Evaluating Environmental Sustainability	10
Environmental Policy and Risk Governance	10
Environmental Innovation	10
Strategic Foresight	10
Risk Communication and Perception	10
Group Project (Full Time Students)	40
Thesis	80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in October and are expected to complete the course within 12 calendar months.

Part-time students register for the course in October and are expected to complete the course within 3 years.

The MSc course is taught in three sections: taught modules (40%), group projects (20%), and an individual research project (40%).

The taught programme, typically delivered between October and February, comprises a structured sequence of modules, each containing a series of lectures and other classroom-based teaching, supplemented by practical work. The taught modules are assessed by assignments. Each module is taught over one week, usually followed by a week largely free of structured teaching to allow time for more independent learning and reflection.

The Group Projects are group-based research program typically undertaken between February and April. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation.

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

The thesis project, typically delivered between May and September, further develops research and project management skills that: provide the ability to think and work in an original way; contribute to knowledge; overcome genuine problems; and communicate through a thesis and oral exam. Each student is allocated a supervisor, who will guide and assess the student work.

Guidance sessions are provided as to what is required from thesis and oral presentation.
Within induction week, students will be introduced to personal development planning and asked to reflect on their transferable skills and to take ownership of their personal development during the course.

7. Course Level Assessment Strategy[4]

The course assessment tasks enable students to demonstrate a full range of skills and attributes that will be required for future "Environmental Management for Business". The modules "Principles of Sustainability" and "Leading Corporate Sustainability" will introduce students to sustainability (and associated challenges), ecosystems, the environment, the circular economy and corporate action. These will be assessed through the completion of a written briefing document for a client (Principle of sustainability) and an individual written assignment. The modules "Economic Valuation and Appraisal" and "Evaluating Environmental Sustainability" will introduce students to financial and economic modelling analysis and life cycle assessment. These will be assessed through the completion of an individual written assignment. Under "Environmental Policy and Risk Governance", "Strategic Foresight" and "Risk communication and Perception", the students will be introduced to the development and appraisal of policy in central government and business, individual and group attitudes towards the perception of risk and a range of methods that can be used to identify, analyse and communicate insights about the future. The modules are assessed through a group video/podcast and associated written critique (Risk Communication and Perception) and written reports. The assignments will be of varying lengths, recognising that writing individual assignments and briefing documents to a short length can be more challenging and can develop different skills relevant to professional practice. The length of each assessment task is clearly stated within the module descriptor. Students will write the briefing document and individual assignment to address the specific award ILOs 1-4. Students will also have the opportunity to develop theory and communication skills, as they are required to give a group presentation under Principles of Sustainability, Leading Corporate Sustainability, Environmental Policy and Risk Governance, Strategic Foresight, Risk Communication and Perception and Environmental Innovation. The ability to work effectively in groups is a highly desirable skill which has translated into ILOs 3. Feedback is given immediately after the group presentation.

All modules are supported by a number of formative tasks including group discussion, case studies and oral presentations. Formative feedback is given verbally within the classroom following discussions or oral feedback provided by the tutor and peers for presentations. The taught components precede the group project,. The group project provides the students with the opportunity to gain professional skills expected of the workplace. In addition to technical skill practice, students develop a range of soft skills such as team working, problem solving, communication skills and reflective practice. The students work in small consultancy teams typically on a client sponsored project for a period of 10 weeks. Many teams will be made up of students from different courses giving the students the opportunity of working in an interdisciplinary team. The students are responsible for interpreting the brief, developing a project plan, selecting and implementing a methodology, deriving results, analysing the results and drawing conclusions in alignment with the aims and objectives. All students participate in a peer review activity providing them with the opportunity to reflect on the practices of their colleagues as well as their own. Peer review feedback is provided individually by an independent member of academic staff. A single group report is produced and the project is presented orally at the concluding Exhibition Day, both elements are summatively assessed by independent markers and a group mark is assigned for element.

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Individual assessment is derived from supervisor observation and meeting minute actions and an individual reflective report where the students reflect on the development of three soft skill competencies based on objectives that they set for themselves. The team working competency is mandatory as one of the three skills for each student.

The individual research project requires students to further develop problem definition, hypothesis setting, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions in the context of research questions relevant to the course followed by a student. The student is required to communicate their findings successfully via a thesis, written in the style of a scientific paper and an oral presentation based around a poster. The projects are designed to integrate knowledge, the taught modules, and apply understanding and skills from the group project, to deliver a high quality written thesis and oral presentation. The individual research project/thesis is typically delivered through collaboration with an industrial sponsor, or it may be an 'internal' project reflecting the research interests of the School.

Course modules

The following modules outline all parts of the programme leading to **MSc.** Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-ENV-INWK	Induction	M Rivas Casado	33		0	Y		05/10/20	09/10/20	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	P Burgess	26		10	Y		12/10/20	16/10/20	40	ICW	100				FT 24/10/20 PT 07/11/20	05/21
3	I-EEM-A1184	Economic Valuation and Appraisal	A Graves	27		10	N		26/10/20	30/10/20	40	ICW	100				FT 07/11/20 PT 21/11/20	05/21

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
4	M-T/LCS Occ B	Leading Corporate Sustainability	N Shete	20		10	Y		09/11/20	20/11/20	40	ICW	100				FT/PT15/01/21	05/21
5	I-ERM-A2014	Risk Communication and Perception	S Jude	25		10	N		23/11/20	27/11/20	40	ICW	100				FT 05/12/20 PT 04/01/21	05/21
6	I-ERM-A2006	Environmental Policy and Risk Governance	S Jude	30		10	N		07/12/20	11/12/20	40	ICW	100				FT 04/01/21 PT 25/01/21	05/21
7	I-EDI-A1127	Evaluating Environmental Sustainability	A Williams	30		10	Y		11/01/21	15/01/21	40	ICW	100				FT 23/01/21 PT 06/02/21	05/21
8	I-EMB-A1128	Environmental Innovation	J Harris	25		10	N		25/01/21	29/01/21	40	ICW	100				FT 06/02/21 PT 20/02/21	05/21
9	I-EMB-A1005	Strategic Foresight	K Garnett	20		10	N		08/02/21	12/02/21	40	ICW	100				FT 20/02/21 PT 06/03/21	05/21
10	I-ENV-GRPP	Group Project	M Rivas Casado	16		40	Y		01/03/21	07/05/21	50 50 50 50	GCW GPRES ICW RP	64 16 10 10				05/05/21 30/04/21 08/05/21 N/A	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
11	I-ENV-DISS	Dissertation (part time students)	M Rivas Casado	10		40	Y		01/03/21	24/09/21	50	IPROJ IPRES	80 20				24/09/21 20/09/21	
12	I-ENV-THESIS	Individual Research Project	M Rivas Casado	20		80	Y		10/05/21	10/09/21	50 50	THESIS OR	90 10				06/09/21 w/c 23/08/21 - 30/08/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
M-T/LCS	Leading Corporate Sustainability	Management	• Food Systems and Management • Future Food Sustainability • Management and Corporate Sustainability • Business and Strategic Leadership • Management and Leadership • Environmental Management for Business
I-EDI-A1127	Evaluating Environmental Sustainability	Environmental Management for Business	• Advanced Chemical Engineering - Biorefining route • EngD Sustainable Materials and Manufacturing
I-EMB-A1122	Principles of Sustainability	Environmental Management for Business	• Future Food Sustainability • EngD Sustainable Materials and Manufacturing

8. How are the ILOs assessed?

The following assessment types are utilised:

The course is assessed as three elements:

- The taught modules (40%) are assessed by in-module assessment, including coursework, which focuses on application of the principles studied, and group presentations, which support underpinning knowledge.
- Group projects (20%) are assessed by means of a written group report and presentations;
- The research project (40%), is assessed by a thesis and an oral examination

This approach has been adopted because:

The use of coursework is entirely appropriate and involves a mix of individual and group working as well as oral and poster presentations. Furthermore a number of the assignments are based on practical aspects of the modules.

Assessment and ILO Mapping

A. Postgraduate Certificate

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.
2	ICW			
3	ICW	ICW		
4			ICW	

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.
5	ICW		ICW	
6	ICW			ICW
7	ICW	ICW		ICW
8		ICW	ICW	
9			ICW	ICW

B. Postgraduate Diploma

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 5.
10	GPROJ ICW
11	IPROJ IPRES

C. MSc

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 6.	ILO 7.
12	THESIS/ OR	THESIS/ OR

CROSS-MODULAR ASSESSMENT

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

Successful students will have a good understanding of key environmental issues, sustainable development, environmental policy, governance and legislation, and basic business processes. This will provide them with the skills they need to follow varied careers, including environment/sustainability managers in business, environmental consultancy, environmental protection agencies, environmental policy formation and environmental NGOs.

The international nature of the course means that career opportunities are not restricted to the UK. Cranfield graduates develop careers around the world.

Some recent employers include UK Environment Agency, Golder Associates, WRG, Shanks, ERM, Environmental KIN, Enviros, Resource Recovery Forum, VR Group (Helsinki), Bouygues Construction, Honeywell, Virgin Media, Yorkshire Water, Caterpillar and National Energy Foundation. Job titles after graduation include Sustainability Manager, Environmental Manager, HSEQ-coordinator, Business Consultant, Risk Analyst, Product Stewardship Engineer and Highway Development Control Officer.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: September 2020

1. What is the course?

Course information

Course Title	Executive Logistics & Supply Chain Management – September 2020
Course code	MSELSPTC, PDELSPTC, PCELSPTC, MSELSPAC
Academic Year	2020/21
Valid entry routes	MSc
Additional exit routes	PgCert PgDip
Mode of delivery	Part-time
Location(s)[1] of Study	Cranfield University
School(s)	School of Management
Theme	Leadership and Management
Centre	Logistics, Procurement and Supply Chain Management (LSCM)
Course Director	Dr Soroosh Saghiri
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	Yes
Apprenticeship Standard the course is mapped to	Senior Leader (Degree) Level 7 Apprenticeship Standard
Is the Degree apprenticeship integrated or non-integrated?	Non-integrated
Is the Mastership offered as an open and/or closed course?	Open
Teaching Institution	Cranfield University

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Part-time MSc – up to 3 years
Course Start Month(s)	September 2020

Institutions delivering the course

This course is delivered by Logistics, Procurement and Supply Chain Management, at the School of Management, where the research interests include:

Logistics, supply chain management and marketing.

Cranfield University interacts with the following institutions and in the following ways:

- students undertake their individual thesis project within their own organisation or field of business, which builds further contacts and opportunities for collaboration with those organisations
- the course contains a number of talks by external speakers from companies such as Accenture, Gartner Research, or from partner academic institutions
- one of the two external examiners for the course is always from the non-academic sector, the other being an academic.
- the course has an Industrial Advisory Board

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

The MSc in Executive Logistics and Supply Chain Management is accredited formally by The Chartered Institute of Logistics & Transport until 2021 and The Chartered Institute of Purchasing and Supply until August 2018, and European Logistics Association until May 2020.

2. What are the aims of the course?

Cranfield University offers this course in order to fulfil a market demand for highly capable graduates in the field of Logistics, Procurement and Supply Chain Management. The course further aims to offer personal and specialist skills development for candidates with extensive industrial experience. These objectives are addressed through the aims of the course which are to provide students with:

- an overall appreciation of logistics and supply chain management and their importance to modern business
- appropriate technical knowledge in the key areas of Logistics and Supply Chain Management
- an understanding of the analytical and managerial skills that will enable them to apply this knowledge within a business environment
- an understanding of the need to manage and plan supply chains within an overall business environment in an integrated and co-ordinated manner

This programme is intended for the following range of students:

- candidates with a minimum of three years business or organisational experience in a supply chain-related role;

- candidates with a similar level of experience in a non-supply chain area who are intending to move into the supply chain field, or have recently had a change in career track

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Demonstrate and analyse a systematic knowledge of supply chain management in general and critical awareness of current supply problems and new thinking at the forefront of the discipline.

ILO 2. Appraise and apply appropriate techniques to address specific challenges in supply chain management

B. Postgraduate Diploma

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 3. Value a comprehensive and critical knowledge of logistics and supply chain components,

ILO 4. Investigate and solve advanced and complex real-life supply chain problems systematically and creatively using a range of quantitative techniques, analytical tools and supply chain design methodologies.

ILO 5. Design and organise supply chains within an overall business environment in an integrated and coordinated manner

ILO 6. Compare, contrast, and select appropriate supply chain management frameworks, theories, and techniques, and contextualise them for a variety of real-life situations.

ILO 7. Evaluate and develop logistics and supply chain frameworks to address cultural, organisational and sustainability issues.

C. MSc

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 8. Undertake independent and original research on a relevant supply chain subject, demonstrating the ability to design, plan, manage and execute an industrial or research based project within a specified time scale.

ILO 9. Produce a high quality thesis, based on self-directed, creative research including critical literature review, justified research method(s), valid data gathering, analysis and interpretation, and report writing

4. How is the course taught?

Students will be supported in their learning and personal development by:

- Lectures by the Cranfield University faculty members and external speakers from industry
- Tutorial support throughout the course, including a meeting with personal tutor during each one week module
- Extensive use is made of the course VLE as a means of delivering material to support and augment classroom learning.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

Executive Logistics & Supply Chain Management

A. Postgraduate Certificate

The accumulation of 60 credits through the assessment of taught modules (note: "Supply Chain Strategy and Sustainability" module is a compulsory module for Postgraduate Certificate) as detailed below:

Description	**Credits**
COMPULSORY MODULES:	
Module 1 Five modules from 2-13	10 50
ELECTIVE MODULES:	
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	**Credits**
COMPULSORY MODULES:	
Module 1 Eleven modules from 2-13	10 110
ELECTIVE MODULES:	
TOTAL:	120

C. MSc

The accumulation of 130 credits through the assessment of taught modules and, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	**Credits**
COMPULSORY MODULES:	
1-13 14 15	130 0 70
ELECTIVE MODULES:	
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria
The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Part-time students register for the course in October and are expected to complete the course within 2 years.

7. Course Level Assessment Strategy[4]

The aim is to provide a varied, stimulating and experiential learning environment. All taught modules consist of formal lecturers, in-class case discussions, group and self-study. Group project work, reflective practice and class exercises are used to develop problem solving skills.

The course further aims to offer personal and specialist skills development for candidates with industrial experience.

The assessment strategy of this course is challenging and diverse and enables students to demonstrate a full range of skills and attributes.

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[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Summative assessment will include a range of assessment types including the preparation of individual and group coursework and presentation, and individual written exams.

This approach has been adopted in order to ensure that students demonstrate their understanding through a wide range of learning techniques, but are not disadvantaged through any one approach.

Written coursework will be of varying lengths, recognising that writing coursework to a short length can be more challenging for some and can develop different skills relevant to professional practice. The length of each assessment task is usually stated within the module descriptor. Students then have opportunities to develop their communication and group working skills, as they are required to give group presentations. Feedback for all assessments is given in a timely fashion, dependent on the type of assessment, but always within 20 working days.

Many modules are supported by a number of formative tasks including group discussion, case studies, oral presentations. Formative feedback will be provided through in-class discussion on the conceptual material introduced during each session.

Formative Feedback
MSc only - The taught components precede the research project, so assessment can be used to develop skills required for the individual research project. Students are generally expected to be more self-directed in their learning during this research project and guidance will be provided through the [*Evidence-Based Management* module] and meetings with their thesis supervisor.

