Course Libraries 2016/17

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. Courses are under constant review, however, and the University reserves the right, without notice, to withdraw, update or amend this course specification at any time.

COURSE TITLE: Defence Acquisition Management

Date of first publication/latest revision: 30 November 2016

1. What is the course?

Course information

Course Title	Defence Acquisition Management
Course code	MSDAMPTR, PDDAMPTR, PCDAMPTR, SPDAMPTR
Academic Year	2016/17
Valid entry routes	MSc/PgDip/PgCert
Additional **Exit routes**	PgDip/PgCert
Mode of delivery	Part-time
Location of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence acquisition
Centre	Centre for Defence Acquisition (CfDA)
Awarding Body	Cranfield University
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)	January

Institutions delivering the course

This course is delivered by the Centre for Defence Acquisition 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 complete the DAM MSc and meet 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.

2. The Chartered Institute of Logistics and Transport (UK):

   Logistics and Transport Centre
   Earlstrees Court
   Earlstrees Road
   Corby
   Northants NN17 4AX
   Tel: 01536 740100
   Fax: 01536 740101
   Email