Course modules ELSCM (September) – Occurrence L

The following modules outline all parts of the programme leading to **MSc.** Other awards associated with the course include some or all of these modules.

Module Number		Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments[9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
			SOM MSc Induction	Dr Soroosh Saghiri	16		0	Y	14.09.20	14.09/20	15.09.20	N/A	AO	N/A				N/A	
1		M-L/ SCSS Occ L20	Supply Chain Strategy and Sustainability	Dr Heather Skipworth	16		10	Y	19.10.20	19.10.20	21.10.20	40	ICW	100				25.11.2020	
2		M-L/ PSP Occ L20	Principles of Strategic Procurement	Dr Soroosh Saghiri	16		10	Y	19.04.21	19.04.21	23.04.21	40	ICW	100				18.05.2021	

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting	Credits	Is the module shared? Y/N	Calendar			Assessment								
													Independent Assessment		Multi-part Assessment			Submission dates		
									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3		M-L/ ACF Occ L21	Accounting and Finance	Dr Simon Templar	16		10	Y	31.01.22	31.01.22	05.02.22	40	EX	100				06.02.2022	
4		M-L/ ATS Occ L20	Analytical Techniques for Supply Chain Management	Dr Emel Aktas	16		10	Y	19.04.21	19.04.21	23.04.21	40	ICW	100				09.06.2021	
5		M-L/ FRT Occ L20	Freight Transport	Prof Melvyn Peters	16		10	Y	14.06.21	14.06.21	18.06.21	40	ICW	100				12.07.2021	
6		M-L/ IOM Occ L21	Inventory and Operations Management	Dr Anurag Tewari	16		10	Y	20.09.21	20.09.21	24.09.21	40	GCW	100				25.10.2021	
7		M-L/ ISB Occ L21	Information Systems and e-Business	Dr Abhi Ghadge	16		10	Y	31.01.22	31.01.22	04.02.22	40 40	GCW ICW	80 20				07.03.2022 07.03.2022	
8		M-L/ PMI Occ L20	Project Management Introduction	Dr Denyse Julien	20		10	Y	25.01.21	25.01.21	29.01.21	40			100 MULTI	GCW GPRAC	75 25	29.01.21 29.01.21	
9		M-L/ PND Occ L20	Physical Network Design	Dr Nicky Yates	16		10	Y	14.06.21	14.06.21	18.06.21	40	ICW	100				02.08.2021	
10		M-L/ WHS Occ L21	Warehousing	Dr Hendrik Reefke	16		10	Y	20.09.21	20.09.21	24.09.21	40	ICW	100				29.11.2021	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
11		M-M/ STG Occ L21	Strategic Management	Prof Mark Jenkins	16		10	Y	28.03.22	28.03.22	01.04.22	40	GCW	100				02.06.2022	
12		M-M/ GME Occ L21	Global Macroeconomics and Business Environment	Prof Joe Nellis	16		10	Y	06.06.22	06.06.22	10.06.22	40	GCW	100				25.07.2022	
13		MXL/ AOB Occ L21	Applied Organisational Behaviour:	Dr Chia-Yu Kou-Barrett	16		10	Y	06.06.22	06.06.22	10.06.22	40	ICW	100				04.07.2022	
14		M-T/ EBM Occ L21	Evidence Based Management	Dr Soroosh Saghiri	16		0	Y	28.03.22	28.03.22	01.04.22	N/A	AO	N/A				N/A	
15		MXL/ THS Occ L21	Thesis	Various	0		70	N	01.04.22	01.04.22	03.10.22	50	Thesis	100				03.10.2022	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
M-L/SCSS	Supply Chain Strategy and Sustainability	FT MSc LSCM	PSCM; ELSCM
M-L/PSP	Principles of Strategic Procurement	FT MSc LSCM	PSCM; ELSCM
M-L/ACF	Accounting and Finance	FT MSc LSCM	PSCM; ELSCM; MiM; MCS; MENT; SM
M-L/ATS	Analytical Techniques for Supply Chain Management	FT MSc LSCM	PSCM; ELSCM
M-L/FRT	Freight Transport	FT MSc LSCM	PSCM; ELSCM
M-L/IOM	Inventory and Operations Management	FT MSc LSCM	PSCM; ELSCM
M-L/ISB	Information Systems and e-Business	FT MSc LSCM	PSCM; ELSCM
M-L/PMI	Project Management Introduction	FT MSc LSCM	PSCM; ELSCM
M-L/PND	Physical Network Design	FT MSc LSCM	PSCM; ELSCM
M-L/WHS	Warehousing	FT MSc LSCM	PSCM; ELSCM
M-M/STG	Strategic Management	MBA	EMBA, ELSCM
M-M/GME	Global Macroeconomics and Business Environment	MBA	EMBA, ELSCM
M-T/AOB	Applied Organisational Behaviour	MSc Management	MCS, MENT, ELSCM
M-T/EBM	Evidence Based Management	MSc Management	MCS, MENT, ELSCM, MML

8. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types. Students can expect to have two written examinations, fourteen pieces of written assessment, plus an individual thesis for the MSc.

This approach has been adopted in order to ensure that:

students demonstrate their understanding through a wide range of learning techniques, but are not disadvantaged through any one approach.

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

	Executive MSc in Logistics and Supply Chain Management (ILO1–9) *Needs 200 credits from all taught modules plus thesis*								
	Postgraduate Diploma (ILO1-7) *Needs 120 credits from taught modules*								
	PgCert (ILO1-2) *Needs 60 credit rom taught modules*								
Award ILOs **Module # /Assessment**	**ILO1**	**ILO2**	**ILO3**	**ILO4**	**ILO5**	**ILO6**	**ILO7**	**ILO8**	**ILO9**
Supply Chain Strategy and Sustainability	☑	☑				☑	☑		
Freight Transport	☑	☑	☑	☑	☑	☑			
Warehousing	☑	☑	☑	☑		☑			
Analytical Techniques for Supply Chain Management	☑	☑		☑		☑			
Information Systems and E-Business	☑	☑			☑	☑			
Inventory and Operations Management	☑	☑	☑	☑	☑	☑			
Accounting and Finance	☑	☑		☑					
Principles of Strategic Procurement	☑	☑	☑			☑	☑		
Physical Network Design	☑	☑		☑		☑			
Project Management Introduction		☑			☑	☑	☑		
Strategic Management		☑		☑	☑	☑	☑		
Global Macroeconomics and Business Environment		☑		☑	☑	☑	☑		
Organisational Behaviour: Application	☑	☑			☑	☑	☑		
Evidence Based Management	☑	☑	☑	☑	☑	☑	☑	☑	☑
Thesis	☑	☑	☑	☑	☑	☑	☑	☑	☑

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)
N/A			

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a

Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

The graduates from the part-time course are likely to be in employment and many maybe sponsored by their employer. However many of these graduates are able to fast-track their careers through the skills and knowledge gained on the course.

Similarly, some graduates choose to use the qualification to move to another employer and there have been many examples of individuals advancing their career by moving into higher-ranked positions in global organizations.

There continues to be a high level of demand for well-qualified Masters graduates in Supply Chain Management and this course is recognised by industry as being at the forefront of meeting that demand.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: 3/8/20

1. What is the course?

Course information

Course Title	Explosives Ordnance and Engineering
Course code	MSEOEFTR, MSEOEPTR, PDEOEFTR, PDEOEPTR, PCEOEFTR, PCEOEPTR
Academic Year	2020-21
Valid entry routes	MSc, PgDip, PgCert,
Additional exit routes	As above
Mode of delivery	Full-time and Part-time
Location(s)[1] of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Centre for Defence Chemistry
Course Director	Dr T Temple
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	Yes
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A
Teaching Institution	Cranfield University
Admissions body	Cranfield University

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Entry requirements	Degree in science or science related subject or exceptionally with at least 7 years relevant experience. If you are entering the Masters programme through the experiential route, then up to three successful completions of EOE modules can be used as part of the case to provide supporting evidence of academic ability for entry onto the EOE. IELTS score of 7.0 required by students for whom English is not a first language
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc, PgDip, PgCert – 1 year Part-time PgCert – 3 years, PgDip – 4 years and MSc 5 Years.
Course Start Month(s)	September (full-time/part-time)

Institutions delivering the course

This course is delivered by Cranfield Defence and Security where the research interests include:

explosive science and safety, energetic materials and synthesis, ordnance, chemical defence, fuels, environmental science, forensic and forensic computing, molecular modelling, high strain-rate physics, weapons and vehicle systems, aeromechanical systems, defence materials (armour), defence analysis.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

The award of EOE MSc meets the educational requirements for the Engineering Council UK's register of Chartered Engineers (CEng); the course is accredited with the Institution of Mechanical Engineers (IMechE) and the Institution of Engineering and Technology (IET)

The Institution of Engineering and Technology (IET) http://www.theiet.org/
The Institution of Mechanical Engineers (IMechE) http://www.imeche.org/

To qualify for the IET students need to pass the project dissertation at first attempt.

2. What are the aims of the course?

To provide military officers, defence industry staff, government servants and civilian students with the advanced academic background necessary for them to contribute effectively to technically demanding projects in the field of explosives and explosives ordnance and engineering.

The course also aims to enable students to:

- independently learn and to gain the ability to advance their knowledge and understanding in the topic of EOE and to develop academic and practical skills to a higher level
- predict possible accident scenarios associated with a particular activity; to analyse critically the risks and to prioritise the risks with likely outcome balanced against probability of occurrence; to propose mitigating activities to reduce the risk and ensure a safe working environment.

Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) entry and exit routes are provided for students who wish to access only parts of the course provided.

This programme is intended for the following range of students:

- Military UK and International, (Army, RN, RAF)

- Civil services

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. A systematic application and a critical understanding of current research at the forefront of explosives and explosives ordnance engineering, together with the capacity to evaluate its relevance to industrial and commercial practice

ILO 2. Conceptual thinking that enables the student to evaluate critically current research and methodologies, develop critiques of them and adapt them in the context of both advanced scholarship and industrial, commercial, and professional relevance, using many of the analytical procedures within the armoury of the explosive engineer or scientist

ILO 3. An ability to acquire and use information effectively in any appropriate medium, including the increasing range of networked information resources from a wide range of adjacent disciplines in engineering, physical and forensic sciences that impact on explosive ordnance engineering

ILO 4. Originality in the application of knowledge, including data and information collected by the student in relation to essays focusing on explosives and explosives ordnance engineering

ILO 5. To be able to compile, reduce and sort a large body of information, from a variety of sources, to critically examine and analyse this information and communicate, with clarity, pertinent information derived from these sources, which manifests as new material (in that it is greater than the sum of the parts of the material assimilated)

ILO 6. Self-direction and originality in tackling and solving problems, working effectively at a professional level making informed judgements in the absence of complete data and communicating conclusions clearly, both orally and in writing, to specialist and non-specialist audiences

B. Postgraduate Diploma

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 7. Peer review, grading and prioritisation of presented work against a clear assessment framework; an indispensable ability because funding for any endeavour is likely finite.

C. MSc

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 8. Originality in the application of knowledge, including data and information collected by the student in relation to an extended individual project focusing on explosives and explosives ordnance engineering

ILO 9. A critical ability and originality of thought through the planning and execution of a detailed research project and present the outcomes and conclusions in an oral format to a variety of audiences

ILO 10. An ability to critically review established explosive ordnance engineering practice in a particular field, write a clear explanation of experimental/analytical procedures and the presentation of results by appropriate means, and present a self-critical discussion of experimental/analytical results with conclusions that place the research in the context of the professional practice in explosive ordnance engineering

ILO 11. Experience in writing Safe Operating Procedures and COSHH and methods of securing health and safety data from a variety of sources

4. How is the course taught?

Students will be supported in their learning and personal development by:

- Technology School TS a facility, which presents defence technology-related educational material in an integrated approach, under one roof, using modern delivery methods in order to enhance defence technology education capabilities. The Defence Academy is the only educational establishment in the UK with the means to do this and is thus ideally placed to develop and champion higher level thinking. The TS has at its heart an integrated education system which enables students to access the full range of educational, experimentation and research material across all domains. To help achieve this it is equipped with a wealth of real (operational) military hardware including, for example, tanks, guns, armoured vehicles, rockets, ammunition and protective personal equipment. Teaching in this environment enables the students unprecedented hands-on learning, which cannot be achieved in a 'lecture-room-and-slides' environment.

- Poster generation and presentation: Here students are given a necessarily vague title for a topic and asked to produce an A0 size poster within three hours. The students work in groups of five and are given minimal instruction. Students must work in an unfamiliar area, where the only direction is from their initiative, teamwork and communication skills and computational search abilities. Students are then asked to criticise each other's posters with three positive points and three negative points. This is to help students acclimatise to the 'research environment', where there is no 'correct answer' and direction must be self-driven. This helps students capture and illustrate 'M-level descriptors' associated with a Master's programme as distinct from a first degree.
- Thought experiments: A particular scenario is given and the students describe how they might perform an experiment to understand a particular phenomenon. The 'results' of the experimentation chosen are predicted by the lecturer based upon knowledge. Analysis and understanding models then predicted by the student and moulded/ adjusted to conform to current accepted models of understanding. Such methods are valuable in areas such as explosives where direct experimentation is difficult, not possible or too dangerous.
- Computational experiments: Students have the opportunity to perform computer simulations (rather than experimentation) of various areas. For example, they will be asked to use a computer code to simulate blast from an explosive in a busy street and predict possible outcomes. Specifically they are requested to use the simulation codes to explore the possibilities and capabilities. This is necessarily slow, and sometimes frustrating, but it provides the students with insight into the simulation arena and its inherent limitations; 'the computer answer is not always correct'. This is supplemented with case studies to show the full scope and capability of the codes if they were to be used by experienced 'expert' users.
- Peer review and prioritisation: Funding for any endeavour is finite and therefore our students will, in their future roles, need to arbitrate upon projects/endeavours that are to be funded and those that are not to be funded. To further develop this important skill, students are asked in groups to carry out

'horizon scanning' – exploring future developments in the EOE arena. They will then present orally their findings to the whole course. Individually, students will then 'peer review' and grade each of the proposed new areas against a clear assessment framework. Finally, they will prioritise each of the proposed areas against their chosen criterion, with the top 30% being (hypothetically) funded. This will furnish students with the knowledge and associated challenges of prioritisation. It will also help them empathise with how, for example, courses are run and structured.

- Immersion in a working testing laboratory: Many laboratory based teaching environments are simulants of in-practice 'industrial' working, which can prove limited in the dissemination of 'real-world' practices. Here, we immerse students into a working testing laboratory. Rather than use downscaling of particular tests in a central laboratory, students will be introduced and educated in a working testing environment. Here they will be better able to appreciate constraints of, for example, size, time, equipment, safety procedures, management, planning, preparation and reporting.
- Research project: Most projects are practically driven and require extensive use of (explosive) range and specialist laboratory facilities. Here students will liaise with technicians and other supporting staff (including supervisors). Planning, logistical and time management skills are crucial to offset range availability, cost and difficulty associated with sourcing explosive materials. Also the need to convince, enthuse and inspire supporting staff of the approach is a valuable skill that will help drive the project. Here safety protocols must be carefully written, argued and communicated to convince liaising staff that it is safe to participate and ultimately allow the proposed programme of work. All these challenges reflect conditions in a professional environment.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Research Tools Parts 1&2	10
Introduction to Explosives Engineering	10
Munitions & Target Response	20
TOTAL COMPULSORY CREDITS	**40**
ELECTIVE MODULES:	
Gun Propellants	10
Testing and Evaluation of Explosives	10
Rocket Motors and Propellants	10
Pyrotechnics	10
Explosives and the Environment	10
Commercial Explosives	10
Manufacture & Material Properties of Explosives	10
Delivery Systems	10
Addressing EOE Capability Gaps: Group Project	20
Counter Improvised Explosive Devices Capability	10
Design for Vulnerability	10
Safety Assurance in EOE	10
Introductory Studies	

	0
NUMBER OF ELECTIVE CREDITS NEEDED FOR PG CERT	**20**
TOTAL AMOUNT OF CREDITS FOR THE PG CERT:	**60**

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	**Credits**
COMPULSORY MODULES:	
Research Tools Parts 1&2	10
Introduction to Explosives Engineering	10
Munitions & Target Response	20
Future Development: Scanning the Horizon in EOE	20
TOTAL COMPULSORY CREDITS	**60**
ELECTIVE MODULES:	
Gun Propellants	10
Testing and Evaluation of Explosives	10
Rocket Motors and Propellants	10
Pyrotechnics	10
Explosives and the Environment	10
Commercial Explosives	10
Manufacture & Material Properties of Explosives	10
Delivery Systems	10
Addressing EOE Capability Gaps: Group Project	20
Counter Improvised Explosive Devices Capability	10
Design for Vulnerability	10
Safety Assurance in EOE	10
Introductory Studies	0
NUMBER OF ELECTIVE CREDITS NEEDED FOR PG DIP	**60**
TOTAL AMOUNT OF CREDITS FOR THE PG DIP:	**120**

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	**Credits**
COMPULSORY MODULES:	
Research Tools Part 1&2	10
Introduction to Explosives Engineering	10
Munitions & Target Response	20
Future Development: Scanning the Horizon in EOE	20
Project (Thesis)	80
TOTAL COMPULSORY CREDITS	**140**
ELECTIVE MODULES:	
Gun Propellants	10
Testing and Evaluation of Explosives	10
Rocket Motors and Propellants	10
Pyrotechnics	10
Explosives and the Environment	10
Commercial Explosives	10

Manufacture & Material Properties of Explosives Delivery Systems Addressing EOE Capability Gaps: Group Project Counter Improvised Explosive Devices Capability Design for Vulnerability Safety Assurance in EOE Introductory Studies	10 10 20 10 10 10 0
NUMBER OF ELECTIVE CREDITS NEEDED FOR MSC	**60**
TOTAL AMOUNT OF CREDITS FOR THE MSC	**200**

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria
The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in September and are expected to complete the course within 12 calendar months.

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

Part-time students register for the course in September and are expected to complete the course within five years.

The taught phase for each 10-credit module is usually completed within one week there is structured teaching to allow time for more independent learning and reflection for Full-time students. The main exception is the Future Developments module which runs from October to March/April (part-time students must have completed at least half of the taught phase before they enrol for this module). Industrial visits are scheduled throughout the course to support student learning.

7. Course Level Assessment Strategy[4]

Students are assessed by formative and summative approaches. Formative assessment can be group and individual workshops, class debates, virtual platform learning. Summative assessments include, formal examinations, oral presentations, coursework, poster presentations and peer review activities.

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Course modules

The following modules outline all parts of the programme leading to MSc. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	R-EOS-IS	Introductory Studies	C. Williams & J. Pons	62	0	0	N	07/09/20	07/09/20	18/09/20	N/A	AO	N/A				N/A	
2	R-EOS-RT	Research Tools Part 1&2	T. Temple & R. Hazael	35	0	10	N	21/09/20 05/10/20	21/09/20 05/10/20	23/09/20 07/10/20	50	OR	100				11/11/20	21/01/21

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%. This will be at the Board of Examiners discretion.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	R-EOS-IE	Introduction to Explosives Engineering	T. Temple & P. Gill	35	0	10	N	21/09/20	28/09/20	02/10/20	50	EX	100				30/10/20	12/01/21
								19/04/21	26/04/21	30/04/21	50	EX	100				14/05/21	06/07/21
4	R-EOS-FDSHE	Future Developments: scanning the Horizon in EOE	T. Temple P. Gill	35	0	20	N	19/10/20	19/10/20	19/10/20	50	GPRES GCW OR	20 20 60				18-19/01/21 17/02/21 SUB 08/04/21 12-13/04/21	22/03/21 22/06/21
5	R-EOS-MTR	Munitions & Target Response	A. Helliker	72	0	20	N	26/10/20	16/11/20	27/11/20	50	EX ICW	50 50				14/01/21 18/12/20	11/03/21 26/02/21
6	R-EOS-MMPE	Manufacture and Materials Properties of Explosives	L. Dossi & S Gaulter	32	4	10	N	02/11/20	02/11/20	06/11/20	50	OR	100				SUB 08/01/21 12-14/01/21	11/02/21
7	R-EOS-ACG	Addressing EOE Capability Gaps	M. Ladyman & R. Hazael	100	0	20	N	24/09/20	24/09/20	24/09/20	50	GPRES GCW	60 40				16/04/21 05/05/20	14/06/21 29/06/21
8	R-EOS-AS2	Delivery Systems	D. Bray & P. Gill	30	0	10	N	07/12/20	07/12/20	11/12/20	50	EX	100				11/01/21	18/03/21

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
9	R-EOS-GPIBWT	Gun Propellants	M. Moniruzzaman & P. Gill	34		10	N	29/12/20	04/01/21	08/01/21	50	EX	100				19/02/21	23/04/21
10	R-EOS-SAE	Safety Assurance in EOE	N. Mai & L. Humphries	46	3	10	N	15/03/21	15/03/21	19/03/21	50	ICW	100				26/04/21	29/06/21
11	R-FP-CEDC	Counter Improvised Explosive Devices Capability	S. Johnson	28	0	10	Y	22/03/21	22/03/21	26/03/21	50	IPRES	100				28/04/21	TBC
12	R-EOS-TEE	Testing and Evaluation of Explosives	N. Mai & C. Stennett	37	3	10	N	01/02/21	01/02/21	05/02/21	50	ICW	100				11/03/21	12/05/21
13	R-EOS-RMP	Rocket Motors and Propellants	P. Gill & D. Bray	28	6	10	Y	11/01/21	08/02/21	12/02/21	50	EX	100				14/04/21	15/06/21
14	R-EOS-PT	Pyrotechnics	R. Vrcelj & L. Humphries	30		10	N	0803/21	08/03/21	12/03/21	50	ICW	100				20/04/21	23/06/21
15	R-EOS-EE	Explosives & the Environment	T. Temple & M. Ladyman	35	10	10	N	14/12/20	14/12/20	18/12/20	50	ICW	100				02/02/21	31/03/21
16	R-EOS-CE	Commercial Explosives	M. Moniruzzam & R. Vrcelj	35		10	N	01/03/21	01/03/21	05/03/21	50	EX	100				15/04/21	16/06/21

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
17	R-EOS-DV	Design for Vulnerability	S. Gaulter & R. Vrcelj	30		10	N	25/01/21	25/01/21	29/01/21	50	ICW	100				26/02/21	28/04/21
18	R-EOE-THESIS	Thesis	T. Temple & Pons	40		80	N	N/A	08/07/21 10/05/21	08/07/21 30/07/21	50 50	ORAL THESIS	25 75				08/07/21 30/07/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	**Module title**	**Course that owns the module**	**Other course(s)/ programme(s) that use the module**
R-EOS-RMP	Rocket Motors and Propellants	Explosive Ordnance Engineering	Weapon & Vehicle Systems
R-FP-CEDC	Counter Improvised Explosive Devices	Forensic Programme	Explosive Ordnance Engineering

8. How are the ILOs assessed?

The following assessment types are utilised:

Oral Presentation (OR), Group Presentation (GPRES), examination (EX), Group Project (GPPR), Coursework (CW)

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

A. Postgraduate Certificate, Diploma and MSc

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11
2	OR	OR	OR	OR	OR	OR					
3					EX						
4	OR/GPRES		OR/GPPRES		OR	OR	GCW				
5	EX/ICW	EX/ICW		ICW	ICW	ICW					
6	OR	OR			OR	OR					
7	GPRES/GCW	GPRES/GCW	GPRES/GCW	GRPRES	GPRES/GCW	GPRES/GCW					
8	EX	EX			EX	EX					
9	EX	EX	EX	EX	EX						
10			ICW	ICW		ICW					
11		IPRES	IPRES	IPRES	IPRES						
12	ICW	ICW	ICW		ICW	ICW					

13	EX	EX	EX		EX						
14			ICW			ICW					
15	ICW			ICW	ICW	ICW					
16	EX			EX		EX					
17	ICW	ICW		ICW	ICW						
18								THESIS /ORAL	THESIS /ORAL	THESIS /ORAL	THESIS /ORAL
19								THESIS /ORAL	THESIS /ORAL	THESIS /ORAL	THESIS

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)
N/A			

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey.

The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

This course provides the advanced academic background necessary to contribute effectively to technically demanding projects in the field of explosives and explosives ordnance engineering. Accordingly, opportunities exist for the armed services, defence industry, government servants and civilians in areas spanning: explosive synthesis; manufacture and quality assurance; security; risk, hazard and safety; explosive related forensics; terrorism; demolition; environmental; nuclear materials; fireworks and display; rocket/gun propellants and weapon design, together with explosives related academic disciplines.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: August 2020

1. What is the course?

Course information

Course Title	MSc in Finance and Management
Course code	MSFNMFTC, PDFNMFTC, PCFNMFTC, MSFMOFTC, MSFMOPTC
Academic Year	2020/21
Valid entry routes	MSc
Additional exit routes	PgDip and PgCert
Mode of delivery	Full-time, Part-time (Muscat only)
Location(s)[1] of Study	Cranfield Campus and Muscat University, Oman
School(s)	School of Management
Theme	Leadership and Management
Centre	Finance and Economics
Course Director	Dr Nemanja Radić Dr Matthias Nnadi (Deputy); Dr Yacine Belghitar (Muscat)
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A
Teaching Institution	Cranfield University

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Admissions body	Cranfield University
Entry requirements	Equivalent of a UK 2.2 degree or with at least 5 years of relevant experience
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc – one year, Part-time MSc – up to three years (Muscat only)
Course Start Month(s)	September

Institutions delivering the course

This course is primarily be delivered by Finance and Accounting group in School of Management. The course has 100 credits on the core modules and 20 credits via electives.

Cranfield University interacts with the following institutions and in the following ways:

Teaching/instruction from external academic, industry and other guest speakers
Individual thesis.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is not formally accredited by any external bodies.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- To prepare students for a career in financial services
- To provide students with a high level of financial skills
- To give students a rounded view of business and its management

This programme is intended for the following range of students:

- Students with good numerate skills
- Young students seeking to develop their understanding of Finance
- Students seeking to work in finance-related services

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. An ability to demonstrate a basic knowledge and understanding of key corporate finance and management issues.
ILO 2. An ability to understand and use accounting and financial information effectively.
ILO 3. An independent learning ability and developing key finance and management skills required for decision making.
ILO 4. Understanding and solving financial problems.

ILO 5. Working effectively both individually and in teams.
ILO 6. Making informed judgements using data analysis.
ILO 7. Development of core finance and management skills necessary for employment in finance sector.

B. Postgraduate Diploma

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 8. A systematic application and a critical awareness of current research and key issues in finance together with the capacity to evaluate its relevance to practice.
ILO 9. A conceptual understanding that enables the student to evaluate contemporary issues and methods for financial analysis and, where appropriate, adapt them in the context of both advanced scholarship and their selected elective subjects.
ILO 10. An ability to acquire and use information effectively in any appropriate medium, including the increasing range of analytical tools for financial decision making.
ILO 11. An independent learning ability and interest in advancing their knowledge and understanding and developing new financial and management skills to a high level.
ILO 12. Self-direction and originality in understanding and solving problems.
ILO 13. Originality in the application of firm valuation and application of basic financial modeling for practical decision making.
ILO 14. Working effectively both individually and in teams.
ILO 15. Development of advanced finance and management skills necessary for employment in finance sector.

C. MSc

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 16. Demonstrate a systematic understanding of key areas in finance and the foundations of management.
ILO 17. Undertake qualitative and quantitative research studies of a specialist nature drawing on appropriate empirical tests and the relevant financial research literature.
ILO 18. Analyse and apply financial information effectively in key decision-making areas in capital markets, financial institutions and at the corporate level.
ILO 19. Work effectively, both individually and in teams, to solve financial and managerial problems in domestic and international finance, and communicate conclusions clearly, to specialist and non-specialist audiences.
ILO 20. Produce a high-quality thesis and critically evaluate the interpretations of the data.

4. How is the course taught?

Overall the aim is to provide a varied, stimulating and experiential learning environment. All taught modules consist of formal lectures, in-class discussions, group and self-study. Group project work, reflective practice and class exercises are used to develop problem solving skills. The course will be supported by an electronic learning environment (VLE - Blackboard) which will be the central repository for all information relating to the course and available to the students at all times. Additional practical expertise will be provided by visiting fellows and guest speakers. Each core module comprises 20 hours of class contact time with a further 80 hours of study time to consolidate learning and carry out assignments, giving 100 notional learning hours per module. Each elective module has 50 notional hours consisting of 15 class contact hours and a further 35 private study hours. The thesis component of the module is a total of 80 credits.

Students will be supported in their learning and personal development by:

- Lectures
- Group work and presentations
- Modelling and programming

- Research-based thesis

Programming and modelling enable students to access important databases on companies and capital markets and use the necessary software programmes for carrying out modelling. Simulated games give students a realistic view of how negotiations are carried in corporate transactions and how decisions affect firm value.

In addition to the teaching methods outlined above, students are supported in their learning and personal development by:

- Personal development lectures delivered by the head of the careers development service
- Help with preparation of CVs
- Help through mock interviews

Students will be supported in their learning and personal development by:

- Two-week orientation program in accounting, finance and statistics aimed at students with quantitative background but have little or no prior background in accounting and finance and statistics
- Library induction, referencing and plagiarism sessions
- PDP specifically supported through SOM careers development sessions
- Organisation Behaviour and Personal Development module
- A Virtual Learning Environment
- Learning teams supported by an academic tutor
- Provision of language classes. Mandatory for those with only one language and optional for those with more

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

Finance and Management (Cranfield) (Full-time only)

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Six modules from 1 to 9, with at least 20 credits from modules 1, 3, or 8.	60
ELECTIVE MODULES:	
N/A	N/A
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 1-10	100
ELECTIVE MODULES:	
4 modules must be taken from 8 optional modules 11-22	20
TOTAL:	120

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Modules 1-10 Thesis - 22	100 80
ELECTIVE MODULES:	
4 modules from 11-22	20
TOTAL:	200

Finance and Management (Muscat) (Full-time and Part-time)

D. MSc

An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Modules 1-10 Thesis - 22	100 80
ELECTIVE MODULES:	
4 modules from 11, 13-15, 17	20
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of

your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]

- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in September and are expected to complete the course within 12 calendar months.

The part-time course is structured over two years as follows:

Year 1	Year 2
Induction	Organisational Management
Accounting	Economics for Financial Markets
Corporate Finance	International Corporate Finance
Statistics in Finance	Research Methods in Finance
Financial Markets, Regulations & Ethics	Strategic Management
Valuations & Financial Modelling	Merger & Acquisitions
Corporate Restructuring	Entrepreneurial Finance
Private Equity	Thesis

7. Course Level Assessment Strategy[4]

The aim is to provide a varied, stimulating and experiential learning environment. All taught modules consist of formal lecturers, in-class case discussions, group and self-study. Group project work, reflective practice and class exercises are used to develop problem solving skills.

The course further aims to offer personal and specialist skills development for candidates with extensive industrial experience.

The assessment strategy of this course is challenging and diverse and enable students to demonstrate a full range of skills and attributes.

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[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

Summative assessment will include a range of assessment types including the preparation of individual and group reports and written exams.

This approach has been adopted in order to ensure that students demonstrate their understanding through a wide range of learning techniques, but are not disadvantaged through any one approach.

Written coursework will be of varying lengths, recognising that writing coursework to a short length can be more challenging for some and can develop different skills relevant to professional practice. The length of each assessment task is usually stated within the module descriptor. Students then have opportunities to develop their communication and group working skills, as they are required to give group presentations. Feedback for all assessments is given in a timely fashion, dependent on the type of assessment, but always within 20 working days.

Many modules (and especially electives in term 3) are supported by a number of formative tasks including group discussion, case studies, oral presentations. Formative feedback will be provided through in-class discussion on the conceptual material introduced during each session.

The taught components precede the research project, so assessment can be used to develop skills required for the individual research project. Students are generally expected to be more self-directed in their learning during this research project and guidance will be provided through the [*Research Methods in Finance* module] and meetings with their thesis supervisor.

Course modules

The following modules outline all parts of the programme leading to **MSc**. Other awards associated with the course include some or all of these modules.

Finance and Management (Cranfield)

Module occ A

Module Number		Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1		M-F/COF	Corporate Finance	Dr Yacine Belghitar	20		10	Y	13/10/20	13/10/20	10/12/20	40	EX	100				w/c 04/01/21	TBC
2		M-F/SAF	Statistical Analysis in Finance	Dr Nemanja Radic	20		10	Y	20/10/20	20/10/20	14/12/20	40	EX	100				w/c 04/01/21	TBC

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3		M-F/ACC	Accounting	Dr Matthias Nnadi	20		10	Y	16/10/20	16/10/20	15/12/20	40	EX	100				w/c 04/01/21	TBC
4		M-F/ECO	Economics for Financial Markets	Dr Constantinos Alexiou	20		10	Y	14/10/20	14/10/20	17/12/20	40	EX	100				w/c 04/01/21	TBC
5		M-F/ORG	Organisational Management	Dr Valentina Battista	20		10	Y	12/10/20	12/10/20	18/12/2020	40	ICW	100				18/01/21	TBC
6		M-F-STR	Strategic Management	Paul Raspin	20		10	N	13/01/21	13/01/21	10/03/21	40	EX	100				w/c 06/04/21	TBC
7		M-F/ICF	International Corporate Finance	Prof Sunil Poshakwale	20		10	N	14/01/21	14/01/21	19/03/21	40 40	GPRAC EX	25 75				19/03/21 W/C 06/04/21	TBC
8		M-F/VFM	Valuation and Financial Modelling	Dr Vineet Agarwal	20		10	Y	11/01/21	11/01/21	18/03/21	40	EX	100				w/c 06/04/21	TBC
9		M-F/FMRE	Financial Markets, Regulation and Ethics	Dr Walter Gontarek	20	20	10	Y	15/01/21	15/01/21	26/02/21	40	IPRAC	100				26/02/21	TBC
10		M-F/RMF	Research Methods in Finance	Dr Vineet Agarwal	20		10	Y	12/01/21	12/01/21	15/03/21	40	ICW	100				01/07/21	TBC
11		M-F/FEC	Applied Financial Econometrics	Dr Yacine Belghitar	15		5	Y	13/04/21	13/04/21	19/05/21	40	ICW	100				28/06/21	TBC

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
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				Dr Peter Yallup															
12		M-F/BDM	Bigdata Management and Cybersecurity	Dr Andrea Moro	15		5	Y		**Not running for 2020/2021**									
13		M-F/BCS	Blockchain, Cryptocurrencies, and Smart Contracts	Dr Andrea Moro	15		5	Y	19/04/21	19/04/21	14/05/21	40	GCW	100				04/06/21	TBC
14		M-I/FNM	Fund Management	Jane Vessey	15		5	Y	15/04/21	15/04/21	17/05/21	40	EX	100				WC 07/06/21	TBC
15		M-F/MAD	Mergers and Acquisitions	Dr Andrea Moro	15		5	Y	13/04/21	13/04/21	18/05/21	40	GPRES	100				30/06/21	TBC
16		M-I/FIS	Fixed Interest Securities	Dr Vineet Agarwal	15		5	Y	19/04/21	19/04/21	24/05/21	40	EX	100				WC 07/06/21	TBC
17		M-F/PEQ	Private Equity	Nemanja Radic	15		5	Y	20/04/21	20/04/21	13/05/21	40	ICW	100				01/07/21	TBC
18		M-I/TATS	Technical Analysis and Trading Systems	Dr Peter Yallup	15		5	Y	14/04/21	14/04/21	18/05/21	40	ICW	100				30/06/21	TBC

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
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									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
19		M-I/IEM	International Investment and Emerging Markets	Prof Sunil Poshakwale	15		5	Y	13/04/21	13/04/21	06/05/21	40	ICW	100				14/06/21	TBC
20		M-F/CRS	Corporate Restructuring	Dr Yacine Belghitar	15		5	Y	26/04/21	26/04/21	17/05/21	40	ICW	100				11/06/21	TBC
21		M-F/IFF	Infrastructure Finance	Ian Alexander	15		5	Y		**Not running for 2020/2021**									
22		M-F/ENF	Entrepreneurial Finance	Dr Andrea Moro	15		5	Y	13/04/21	13/04/21	20/05/21	40	GCW	100				24/06/21	TBC
23		M-F/SMA	Strategic Management Accounting and Control	Prof Michael Bourne	15		5	Y	04/05/21	04/05/21	13/05/21	40	ICW	100				17/06/21	TBC
24		M-F/THS	Thesis	Dr Nemanja Radić	50		80	Y	29/04/21	29/04/21	03/09/21		THESIS	100				17/09/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Finance and Management (Muscat)

Module Number		Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent	Weighting within module of multi-part assessments[16] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
1		M-F/COF Occ B	Corporate Finance	Dr Yacine Belghitar	20		10	Y	08/11/20	08/11/20	12/11/20	40	EX	100				w/c 04/01/21	TBC
2		M-F/SAF Occ B	Statistical Analysis in Finance	Nemanja Radic	20		10	Y	06/12/20	06/12/20	10/12/20	40	EX	100				w/c 04/01/21	TBC
3		M-F/ACC Occ B	Accounting	Dr Matthias Nnadi	20		10	Y	18/10/20	18/10/20	22/10/20	40	EX	100				w/c 04/01/21	TBC
4		M-F/ECO Occ B	Economics for Financial Markets	Dr Constantinos Alexiou	20		10	Y	29/11/20	29/11/20	03/12/20	40	EX	100				w/c 04/01/21	TBC

[12] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[13] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[14] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[15] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[16] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[17] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[18] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent	Weighting within module of multi-part assessments [16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
5		M-F/ORG Occ B	Organisational Management	Dr Valentina Battista	20		10	Y	25/10/20	25/10/20	29/10/20	40	ICW	100				18/01/2021	TBC
6		M-F-STR Occ B	Strategic Management	Dr Ahmed Ghoneim	20		10	N	21/03/21	21/03/21	25/03/21	40	EX	100				WC 06/04/21	TBC
7		M-F/ICFM Occ B	International Corporate Finance (Muscat)	Prof Sunil Poshakwale	20		10	N	24/01/21	24/01/21	28/01/21	40 40	GPRAC EX	25 75				18/02/21 WC 06/04/21	TBC
8		M-F/VFM Occ B	Valuation and Financial Modelling	Dr Vineet Agarwal	20		10	Y	07/02/21	07/02/21	11/02/21	40	 EX	00 100				WC 06/04/21	TBC
9		M-F/FMRE Occ B	Financial Markets, Regulation and Ethics	Dr Zeina Al-Ahmad	20		10	Y	10/01/21	10/01/21	14/01/21	40	IPRAC	100				14/01/21	TBC
10		M-F/RMF Occ B	Research Methods in Finance	Dr Vineet Agarwal	20		10	Y	07/03/21	07/03/21	11/03/21	40	ICW	100				01/07/21	TBC
11		M-F/CRS Occ B	Corporate Restructuring	Dr Yacine Belghitar	15		5	Y	16/05/21	16/05/21	19/05/21	40	ICW	100				10/06/21	TBC
12		M-F/IFF	Infrastructure Finance	Ian Alexander	15		5	Y		**Not running for Muscat**									

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent	Weighting within module of multi-part assessments[16] (%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
13		M-F/ENF Occ B	Entrepreneurial Finance	Dr Andrea Moro	15		5	Y	18/04/21	18/04/21	21/04/21	40	GCW	100				18/06/21	TBC
14		M-F/SMA	Strategic Management Accounting and Control	Prof Michael Bourne	15		5	Y		**Not running for Muscat**									TBC
15		M-F/MAD Occ B	Mergers and Acquisitions	Dr Andrea Moro	15		5	Y	23/05/21	23/05/21	27/05/21	40	ICW	100				27/05/21	TBC
16		M-F/FEC	Applied Financial Econometrics	Dr Yacine Belghitar Dr Peter Yallup	15		5	Y		**Not running for Muscat**									
17		M-F/PEQ Occ B	Private Equity	Dr Benoit Chevalier-Roignant	15		5	Y	02/05/21	02/05/21	05/05/21	40	ICW	100				15/05/21	TBC
18		M-I/FNM	Fund Management	Jane Vessey	15		5	Y		**Not running for Muscat**									
19		M-I/FIS	Fixed Interest Securities	Dr Vineet Agarwal	15		5	Y		**Not running for Muscat**									
20		M-I/TATS	Technical Analysis and Trading Systems	Dr Peter Yallup	15		5	Y		**Not running for Muscat**									

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number		Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Assessment							
													Independent Assessment		Multi-part Assessment			Submission dates	
									Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent	Weighting within module of multi-part assessments [16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
21		M-I/IEM	International Investment and Emerging Markets	Prof Sunil Poshakwale	15		5	Y		**Not running for Muscat**									
22		M-F/THS Occ B	Thesis	Dr Nemanja Radic	50		80	Y	29/04/21	29/04/21	03/09/21	50	THESIS	100				17/09/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	**Module title**	**Course that owns the module**	**Other course(s)/ programme(s) that use the module**
M-F/COF	Corporate Finance	Finance and Management	Investment Management
M-F/SAF	Statistical Analysis in Finance	Finance and Management	Investment Management
M-F/ACC	Accounting	Finance and Management	Investment Management
M-F/ECO	Economics for Financial Markets	Finance and Management	Investment Management
M-F/ORG	Organisational Management	Finance and Management	Investment Management
M-F/VFM	Valuation and Financial Modelling	Finance and Management	Investment Management
M-F/FMRE	Financial Markets, Regulation and Ethics	Finance and Management	Investment Management Retail and Digital Banking
M-F/RMF	Research Methods in Finance	Finance and Management	Investment Management
M-F/MAD	Mergers and Acquisitions	Finance and Management	Investment Management
M-F/BCS	Blockchain, Cryptocurrencies, and Smart Contracts	Finance and Management	Investment Management
M-F/FEC	Applied Financial Econometrics	Finance and Management	Investment Management
M/F/BDM	Bigdata Management and Cybersecurity	Finance and Management	Finance and Management
M-F/PEQ	Private Equity	Finance and Management	Investment Management
M-F/CRS	Corporate Restructuring	Finance and Management	Investment Management
M-F/IFF	Infrastructure Finance	Finance and Management	Investment Management
M-F/ENF	Entrepreneurial Finance	Finance and Management	Investment Management
M-F/SMA	Strategic Management Accounting and Control	Finance and Management	Investment Management
M-I/FNM	Fund Management	Investment Management	Finance and Management
M-I/FIS	Fixed Income Securities	Investment Management	Finance and Management
M-I/TATS	Technical Analysis and Trading Systems	Investment Management	Finance and Management
M-I/IEM	International Investment and Emerging Markets	Investment Management	Finance and Management
M-F/THS	Thesis	Finance and Management	Investment Management

8. How are the ILOs assessed?

The course uses a range of assessment types. Students can expect to have written examinations, pieces of assessment by submitted course work and elements of assessment by presentation. This approach has been adopted in order to give the opportunity for students to learn in groups and develop their soft skills such as negotiation strategy and effective presentation.

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

(Module numbers should correspond with those used in the Course module table above.)

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11	ILO 12	ILO 13	ILO 14	ILO 15	ILO 16	ILO 17	ILO 18	ILO 19	ILO 20
1	✓		✓	✓		✓	✓													
2	✓		✓		✓	✓	✓													
3	✓	✓	✓	✓		✓	✓													
4	✓		✓				✓													
5	✓		✓				✓													
6	✓		✓						✓				✓		✓					
7	✓				✓				✓	✓	✓			✓	✓					
8					✓		✓	✓	✓	✓	✓		✓	✓	✓					
9	✓	✓	✓	✓		✓	✓		✓		✓				✓					
10								✓	✓	✓		✓		✓	✓					
11								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
12									✓	✓	✓	✓				✓		✓	✓	
13						✓		✓	✓	✓	✓									
14				✓	✓		✓	✓												
15								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
16									✓	✓	✓	✓			✓	✓		✓	✓	
17								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
18									✓	✓	✓	✓	✓			✓	✓	✓	✓	
19								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
20								✓	✓		✓		✓	✓	✓	✓		✓		
21									✓		✓			✓	✓			✓		
22										✓	✓	✓	✓	✓	✓			✓		
23								✓	✓		✓	✓		✓	✓	✓		✓		
24																	✓			✓

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)
N/A	N/A	N/A	N/A
		N/A	N/A

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and

procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. <u>What opportunities are graduates likely to have on completing the course?</u>

Almost all of our graduates for whom we have career data work in financial institutions or consultancies specialising in financial services.

A large number of our students have joined prestigious financial service organisations including investment banks, private equity firms, stock brokers, financial consultancies and commercial banks.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: 06/07/21

1. What is the course?

Course information

Course Title	Food Systems and Management
Course code	MSFSMFTC, MSFSMPTC, PDFSMFTC, PDFSMPTC, PCFSMFTC, PCFSMPTC
Academic Year	2020/21
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Cranfield Soil and Agrifood Institute
Course Director	Dr Carmen Alamar Gavidia
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Teaching Institution	Cranfield University.
Admissions body	Cranfield University
Entry requirements	1st or 2nd class UK honours degree or equivalent; in a science or engineering subject Candidates with other qualifications will be considered according to experience Where applicable minimum IELTS score of 6.5 or TOEFL 580
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc - one year, Part-time MSc - up to three years, Full-time PgCert - one year, Part-time PgCert - two years, Full-time PgDip - one year, Part-time PgDip - two years
Course Start Month(s)	Full Time: October Part-time: throughout the year (October preferred, other times on case by case basis)

Institutions delivering the course

This course is delivered by the Cranfield Soil and Agrifood Institute where the research interests include:

Agriculture, precision agriculture, soil biology, plant genomics, seed biology, food microbiology (bacteriology and mycology) and postharvest technology.
Our research activities span different disciplines including soil sciences, seed biology, plant genetics, food bacteriology and mycology and postharvest technology. This wide range of research activities and our network of national and international collaborations gives us the opportunity to offer a variety of research projects to our MSc students that suit their individual research interests.

This course belongs to the Food Systems and Management Industrial Advisory Panel which formally meets once a year. Current members of the Industrial Advisory Panel include, among others: McDonald's Restaurants Ltd, Coca Cola Enterprises, Unilever, Cobrey Farms and an independent consultant.

Cranfield University also actively seeks sponsorship and support for individual thesis projects from the food and environmental sector employers to provide professional experience and development opportunities for students. Thesis sponsors and supporters include: Coca Cola Enterprises, Selva Organic, McDonald's Restaurants Ltd, GreenWay Foods, Giles Foods, Discovery Foods, Edward Vinson Ltd., and Whitworth's.

Cranfield University has agreements with a number of top quality European higher education institutions through its European Partnership Programme (EPP). Within these agreements students from partner institutions have the opportunity to take a Master of Science (MSc) at Cranfield University as an alternative to the final year of their home university programme.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited by the Institution of Agricultural Engineers (IAgrE) and the Institute of Food Science and Technology (IFST).

2. What are the aims of the course?

Cranfield University offers this course in order to:

- To provide students with both the academic and practical skills used by all professionals who are concerned with the issues surrounding the production and supply of safe and high quality food in the modern world.
- To develop the capacity to undertake successful technical research projects using appropriate methods of critical analysis

This programme is intended for the following range of students:

- Graduates with honours degree and equivalent ideally in a subject related to a component of the course
- Graduates currently in employment keen to extend their qualifications or to pursue a career change
- Individuals with other qualifications but who possess considerable relevant experience

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate in Food Systems and Management

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Evaluate and compare the utilisation of classical and the most recent technologies in order to improve or maintain food quality at different stages of the food chain (pre- and post-harvest, transport, processing).

ILO 2. Compare the importance of different food contaminants and analysis techniques to evaluate the utilisation of existing and new methodologies to reduce food contamination in different food chains thus improving food safety.

ILO 3. Holistically analyse different food chains considering their multiple stages, including the management and business-wide needs, and diversity to identify strengths and weaknesses by synthesising existing knowledge and proposing potential improvements to increase final product quality and safety and increase the potential business success.

B. Postgraduate Diploma in Food Systems and Management

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 4. Integrate knowledge, understanding and skills from the taught modules in a real-life situations to address problems faced by industrial clients; creating new problem diagnoses designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms

C. MSc in Food Systems and Management

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 5. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 6. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

The MSc course is taught in three sections: taught modules (40%), group projects (20%), and an individual research project (40%).

The taught programme, typically delivered between October and February, comprises a structured sequence of modules, each containing a series of lectures and other classroom-based teaching, supplemented by practical work. The taught modules are assessed by assignments. Each module is taught over one week, usually followed by a week largely free of structured teaching to allow time for more independent learning and reflection.

The Group Projects are group-based research programs typically undertaken between February and April. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation. Part time students that might have problems when scheduling the group project are offered the possibility to develop a dissertation, which in most situations will be based around a topic relevant to the student's work. The definition of the dissertation topic will be determined in consultation with the Food Systems and Management Course Director. It is expected that the dissertation will be submitted at the beginning of the second year of part time study (if the course is taken over two years). However, the precise date of submission will be agreed with the Course Director.

The thesis project, typically delivered between May and September, further develops research and project management skills that: provide the ability to think and work in an original way; contribute to knowledge; overcome genuine problems; and communicate through **a thesis and oral exam**. Each student is allocated a supervisor, who will guide and assess the student work.

Guidance sessions are provided as to what is required **from thesis and oral presentation.**

Within induction week, students will be introduced to personal development planning and asked to reflect on their transferable skills and to take ownership of their personal development during the course.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	

Induction Module Quality of Food & Beverages Food Diagnostics Food Safety & Quality Management and Certification Postharvest Technology Agrifood Business Innovation	0 10 10 20 10 10
ELECTIVE MODULES:	
N/A	
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	**Credits**
COMPULSORY MODULES:	
Induction Module Food Diagnostics Food Safety & Quality Management and Certification Leading Corporate Sustainability Quality of Food & Beverages Postharvest Technology Food Chain Resilience Agrifood Business Innovation Group project (Full time or Part Time students)	0 10 20 10 10 10 10 10 40
ELECTIVE MODULES:	
Dissertation in place of Group Project (Part time only)	40
TOTAL:	120

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	**Credits**
COMPULSORY MODULES:	
Induction Module Food Diagnostics Food Safety & Quality Management and Certification Leading Corporate Sustainability Quality of Food & Beverages Postharvest Technology Food Chain Resilience Agrifood Business Innovation Group project (Full time or Part Time students) Individual thesis project	0 10 20 10 10 10 10 10 40 80
ELECTIVE MODULES:	
Dissertation in place of Group Project (Part time only)	40
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria
The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Please see the course structure document for details on the individual elements of the course.
Full-time students register for the course in October and are expected to complete the course within 12 calendar months.

The course is also offered on a part-time basis and such students are expected to complete the course within 2 to 3 years. Part-time students are not restricted to starting in October. Instead they are offered individual guidance on the best sequence of study based on their prior knowledge and availability to attend.

Ideally part time students will join in time to undertake the Induction module with the rest of the cohort, but where this is not possible ad hoc induction sessions can be arranged.

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

7. Course Level Assessment Strategy[4]

The Food Systems and Management level assessment strategy complies with the principles of the UK Quality code for Higher Education. It considers a diverse range of assessments with both summative and formative feedback, so that we can cater for different student learning styles, backgrounds and aptitudes. Examples of course assessments can be found below:

- Individual course work (ICW)/assignment: Individual written assignments are widely used throughout the modules to assess the students learning achievement via summative assessment. However, this ICW also includes formative assessment in the form of specific and general written comments in the body of the submitted assignment.
- *Individual or group oral presentations* provide opportunities for students to be both summatively or formatively assessed, depending on the module's specifications. Constructive verbal feedback is provided immediately and based on the module's assessment criteria; in a wider sense, strong points and areas for improvement are also highlighted (e.g. presentation skills). Timely written feedback will also be provided to enhance students learning.
- *Group activities or laboratory practical*: formative feedback is given during the course of the activity, assessing how they approach the learning process, if they achieve the ILOs they are working towards, guiding them to the correct answer, etc. These activities are a good opportunity for learners to put into practice the more theoretical concepts assimilated during the modules – application of knowledge; they facilitate 'learning by doing'.
- *Directed and specific questions* during lectures/practical sessions help opening a constructive debate whilst assessing learners understanding and engagement on the particular topic. This activities provide opportunities for immediate formative feedback.
- *Quizzes.* On-line quizzes (e.g. Socrates), are used as to formatively assess the level of individual understanding, and whether the ILOs have been achieved. It is suitable for those students that are less confident in speaking aloud; it can be anonymous and also gives some kind of healthy competition. The learners receive immediate feedback from the facilitator/tutor, who can clarify and support areas of improvement in a more 'casual/friendly' environment.

Assessment details for the Group Project, Dissertation and Individual Research Project/Thesis are provided below.

Group Project:
The group project provides the students with the opportunity to gain professional skills expected of the workplace. In addition to technical skill practice, students develop a range of soft skills such as team working, problem solving, communication skills and reflective practice. The students work in small consultancy teams typically on a client sponsored project for a period of 10 weeks. Many teams will be made up of students from different courses giving the students the opportunity of working in an interdisciplinary team. The students are responsible for interpreting the brief, developing a project plan, selecting and implementing a methodology, deriving results, analysing the results and drawing conclusions in alignment with the aims and objectives.

All students participate in a peer review activity providing them with the opportunity to reflect on the practices of their colleagues as well as their own. Peer review feedback is provided individually by an independent member of academic staff. A single group report is produced and the project is presented orally at the concluding Exhibition Day; both elements are summatively assessed by independent markers and a group mark is assigned per element. Individual assessment is derived from supervisor observation and meeting minute actions and an individual reflective report where the students reflect on the development of three soft skill competencies based on objectives that they set for themselves. The team working competency is mandatory as one of the three skills for each student. The students will also

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

receive formative feedback from their supervisors, both verbally and in written, on for example: report and poster drafts, meeting discussions, etc., over the course of the Group Project.

Dissertation:
Part time students are not required to complete the Group Project undertaken by the full time registered students on a SWEE MSc course. An alternative assignment takes the form of a dissertation or design project which in most situations will be based around a topic relevant to the work of the part-time student. It is evident that some aspects of the Group Project experience that the work-based dissertation replaces – for example the client interaction and group dynamics components will not directly replicated by undertaking this assignment. It is expected that these experiences would normally be a part of the normal working life of the part-time student.

It is expected that the dissertation will normally consist of the following elements: Abstract, Background context, Introduction to the theme(s) addressed within the dissertation, setting out the issues that will be covered, Methodology, In depth analysis/discussion of the topics discussed, Concluding remarks, References, Appendices (if relevant). Two supervisors are allocated to the dissertation and supervision follows the model used for the independent research project. The student will submit a 6,000 word report and will give an oral presentation of their work. Both elements of the assessment will be marked by independent assessors (summative assessment). Formative feedback will be provided regularly: e.g. verbally during the regular meetings with the supervisor; and in written on any draft produced prior to the submission, as well as in the submitted version.

Individual Research Project/Thesis
The individual research project requires students to further develop problem definition, hypothesis setting, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions in the context of research questions relevant to the course followed by a student. The student is required to communicate their findings successfully via a thesis, written in the style of a scientific paper, and an oral presentation based around a poster. The projects are designed to integrate knowledge, the taught modules, and apply understanding and skills from the group project, to deliver a high quality written thesis and oral presentation. The individual research project/thesis is typically delivered through collaboration with an industrial sponsor, or it may be an ‘internal’ project reflecting the research interests of the School.

The students will receive formative feedback on both the poster and the thesis during the course of the Individual Thesis Project. This feedback will be provided verbally during the regular meetings with the supervisors; or in written, in the form of specific comments on the different drafts provided prior to submission. Written feedback will also be provided on the submitted version of the thesis. The summative feedback is allocated as 10% for the poster presentation and 90% for the thesis document.

Course modules

The following modules outline all parts of the programme leading to **MSc.** Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-AGF-INWK	Induction module	A Medina Vaya	33		0	Y		05/10/20	09/10/20	N/A	AO	N/A				N/A	
2	I-AGF-PBFQ	Quality of Food & Beverages	A Thompson	30		10	N		12/10/20	16/10/20	40			100	IPRES	100	FT/PT 16/10/20	05/21
3	I-FCS-A1005	Food Diagnostics	Carmen Alamar Gavidia	25		10	N		26/10/20	30/10/20	40	ICW	100				FT 07/11/20 PT 21/11/20	05/21

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
4	M-T/LCS Occ B	Leading Corporate Sustainability	N Shete	20		10	Y		09/11/20	20/11/20	40	ICW	100				FT/ PT 15/01/21	05/21
5	I-FCS-A1007	Postharvest Technology	N Falagan	30		10	N		23/11/20	27/11/20	40	ICW	100				FT 05/12/20 PT 04/01/21	05/21
6	I-FFS-FCR	Food Chain Resilience	A Ghadge	25		10	Y		07/12/20	11/12/20	40	ICW	100				FT 04/01/21 PT 25/01/21	05/21
7	I-FCS-FSQMC	Food Safety and Quality Management and Certification	A Medina-Vaya	81		20	N		11/01/21	22/01/21	40	ICW	100				FT 06/02/21 PT 20/02/21	05/21
8	I-FCS-ABI	Agrifood Business Innovation	S Kourmpetli	40		10	Y		15/02/21	19/02/21	40	ICW	100				FT 27/02/21 PT 13/03/21	05/21
9	I-AGF-GRPP	Group Project	A Medina Vaya	16		40	Y		01/03/21	07/05/21	50 50 50 50	GCW GPRES ICW RP	64 16 10 10				05/05/21 30/04/21 08/05/21 N/A	
10	I-AGF-DISS	Dissertation in place of group project for part time	A Medina Vaya	10		40	Y		01/03/21	24/09/21	50	IPROJ IPRES	80 20				24/09/21 20/09/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
		students																
11	I-AGF-THESIS	Individual Thesis Project	A Medina Vaya	20		80	N		10/05/21	10/09/21	50 50	THESIS OR	90 10				06/09/21 w/c 23/08/21 - 30/08/21	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination ; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-FFS-FCR	Food Chain Resilience	Future Food Sustainability	Food Systems and Management
M-T/LCS	Leading Corporate Sustainability	School of Management	• Management • Management and Corporate Sustainability • MSc in Business and Strategic Leadership • MSc in Management and Leadership • MSc Future Food Sustainability

8. How are the ILOs assessed?

The following assessment types are utilised:

- the taught modules (40%) are assessed by in-module assessment (including coursework, which focuses on application of principles studied and class tests, which support underpinning knowledge).
- group projects (20%) are assessed by means of a written group report, presentations and an individual contribution component. For part time students a dissertation based around a topic relevant to the student work will be evaluated.
- the research project (40%), is assessed by a thesis and an oral examination

This approach has been adopted because:

This is the standard criteria of assignment in SWEE.

Assessment and ILO Mapping

A. Postgraduate Certificate in Food Systems and Management

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.
2	IPRES		
3	ICW	ICW	
4	ICW	ICW	
5	ICW	ICW	ICW
6			ICW
7		ICW	ICW
8		ICW	ICW

B. Postgraduate Diploma in Food Systems and Management

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 4.
09	GPROJ ICW
10	IPROJ IPRES

C. MSc in Food Systems and Management

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 5.	ILO 6.
11	THESIS/ OR	THESIS/ OR

CROSS-MODULAR ASSESSMENT

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality

Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. <u>What opportunities are graduates likely to have on completing the course?</u>

On completion, graduates have a broader network of global contacts, increased opportunities for individual specialism in their chosen career.
Some of the employers over the last three years include:

- Coca Cola Enterprises
- Giles Foods
- G's

COURSE SPECIFICATION

Cranfield University: Course Specifications
Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: January 2020

1. What is the course?

Course information

Course Title	Forensic Programme
Course code	**MSc, PgDip Forensic Archaeology and Anthropology** (MSFAAFTC, PDFAAFTC, MSFAAPTC, PDFAAPTC) **MSc, PgDip Forensic Ballistics** (MSFBLFTC, PDFBLFTC, MSFBLPTC, PDFBLPTC) **MSc, PgDip Forensic Explosives and Explosion Investigation** (MSFEIFTC, PDFEIFTC, MSFEIPTC, PDFEIPTC) **MSc, PgDip, PgCert Forensic Investigation** (MSFOIFTR – PDFOIFTC, MSFOIPTC, PDFOIPTC, PCFOIFTC, PCFOIPTC) **MSc, PgDip, PgCert Forensic Investigation of Heritage Crime** (MSFHCFTC, MSFHCPTC, PDFHCFTC, PDFHCPTC, PCFHCFTC, PCFHCPTC) FIHC: Full-time deferred intake 2020-2021 **Short Course for Credit** SPFPPPTC
Academic Year	2020/2021
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	MSc, PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield and Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Cranfield Forensic Institute
Programme Director **Course Director**	Professor David Lane (Programme Director) Professor Peter Zioupos (Forensic Investigation) Dr Nick Marquez-Grant (Forensic Archaeology and Anthropology) Dr Katherine Hewins (Forensic Ballistics) Mr Stephen Johnson & Mr Mike Harris (Forensic Explosives and Explosion Investigation) Professor Andrew Shortland (Forensic Investigation of Heritage Crime)

[1] If any part of this course is delivered at another site, please note which one(s) here

Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No (CEDC module is part of the AP contract)
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	NA
Is the Degree apprenticeship integrated or non-integrated?	NA
Is the Mastership offered as an open and/or closed course?	NA
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Part-time: MSc 3 years, PgDip and PgCert 2 years or Full-time: MSc 11 months, PgDip and PgCert 1 year
Course Start Month(s)	October

Institutions delivering the course

This course is delivered by Cranfield Forensic Institute within Cranfield Defence and Security, where the research interests include security technology, forensic archaeology and anthropology, ballistics, explosives, forensic biomechanics and osteomics, forensic and security imagining.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

Parts of this course (FI, FAA, FB and FEEI) are accredited formally by the Chartered Society of Forensic Sciences until April 2022. An application for the accreditation of FIHC will be made once its first full time cohort has graduated.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- provide students with an understanding of how the physical sciences and other specific disciplines can be used to help resolve issues in relation to civil and criminal law
- help equip students with the necessary understanding of science and other specific disciplines, courtroom skills and research methods in order to prepare them to practise as professional forensic scientists, expert witnesses and heritage crime investigators.

[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Postgraduate Diploma (PgDip) is available as an entry and exit route to all Named Awards on the Forensic Programme.

Postgraduate Certificate (PgCert) is only available as an entry and exit route on Forensic Investigation and Forensic Investigation of Heritage Crime.

This programme is intended for the following range of students:

- graduates with relevant first degrees
- other graduates working in relevant professional fields of study, including forensic science, heritage crime and law
- practitioners in forensic science and heritage crime.

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Analyse and critically review current practice in forensic science
ILO 2. Categorize and compare a wide range of different types of evidence using many of the techniques within the armoury of the modern forensic scientist, engineer or heritage crime investigator
ILO 3. Critically assess data through the selection of appropriate statistical tests or reasoning
ILO 4. Systematically organise evidence to ensure its traceability
ILO 5. Construct an argument and communicate it effectively in a form suitable for a specific target audience, such as technical reports, expert witness statements and the presentation of evidence in court
ILO 6. Collect and evaluate information and compose reports using a wide range of transferable skills through literature searches, databases, the Internet and desktop publishing.

B. Postgraduate Diploma

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 7. Evaluate a wide range of evidence from adjacent disciplines that impact on forensics in archaeology, anthropology, engineering or the physical sciences according to the particular course on which a student has studied.

C. MSc

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 8. Independently design, plan and execute a detailed research project and present results at meetings
ILO 9. write a research thesis that includes:
- a critical review of established forensic practice in a particular field
- a critical evaluation of current research and methodologies in that area, judging good and bad practice, and defending their opinions
- a clear explanation of experimental/analytical procedures and the evaluation of results by appropriate means

- self-critical evaluation of experimental/analytical results with conclusions that place the research in the context of the professional practice of the forensic sciences.

4. How is the course taught?

Students will be supported in their learning and personal development by:

- research led teaching – through a course team that are active researchers or practitioners
- hands-on experience – experience based learning through students spending time in the laboratory
- learning through assessment methods - we view assessment as part of the learning process, with a variety of assessment methods extending the curriculum and transferable skills
- an immersion culture – as part of the Cranfield experience we aim to fully immerse our students in forensics, not just through lectures, tutorials and workshops, but also through social interaction with teaching staff.

The main instrument of teaching and learning in the taught phase modules remains the traditional lecture, incorporating the effective use of visual aids and supported by high quality written material where appropriate. Tutorial sessions centring on a particular subject area or involving more wide-ranging discussions are also an important feature of the course. However, there is a growing move to reduce the amount of teacher-centred learning and allow students to take the initiative in the learning process. Thus some modules include a requirement for each student to make an oral presentation to the rest of the class on a piece of practical work or a specific subject in the literature that is then assessed by the staff present. This is a challenging task but students recognise its importance in the context of a future career in forensic science and find it stimulating. Students are required to present their written work in a variety of forms, including the conventional essay as well as laboratory reports and expert witness statements. In the case of MSc students this includes presenting the results of their individual research project in the format of a thesis or a journal paper plus a separate literature review. The emphasis is always on clear, concise and accurate presentation. This ensures that students are continually encouraged to think about report writing and are given frequent opportunities to improve their techniques as they progress through the course. The ‘Courtroom Skills’ module provides a focus for the discussion of verbal and writing skills but students are giving guidance on reports and presentations at a very early stage in the course during Introductory Studies. Many modules employ role play to demonstrate how theory is put into practice. This ranges from crime scene exercises where students work in small groups collecting evidence according to a range of different scenarios, to working in larger groups on mass grave excavations and ‘war games’ to simulate heritage crime investigations.

In addition to the teaching methods outlined, students will be supported in their learning and personal development by:

1. Good staff student relations. Staff endeavour to be enthusiastic and helpful and experience has shown that the students respond accordingly. The Course Director or Programme Director will address any immediate issues of concern that a student or students may have in connection with the course.
2. All students are provided with a personal tutor who is available to support the student and advise on academic issues and provide pastoral care. Students are encouraged to meet with their personal tutors at least twice during the taught phase of the course. Additional meetings are scheduled as required.
3. After the taught phase pastoral care largely transfers to the student’s individual research project supervisor, who they are encouraged to meet with regularly.
4. Each course within the Forensic Programme is managed by a Director who is a subject matter expert and who can specifically advise on matters relating to choice of elective modules.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Diploma in Forensic Archaeology and Anthropology
The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 2-5 Modules 13-16	50 40
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 7, 8, 10, 17, 18, 19, 20, 21, 22, 23, 28, 29, 30, 31	0 30
TOTAL:	**120**

B. MSc in Forensic Archaeology and Anthropology
In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Modules 2-5 Modules 13-16 Research project (33)	50 40 80
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 7, 8, 10, 17, 18, 19, 20, 21, 22, 23, 28, 29, 30, 31	0 30
TOTAL:	**200**

C. Postgraduate Diploma in Forensic Ballistics
The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 2, 3, 5 Modules 9, 10, 11, 12, 25, 26	30 60
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 6, 7, 8,13, 15, 18, 19, 20, 21, 22, 23, 24, 27, 28, 29, 30, 31	0 30
TOTAL:	**120**

D. MSc in Forensic Ballistics

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Modules 2, 3, 5 Modules 9, 10, 11, 12, 25, 26 Research project (33)	30 60 80
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 6, 7, 8, 13, 15, 18, 19, 20, 21, 22, 23, 24, 27, 28, 29, 30, 31	0 30
TOTAL:	**200**

E. Postgraduate Diploma in Forensic Explosives and Explosion Investigation

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 2, 3, 5 Modules 6, 7, 24, 25, 26, 27	30 60
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 8, 9, 10, 11, 13, 15, 18, 19, 20, 21, 22, 23, 28, 29, 30, 31	0 30
TOTAL:	**120**

F. MSc in Forensic Explosives and Explosion Investigation

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Modules 2, 3, 5 Modules 6, 7, 24, 25, 26, 27 Research project (33)	30 60 80
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 8, 9, 10, 11, 13, 15, 18, 19, 20, 21, 22, 23, 28, 29, 30, 31	0 30
TOTAL:	**200**

G. Postgraduate Certificate in Forensic Investigation

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
30 credits selected from Modules 2-5	30

ELECTIVE MODULES:	
Module 1 3 modules: To be agreed with the Course Director from the remaining modules 6 - 24, 28 - 31	0 30
TOTAL:	**60**

H. Postgraduate Diploma in Forensic Investigation

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Modules 2-5	50
ELECTIVE MODULES:	
Module 1 7 modules selected from any of the following: 6 - 24, 28 - 31	0 70
TOTAL:	**120**

I. MSc in Forensic Investigation

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	Credits
COMPULSORY MODULES:	
Modules 2-5 Research Project (33)	50 80
ELECTIVE MODULES:	
Module 1 7 modules selected from any of the following: 6 - 24, 28 - 31	0 70
TOTAL:	**200**

J. Postgraduate Certificate in Forensic Investigation of Heritage Crime

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
20 credits selected from modules: 2, 3, 5 30 credits selected from modules: 20, 28, 29, 30, 31, 32	20 30
ELECTIVE MODULES:	
Module 1 10 credits: To be agreed with the Course Director from the remaining modules from: 4, 7, 8, 10, 13, 15, 17, 19, 21, 22, 23, 24	0 10
TOTAL:	**60**

K. Postgraduate Diploma in Forensic Investigation of Heritage crime

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits

COMPULSORY MODULES:	
Modules 2, 3, 5 Modules 20, 28, 29, 30, 31, 32	30 70
ELECTIVE MODULES:	
Module 1 20 credits selected from any of the following: 4, 7, 8, 10, 13, 15, 17, 19, 21, 22, 23, 24	0 20
TOTAL:	**120**

L. MSc in Forensic Investigation in Heritage Crime

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	**Credits**
COMPULSORY MODULES:	
Modules 2, 3, 5 Modules 20, 28, 29, 30, 31, 32 Research Project (33)	30 70 80
ELECTIVE MODULES:	
Module 1 20 credits selected from any of the following: 4, 7, 8, 10, 13, 15, 17, 19, 21, 22, 23, 24	0 20
TOTAL:	**200**

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
    - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
    - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
    - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in October and are normally expected to complete the PgCert course within 32 weeks, the PgDip course with 32 weeks and the MSc course within 48 weeks. The PgCert is only available for Forensic Investigation and Forensic Investigation of Heritage Crime.

Part-time students register for the course in October and are expected to complete the MSc within 3 years, the PgDip within 2 years and the PgCert within 2 years.

With the exception of Analytical Techniques that has a two week residential most modules are taught over one week, for some modules this will include sufficient time for parts of the module assessments such as individual or group presentations. Most assessments are completed after the residential element. The examination for Reasoning for Forensic Science and coursework is completed after the residential element of the module. The coursework for Courtroom Skills is submitted before the module with a practical assessment completed during the residential week

Each option within the course is based around a specific set of option-specific, compulsory modules (a "theme"), with a complementary series of associated role- specific modules. Students select modules across the whole programme according to their individual requirements and entry qualifications.

Students are asked to consider their option and theme prior to completing all of the common compulsory modules. This choice will be made in close consultation with a designated personal tutor.

Students would normally commence their individual research project only on successful completion of the taught component of the course. It is expected that the individual research project will normally fall within the scope of the dominant theme established in the taught phase.

7. Course Level Assessment Strategy[4]

The Forensic Programme aims to equip students with the necessary understanding of science and other specific disciplines, courtroom skills and research methods in order to prepare them to practise as professional forensic practitioners. To reflect this our assessment strategy uses coursework assignments as opposed to the conventional written examination. These are limited to a few occasions throughout in the course where specific skills are tested. Summative assessments often involve a practical exercise that can be laboratory or field based and presented as a casework scenario or as role-play. These are assessed through a written technical report, expert witness statement or an oral presentation. Multipart

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

assessment is limited to one module, *Courtroom Skills*, where the assessment reflects the professional demands on an expert witness.

Students undertake a spectrum of assessment types throughout the course. Different types of summative assessment allow us to assess different aspects of the student's knowledge and ability, and allow us to cover a range of preferred learning/assessment styles. Professional skills are developed through writing expert witness statements and analytical reports on case studies and practical work, with a particular emphasis on clear and concise presentation. These involve a variety of tasks such as the assessment of firearms operation, an evaluation of health and safety at a hazardous scene and documenting a mass grave excavation. Both individual and group presentations and briefings are used to assess communication skills appropriate for a range of target audiences, providing both formative and summative assessment.

The Forensic Programme has very few formal examinations, reflecting the applied nature of the course. All students take the module *Reasoning in Forensic* Science that covers statistical analysis and reasoning. The breadth and variety of applications covered during this module can only be accommodated by a carefully structured written examination supported by formative assessment through classroom discussions and tutorials. Similarly, the breadth and variety of skeletal remains encountered during the module *Further Forensic Anthropology – Identification*, and how they contribute to a biological profile, demands a summative assessment with comparable variety. The spotter examination does this by rotating students around a series of different stations where they answer questions about exhibits. Classroom exercises on human skeletal remains and the optional 'bone club' provide formative assessment.

There is only one multipart assessment on the Forensic Programme. The *Courtroom Skills* module is assessed by a combination of individual coursework (a written expert witness statement), and an oral assessment of performance in mock courtroom trials where students take on the role of expert witness, prosecution barrister and defence barrister. This replicates the two key roles that a Forensic Scientist may have presenting evidence in a written form before trial and presenting evidence under cross-examination during a trial. The interactive nature of the assessment gives continuous formative assessment, introduces students to how a court runs, and assesses their verbal reasoning from both sides of an argument and how they perform within the court environment.

Course modules

The following modules outline all parts of the programme leading to an **MSc.** Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	R-FP-IS	Introductory Studies	Peter Masters	70	0	0	Y	05/10/20	05/10/20	09/10/20	N/A	AO					N/A	N/A
2	R-FP-IEC	Investigation and Evidence Collection	Stephanie Giles	40	0	10	Y	12/10/20	12/10/20	16/10/20	50	ICW	100				FT 16/11/20 PT 30/11/20	Next available opportunity

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education.
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear andragogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

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												Independent Assessment		Multi-part Assessment			Submission dates		
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3	R-FP-RFS	Reasoning for Forensic Science	Peter Zioupos	25	0	10	Y	19/10/20	19/10/20	23/10/20	50	EX	100				W/c 14/12/20	W/c 19/04/21
4	R-FP-AT	Analytical Techniques	Fiona Brock	40	5	20	N	09/11/20	09/11/20	20/11/20	50	ICW	100				FT 05/01/21 PT 15/01/21	Next available opportunity
5	R-FP-CS	Courtroom Skills	Peter Zioupos	25	0	10	Y	05/10/20	10/05/21	14/05/21	50 50			100	OR ICW	60 40	ALL 14/05/21 ALL 09/04/21	Next available opportunity
6	R-FP-FIEED Occ A	Forensic Investigation of Explosives and Explosive Devices	Nathalie Mai	37	0	10	Y	11/01/21	11/01/21	15/01/21	40	ICW	100				FT 15/02/21 PT 01/03/21	Next available opportunity
7	R-FP-FEI Occ A	Fires, Explosions and their Investigation	Karl Harrison	28	0	10	Y	01/03/21	01/03/21	05/03/21	40	ICW	100				FT 06/04/21 PT 19/04/21	Next available opportunity
8	R-FP-TE	Trace Evidence	David Lane	24	2	10	Y	01/02/21	01/02/21	05/02/21	40	ICW	100				FT 08/03/21 PT 22/03/21	Next available opportunity
9	R-FP-MEP	Materials Engineering and Processing	Jon Painter	32	0	10	N	02/11/20	02/11/20	06/11/20	40	ICW	100				FT 07/12/20 PT 21/12/20	Next available opportunity

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Assessment								
												Independent Assessment		Multi-part Assessment			Submission dates		
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
10	R-FP-IFIFB Occ A	Introduction to Firearms Investigations and Forensic Ballistics	Katherine Hewins	32	0	10	Y	30/11/20	30/11/20	04/12/20	40	ICW	100				FT 13/01/21 PT 27/01/21	Next available opportunity	
11	R-FP-FI	Firearms Investigations	Katherine Hewins	32	0	10	N	25/01/21	25/01/21	29/01/21	40	ICW	100				FT 01/03/21 PT 15/03/21	Next available opportunity	
12	R-FP-FBI	Forensic Ballistics Investigations	Katherine Hewins	32	0	10	N	22/02/21	22/02/21	26/02/21	40	ICW	100				FT 29/03/21 PT 12/04/21	Next available opportunity	
13	R-FP-FARBR	Forensic Archaeology: Recovering Buried Remains	Roland Wessling	28	0	10	N	02/11/20	02/11/20	06/11/20	40	ICW	100				FT 07/12/20 PT 21/12/20	Next available opportunity	
14	R-FP-FAMGE	Forensic Archaeology: Mass Grave Excavation	Roland Wessling	56	0	10	N	15/03/21	15/03/21	21/03/21	40	ICW	100				FT 19/04/21 PT 04/05/21	Next available opportunity	
15	R-FP-FFAO	Fundamentals of Forensic Anthropology: Osteology	Nick Marquez Grant	33	0	10	N	07/12/20	07/12/20	11/12/20	40	ICW	100				FT 20/01/21 PT 03/02/21	Next available opportunity	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

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16	R-FP-FFAI	Further Forensic Anthropology: Identification	Nick Marquez Grant	32	0	10	N	18/01/21	18/01/21	22/01/21	40	EX	100				W/c 19/04/21	Next available opportunity
17	R-FP-PAE	Practical Archaeological Excavation	David Errickson	50	0	10	N	17/05/21	17/05/21	21/05/21	40	ICW	100				FT 21/06/21 PT 05/07/21	Next available opportunity
18	R-FP-MFI	Mass Fatality Incidents	David Errickson	27	0	10	N	08/03/21	08/03/21	12/03/21	40	ICW	100				FT 12/04/21 PT 26/04/21	Next available opportunity
19	R-FP-EFS	Environmental Forensic Science	Hannah Moore	31	0	10	N	23/11/20	23/11/20	27/11/20	40	ICW	100				FT 06/01/21 PT 20/01/21	Next available opportunity
20	R-FP-FF	Fakes and Forgeries	Andrew Shortland	28	0	10	N	11/01/21	11/01/21	14/01/21	40	ICW	100				FT 15/02/21 PT 01/03/21	Next available opportunity
21	R-FP-RIFS	Radiographic Investigations in Forensic Science	Keith Rogers & Roland Wessling	25	0	10	N	15/02/21	15/02/21	19/02/21	40	ICW	100				FT 22/03/21 PT 06/04/21	Next available opportunity
22	R-FP-HF	Hazardous Forensics	Matthew Healy	25	0	10	N	12/04/21	12/04/21	16/04/21	40	ICW	100				FT 17/05/21 PT 01/06/21	Next available opportunity

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

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23	R-FP-FEAI	Forensic Exploitation & Intelligence	Stephen Johnson	28	0	10	Y	08/02/21	08/02/21	12/02/21	40	ICW	100				FT 15/03/21 PT 29/03/21	Next available opportunity
24	R-FP-CEDC	Counter-Improvised Explosive Devices Capability	Mike Harris	28	0	10	Y	22/03/21	22/03/21	26/03/21	50	IPRES	100				28/04/21 hand in date 11/05/21 presentation date	Next available opportunity
25	R-FP-ISI	Introduction to Shock and Impact	Rachael Hazael	32	0	10	N	07/12/20	07/12/20	11/12/20	50	ICW	100				FT 20/01/21 PT 03/02/21	Next available opportunity
26	R-FP-BIP	Ballistic Impact Protection	Rachael Hazael	27	0	10	N	26/04/21	26/04/21	30/04/21	40	ICW	100				FT 01/06/21 PT 14/06/21	Next available opportunity
27	R-FP-EES	Explosive Effects on Structures	Richard Critchley	31	0	10	N	08/03/21	08/03/21	12/03/21	40	ICW	100				FT 12/04/21 PT 26/04/21	Next available opportunity
28	R-FP-UKHC	UK Heritage Crime	Peter Campbell	22	0	10	N	25/01/21	25/01/21	29/01/21	40	ICW	100				FT 01/03/21 PT 15/03/21	Next available opportunity
29	R-FP-UKHE	UK Heritage Exercise	Peter Campbell	22	0	10	N	Deferred intake 2020-2021			40	ICW	100					
30	R-FP-IHC	International Heritage Crime	Alice Farren Bradley	22	0	10	N	01/03/21	01/03/21	05/03/21	40	ICW	100				FT 06/04/21 PT 19/04/21	Next available opportunity

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

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												Independent Assessment		Multi-part Assessment			Submission dates		
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31	R-FP-IHE	International Heritage Exercise	Alice Farren Bradley	22	0	10	N	Deferred intake 2020-2021			40	ICW	100					
32	R-FP-HCP	Heritage Crime Portfolio	Dennis Braekmans	20	0	20	N	06/04/21	06/04/21	09/04/21	40	ICW	100				FT 10/05/21 PT 24/05/21	Next available opportunity
33	R-FP-THESIS	Research Project	Keith Rogers	50	0	80	N	01/02/21 Project day: 17/12/20 B20 PT: 01/10/20 C20 PT: 30/03/21 B21 PT: 05/10/21 C21 PT: 31/03/22 B19 PT: 30/03/20	01/02/21	27/08/21	50			100	EXEC THESIS ORAL	20 60 20	A20 FT: N/A 27/08/21 12-16/07/21 B20 PT: 30/09/21 C20 PT: 31/03/22 B21 PT: 06/10/22 C21 PT: 30/03/23 B19 PT: 31/03/21	N/A

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

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												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments [9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
								B22 PT: 03/10/22									B22 PT: 04/10/23	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module Type for Forensic Award Themes (C – Compulsory, E – Elective, RS – Role Specific *20 credits ** pre-requisite)

Module	MSc Theme	Forensic Archaeology and Anthropology	Forensic Ballistics	Forensic Investigation	Forensic Explosives and Explosion Investigation	Forensic Investigation of Heritage Crime)		Marketed as short course	Joint with another MSc
1	IS	E	E	E	E	E			
2	IEC	C	C	C	C	C		YES	
3	RFS	C	C	C	C	C		YES	
4	AT*	C		C		E		YES	
5	CS	C	C	C	C	C		NO	
6	FIEED		E	E	RS			YES	
7	FEI	E	E	E	RS	E		YES	
8	TE	E	E	E	E	E		YES	
9	MEP		RS	E	E			YES	
10	IFIFB	E	RS	E	E	E		YES	
11	FI**		RS	E	E			YES	
12	FBI**		RS	E				YES	
13	FARBR	RS	E	E	E	E		YES	
14	FAMGE	RS		E				YES	
15	FFAO	RS	E	E	E	E		YES	
16	FFAI**	RS		E				YES	
17	PAE	E		E		E		YES	
18	MFI	E	E	E	E			YES	
19	EFS	E	E	E	E	E		YES	

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Module	MSc Theme	Forensic Archaeology and Anthropology	Forensic Ballistics	Forensic Investigation	Forensic Explosives and Explosion Investigation	Forensic Investigation of Heritage Crime		Marketed as short course	Joint with another MSc
20	FF	E	E	E	E	RS		YES	
21	RIFS	E	E	E	E	E		YES	
22	HF	E	E	E	E	E		YES	
23	FEAI	E	E	E	E	E		YES	
24	CEDC		E	E	RS	E		YES	EOE
25	ISI		RS		RS			YES	
26	BIP		RS		RS			YES	
27	EES		E		RS			YES	
28	UKHC	E	E	E	E	RS		YES	
29	UKHE	E	E	E	E	RS		YES	
30	IHC	E	E	E	E	RS		YES	
31	IHE	E	E	E	E	RS		YES	
32	HCP*					RS			
33	Thesis - FP	C	C	C	C	C			

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

Please list all modules that are used by another existing course.

Module code	**Module title**	**Course that owns the module**	**Other course(s)/ programme(s) that use the module**
R-FP-IS	Introductory Studies	Forensic Programme	Counterterrorism Programme
R-FP-IEC	Investigation and Evidence Collection	Forensic Programme	Counterterrorism Programme
R-FP-RFS	Reasoning for Forensic Science	Forensic Programme	Counterterrorism Programme
R-FP-CS	Courtroom Skills	Forensic Programme	Counterterrorism Programme
R-FP-FEI	Fires, Explosions and their Investigation	Forensic Programme	Defence and Security Programme Counterterrorism Programme
R-FP-FIEED	Forensic Investigation of Explosives and Explosive Devices	Forensic Programme	Defence and Security Programme
R-FP-IFIFB	Introduction to Firearms Investigations and Forensic Ballistics	Forensic Programme	Defence and Security Programme Counterterrorism Programme
R-FP-CEDC	Counter-Improvised Explosive Devices Capability	Forensic Programme	Explosives Ordnance Engineering MSc Counterterrorism Programme
R-FP-AT	Analytical Techniques	Forensic Programme	Counterterrorism Programme
R-FP-FI	Firearms Investigations	Forensic Programme	Counterterrorism Programme
R-FP-FBI	Forensic Ballistics Investigation	Forensic Programme	Counterterrorism Programme
R-FP-FEAI	Forensic Exploitation and Intelligence	Forensic Programme	Counterterrorism Programme

8. How are the ILOs assessed?

The assessment of candidates is based upon a combination of examinations, coursework assignments and, for masters course students, the research based dissertation:

- For the PgCert, a balance of assignments and examinations is designed to assess underlying principles and applications within the forensic environment and an ability to acquire and use information in that context.
- In the PgDip, the emphasis develops into a greater depth of analysis of role specific issues. Focus is on best practice and awareness of current research in that particular field. Students are expected to take on a professional role and assessments involve critical evaluation and professional judgement through a balance of report writing (including expert witness statements, analytical reports and critical reviews) oral examinations (individual and group presentations) and written examinations.

To complete the course to the award of a Masters level qualification, students must progress through PgCert and PgDip modules and assessment to the final element of the programme, the research based dissertation. Students must pass this final element of the programme with a minimum mark of 50%. The practical nature of the course requires that this should normally be based on an experimental investigation and should be appropriate for the scope of the dominant theme established in the taught phase.

A variety of different types of coursework are used to assess different aspects of the student's knowledge and ability. Conventional essay work is used to test research skills and analytical ability, and is often based on a critical review of the literature. A wide range of data types and sources are used. While journals, conference papers and specialist textbooks are most frequently used, students are expected to use other sources such as government publications, newspapers, television and internet sites when appropriate. Consequently, students have to demonstrate an awareness of the reliability of the source and the possibility of conflicting interests. Professional skills are developed through writing analytical reports on case studies and practical work, with a particular emphasis on clear but concise presentation. Students can expect assessed coursework to be returned to them no longer than 20 working days following the deadline for handing in, according to university regulations.

Throughout the course both individual and group presentations and briefings are used to assess communication skills appropriate for a range of target audiences. The first presentation is made in groups, as this is particularly valuable for instilling confidence and assessing an individual's ability to work within a team. However, each member is expected to clearly demonstrate his or her individual contribution and partake in the presentation.

All forensic computing modules require a coursework assignment based on an essay, a practical forensic examination or experimentation. The Forensic Computing Foundations module requires two such assignments. Most forensic computing modules also have a written examination either theory, practical or a combination of the two.

Assessment and ILO Mapping

Complete the grid below by inserting in the boxes which assessments from the modules directly assess the Award ILOs.

A. Postgraduate Certificate and Postgraduate Diploma

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.
1							
2	ICW	ICW		ICW	ICW	ICW	
3	EX		EX		EX		
4	ICW	ICW	ICW	ICW	ICW	ICW	
5	ICW			ICW OR	ICW OR	ICW	
6	ICW	ICW		ICW	ICW		ICW
7		ICW		ICW			ICW

8	ICW	ICW	ICW	ICW			
9		ICW				ICW	
10	ICW	ICW			ICW	ICW	
11	ICW	ICW		ICW	ICW	ICW	
12	ICW	ICW	ICW			ICW	ICW
13	ICW	ICW					ICW
14	ICW					ICW	ICW
15	ICW						ICW
16	EX						EX
17	ICW			ICW	ICW	ICW	
18	ICW			ICW		ICW	ICW
19	ICW		ICW	ICW			
20	ICW	ICW	ICW		ICW		
21	ICW	ICW		ICW	ICW	ICW	ICW
22	ICW		ICW	ICW	ICW	ICW	ICW
23			ICW		ICW	ICW	ICW
24		IPRES		IPRES	IPRES	IPRES	IPRES
25		ICW	ICW		ICW	ICW	ICW
26	ICW	ICW	ICW		ICW	ICW	ICW
27	ICW	ICW	ICW		ICW	ICW	ICW
28	ICW	ICW			ICW	ICW	ICW
29	ICW	ICW	ICW	ICW			ICW
30	ICW	ICW			ICW	ICW	ICW
31	ICW	ICW	ICW	ICW			ICW
32	ICW		ICW		ICW	ICW	ICW

B. MSc

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs Module No.	**ILO 1.**	**ILO 2.**	**ILO 3.**	**ILO4**	**ILO5**	**ILO6**	**ILO7**	**ILO8**	**ILO9**
33	THESIS	EXEC, THESIS	EXEC, THESIS	EXEC	THESIS, ORAL	EXEC, THESIS	EXEC, THESIS	EXEC	THESIS

CROSS-MODULAR ASSESSMENT (including any assessment which rests outside an individual module)

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)
NA	NA	NA	NA

Forensics programme course specification: Version 1.0 July 2020

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

Course changes are approved by the School's Director of Education on behalf of Education Committee and Senate. Significant changes to a course will be referred to a Course Review Panel at the discretion of the Director of Education.

The University has in place regular monitoring procedures for quality assurance including an Annual Reflective Review for each course and an in depth 6 year review of each School's (total) educational provision known as the Senate Review.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guiding principles to meet the Expectations and Core Practices of the UK Quality Code for Higher Education. External examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

Each course has a formally constituted Examination Board, which includes the External Examiner, and which is responsible for ensuring that awards are made within the Regulations of the University and that students are made awards on the basis of meeting the specified Intended Learning Outcomes of a course at the appropriate standard.

Each course has a formally constituted Course Committee which meets at least twice a year to discuss, inter alia, programme design and planning, the student experience (including feedback) and student progress.

Each course has an Industry Advisory Panel (or similar) which meets at least once a year to engage with external stakeholders on curriculum design and currency of course content.

Student feedback both qualitative and quantitative is collected for each module studied. In addition students are invited to participate in the University's annual New Student Survey and Student Satisfaction Survey along with the annual national Postgraduate Taught Student Experience Survey. The results of all feedback are considered by the Course Committee and additionally, in respect of the University and national surveys, issues of quality are considered by and acted on where appropriate by the Education Committee, Senate, School and University Executives.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the UK Quality Code for Higher Education. The delivery of new partnership provision is ultimately approved by the Universities Education Committee, on behalf of Senate.

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As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

10. What opportunities are graduates likely to have on completing the course?

The programme offers a highly effective springboard into many career opportunities. These include employment routes to Government and non-Governmental bodies, police departments and independent forensic consultants working for insurance companies. It is also a necessary introduction that leads into conducting research at PhD level in the subject.
The Digital Forensics MSc could be an important stepping-stone to an academic career in Digital Forensics.

Specific course features that enable a high probability of employment include the growing field of digital forensics, the niche areas of ballistics and explosives, the science base to archaeology and anthropology, and managerial roles within government laboratories.

COURSE SPECIFICATION

Cranfield University: Course Specifications

Course specifications outline the content and structure of a course leading to an award of Cranfield University. This version of the course specification has been approved by Education Committee and every effort has been made to ensure the accuracy of the information.

Date of first publication/latest revision: 06/07/20

1. What is the course?

Course information

Course Title	Future Food Sustainability
Course code	MSFFSFTC, MSFFSPTC, PDFFSFTC, PDFFSPTC, PCFFSFTC, PCFFSPTC
Academic Year	2020/21
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Cranfield Soil and Agrifood Institute
Course Director	Dr Sofia Kourmpetli
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Is this course offered as a Cranfield Mastership?	No
Apprenticeship Standard the course is mapped to	N/A
Is the Degree apprenticeship integrated or non-integrated?	N/A
Is the Mastership offered as an open and/or closed course?	N/A

[1] If any part of this course is delivered at another site, please note which one(s) here
[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Candidates must normally possess, or be expected to achieve, a 1st or 2nd class UK Honours degree in a relevant science or social science-based discipline, or the international equivalent of these UK qualifications. Other relevant qualifications together with industrial experience may be considered. International students will need to provide evidence that they have achieved a satisfactory test result in an English qualification. The minimum standard expected is as follows: IELTS - 6.5, TOEFL – 92, Pearson PTE Academic – 65, Cambridge English Scale – 180, Cambridge English: Advanced – C, Cambridge English: Proficiency - C
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc - one year, Part-time MSc - up to three years, Full-time PgCert - one year, Part-time PgCert - two years, Full-time PgDip - one year, Part-time PgDip - two years
Course Start Month(s)	Full-time: October Part-time: normally an October start

Institutions delivering the course

This course is mainly delivered by the Cranfield Soil and Agrifood Institute in collaboration with other Cranfield University schools and institutes: The Centre for Environmental and Agricultural Informatics, Cranfield Water Science Institute and the Cranfield School of Management where the research interests include:

Soil health, food production, postharvest technology, food mycology, plant genetics, strategic thinking, agricultural informatics, food chain logistics, water usage and management and corporate sustainability.

Cranfield University remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course has been accredited by the Institution of Agricultural Engineers (IAgrE) until 2021.

2. What are the aims of the course?

- To provide students with a critical awareness of the challenges, risks and opportunities of providing a sustainable supply of sufficient food to the world's population both now and in the future
- To develop graduates with the capacity to undertake successful technical research projects using appropriate methods of critical analysis
- To develop critical, creative and independent learners who can participate freely in the wide area of future food sustainability

This programme is intended for the following range of students:

- Graduates with honours degree or equivalent ideally in a subject related to a component of the course
- Graduates currently in employment keen to extend their qualifications or to pursue a career change

- Individuals with other qualifications but who possess considerable relevant experience

3. What should students expect to achieve in completing the course?

Award intended learning outcomes (ILOs) (skills and knowledge).

A. Postgraduate Certificate in Future Food Sustainability

In completing this course, and achieving the associated award, a diligent student should be able to:

ILO 1. Evaluate the main principles and issues of providing a sustainable supply of sufficient food in the future from a European and in some instances a global perspective

ILO 2. Critically appraise the scientific interventions such as crop development, water usage and soil management, in terms of their ability to mitigate against future food sustainability issues

ILO 3. Develop systematic and analytical skills in informatics based on the use of scientific data derived from crop development, and water and soil usage

ILO 4. Integrate technological and social science information and show how they can be utilised to predict future impacts

B. Postgraduate Diploma in Future Food Sustainability

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 5. Assess how sustainability options based on technological developments can be utilised for financial and economic decision making

ILO 6. Apply key aspects of supply chain management which are critical to the resilience of the global food supply network, and show how they can be used in integrated decision making

ILO 7. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. MSc in Future Food Sustainability

In addition to the intended learning outcomes outlined above, a diligent student would also be expected to:

ILO 8. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 9. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

The MSc course is taught in three sections: taught modules, a group project, and an individual research project.

- The taught programme, typically delivered between October and February, comprises a structured sequence of modules, each containing a series of lectures and other classroom-based teaching, supplemented by practical work. Eight taught modules are assessed by assignments. Each module is taught over one week, followed by a week largely free of structured teaching to allow time for more independent learning and reflection, and completion of the module assignment.

- The Group Projects are group-based research programs typically undertaken between February and April. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation.

- The thesis project, typically delivered between May and September, further develops research and project management skills that: provide the ability to think and work in an original way; contribute to knowledge; overcome genuine problems; and communicate through a Thesis and oral exam. Each student is allocated a supervisor, who will guide and assess the student work. Guidance sessions are provided as to what is required from the Thesis and oral presentation.

Within the induction week, students will be introduced to personal development planning and asked to reflect on their transferable skills and to take ownership of their personal development during the course. In addition, students carry out a reflective review exercise during their Group Project where they reflect on PDP objectives set in the Group Project.

5. What do students need to achieve in order to graduate?

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 8. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

In brief, students will normally need to achieve the following in order to be awarded the qualifications:

A. Postgraduate Certificate

The accumulation of 60 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Principles of Sustainability	10
Water and Sustainable Agrifood Systems	10
Soil Systems	10
Agricultural Informatics	10
Plant-based Technologies	10
Strategic Foresight	10
ELECTIVE MODULES:	
TOTAL:	60

B. Postgraduate Diploma

The accumulation of 120 credits (or more) through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Principles of Sustainability	10
Water and Sustainable Agrifood Systems	10
Soil Systems	10
Economic Valuation and Appraisal	10
Agricultural Informatics	10

Plant-based Technologies Leading Corporate Sustainability Strategic Foresight Group Project (Full Time Students)	10 10 10 40
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	120

C. MSc

In addition to the requirement for the Postgraduate Diploma outlined above, students must successfully complete the thesis. An MSc will be awarded on successful completion of 200 credits as outlined below:

Description	**Credits**
COMPULSORY MODULES:	
Induction Module Principles of Sustainability Water and Sustainable Agrifood Systems Soil Systems Economic Valuation and Appraisal Agricultural Informatics Plant-based Technologies Leading Corporate Sustainability Strategic Foresight Group Project (Full Time Students) Thesis	0 10 10 10 10 10 10 10 10 40 80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	 40 40
TOTAL:	200

If a student does not meet the required standards for the award, the examiners for the programme may decide to offer a lower award associated with the programme, providing that a lower exit award exists and the student meets the requirements of that lower award.

Pass Criteria

The University operates standard pass criteria which can be found in the Senate Handbook on Assessment Rules.

In order to achieve your award, you are required to achieve:

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of

your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee); [3]

- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);
  - if, having failed to attain the minimum mark for 30 learning credits, you fail to obtain the minimum mark for **any additional learning credits** over the course of your studies you will be disqualified from the right to re-take the assessments: this will normally result in intended award failure. (Please note the board of examiners may at its discretion overrule this limit, but this is not an automatic right);
  - it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Full-time students register for the course in October and are expected to complete the course within 12 calendar months.

The course is also offered on a part-time basis and such students are expected to complete the course within 2 to 3 years. Part-time students are not restricted to starting in October. Instead they are offered individual guidance on the best sequence of study based on their prior knowledge and availability to attend.

7. Course Level Assessment Strategy[4]

All taught modules are assessed through an individual summative written assignment. Assessments are diverse in context and style in order to ensure that all the course ILOs are met but to also allow students to practise different types of writing styles (e.g preparing a briefing document for a local council, compiling a field and laboratory data report, undertaking an economic analysis for an NGO, writing an essay based on scientific literature). Wherever possible, real or realistic examples are used for the assignments in order to prepare the students for the type of work they might be required to undertake when they enter the job market. Formative assessments are included in each module in the form of group and individual oral presentations. Feedback is given in a timely manner through group discussions and Q&A sessions after presentations. Written feedback is provided for all summative assessments within 20 working days.
In addition, the Group Project assessment is completed through a consultancy report for a real client and a group presentation to a wider audience. A poster is also required to be presented but is not assessed. This gives students the opportunity to develop their poster-making skills and receive formative feedback

[3] Providing the minimum mark is met, a mark of 40-49% will be automatically compensated if a student's overall average taught assessment mark (including the failed assessment) is greater than 50%. Students are advised, however, that they retain the right to re-take an assessment with a mark of <40% (but should note that a re-take attempt will be capped at 50%), as long as they haven't failed more than 30 credits. At the discretion of the Board of Examiners or by Board of Examiners Chair's Actions a student may be permitted a re-take attempt of modules in the range of 40-49% only if the average mark of their other taught modules would not allow them to qualify for their award (<50%).

[4] Guidance to aid colleagues writing or updating a course-level assessment strategy for inclusion in the Course Specification can be found as Appendix K in either the Senate Handbook on Setting up a New Taught Course or the Senate Handbook on Managing Taught Courses https://intranet.cranfield.ac.uk/EducationServices/Pages/SenateHandbooksA-Z.aspx

before they are required to present one as part of the individual thesis summative assessment. The submission of a scientific research paper is required for the successful completion of the individual research project component of the course, ensuring that ILOs 8 and 9 are met.

Course modules

The following modules outline all parts of the programme leading to **MSc**. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Assessment								
												Independent Assessment		Multi-part Assessment			Submission dates		
								Module Start Date (eg Pre-course task)	Module Delivery Start Date	Module Delivery End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-AGF-INWK	Induction Module	A Medina Vaya	33		0	Y		05/10/20	09/10/20	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	Paul Burgess	26		10	Y		12/10/20	16/10/20	40	ICW	100				FT 24/10/20 PT 07/11/20	05/21

[5] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[6] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[7] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%.
[8] For **independent assessments** please record type and weighting of each separate piece of assessment individually. 10 credit modules should be designed to allow assessment through a single independent summative assessment. Deviations will require approval by the School Director of Education
[9] For **multi-part assessments** please record the overall weighting of module which should be 100%. Multipart assessments should only be included in courses where there is a clear androgogical reason and where each element forms part of a continuous learning and assessment experience for students.
[10] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate*)*. If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[11] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

Assessment Types: AO – Attendance only; ICW – Individual Coursework; GCW – Group Coursework; IPRES – Individual Presentation; GPRES – Group Presentation; IPRAC – Individual Practical; GPRAC – Group Practical; IPROJ – Individual Project (>20 credits); GPROJ – Group Project (>20 credits); EX – Examination; RP – Reflective Portfolio; OR- Viva Voce examination; THESIS – Thesis; MULTI – Multi-part Assessment

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3	I-EEM-A1184	Economic Valuation and Appraisal	A Graves	27		10	Y		26/10/20	30/10/20	40	ICW	100				FT 07/11/20 PT 21/11/20	05/21
4	M-T/LCS Occ B	Leading Corporate Sustainability	R Watson	20		10	Y		09/11/20	20/11/20	40	ICW	100				FT/PT 15/01/21	05/21
5	I-FFS-WSS	Water and Sustainable Agrifood Systems	T Hess	30		10	N		23/11/20	27/11/20	40	ICW	100				FT 05/12/20 PT 04/01/21	05/21
6	I-LAM-A1138	Soil Systems	J Hannam	34		10	N		07/12/20	11/12/20	40	ICW	100				FT 04/01/21 PT 25/01/21	05/21
7	I-FFS-PBT	Plant-based Technologies	A Thompson	20		10	N		11/01/21	15/01/21	40	ICW	100				FT 23/01/21 PT 06/02/21	05/21
8	I-FFS-AI	Agricultural Informatics	D Simms	40		10	N		25/01/21	29/01/21	40	ICW	100				FT 06/02/21 PT 20/02/21	05/21
9	I-EMB-A1005	Strategic Foresight	K Garnett	30		10	Y		08/02/21	12/02/21	40	ICW	100				FT 20/02/21 PT 06/03/21	May 21
10	I-AGF-GRPP	Group Project	A Medina Vaya	16		40	Y		01/03/21	07/05/21	50 50 50 50	GCW GPRES ICW RP	64 16 10 10				05/05/21 30/04/21 08/05/21 N/A	

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11	I-AGF-DISS	Dissertation in place of group project for part time students	A Medina Vaya	10		40	Y		01/03/21	24/09/21	50	IPROJ IPRES	80 20				24/09/21 20/09/21	
12	I-AGF-THESIS	Individual Thesis Project	A Medina Vaya	20		80	Y		10/05/21	10/09/21	50 50	THESIS OR	90 10				06/09/21 w/c 23/08/21-30/08/21	

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Please list all modules that are used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-EEM-A1184	Economic Valuation and Appraisal	Environmental Management for Business	Future Food Sustainability
M-T/LCS	Leading Corporate Sustainability	Management	Food Systems and Management Management and Corporate Sustainability Business and Strategic Leadership Management and Leadership Future Food Sustainability Environmental Management for Business
I-EMB-A1122	Principles of Sustainability	Environmental Management for Business	Future Food Sustainability
I-EMB-A1005	Strategic Foresight	Future Food Sustainability	Environmental Management for Business

8. How are the ILOs assessed?

The following assessment types are utilised:

The taught modules are assessed by in-module assessment (including a mix of summative and formative coursework, which focuses on application of principles studied and underpinning knowledge). In addition, the Group Project for full-time students is assessed by two written reports and an oral presentation. The performance of each student in the group to work individually and as part of a team is assessed by means of one of the written reports, which is a reflective review. The dissertation for part-time students is based on a review of available information including academic literature, presentation of ideas and analysis and the development of conclusions.

Assessment and ILO Mapping

A. Postgraduate Certificate

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.
2	ICW			ICW
5	ICW	ICW		
6	ICW	ICW		
7		ICW	ICW	
8	ICW	ICW		
9	ICW			ICW

B. Postgraduate Diploma

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 5.	ILO 6.	ILO 7.
3	ICW		
4	ICW	ICW	
10			GPROJ ICW
11			IPROJ IPRES

C. MSc

In addition to those outlined above, the Award intended learning outcomes are assessed by the following module assessments:

Award ILOs / Module No.	ILO 9.	1LO 10.
12	THESIS/ OR	THESIS/ OR

CROSS-MODULAR ASSESSMENT

Title	Modules Covered	Assessment	
		Type	Weight (%)

9. How will the University assure the quality of the provision?

New course proposals are reviewed by a Course Validation Panel, comprising at least the following membership: normally one subject matter expert external to the School or University, at least 3 academic staff not associated with the proposal. The Panel may include 1 member of professional staff. Panels are supported by an appropriately trained Secretary who provides authoritative guidance on policy and procedure to the Panel. Proposals are reviewed in line with the UK Quality Code for Higher Education. New courses are ultimately approved by the University's Education Committee, on behalf of Senate.

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10. What opportunities are graduates likely to have on completing the course?

This course is part of the Agriculture and Food teaching Programme within CSAFI and, as such, is teamed with the MSc course in Food Systems and Management. The Future Food Sustainability course will therefore make use of relevant links with industry that have previously been developed. This is anticipated to include employment opportunities for suitable graduates. Some of the employers over the last three years include:

- Kellogg's
- Carlsberg Group
- Deloitte

- Food Experts SL

On completion, graduates also have a broad network of global contacts, and increased opportunities for individual specialism in their chosen careers by making use of Cranfield Alumnus Society.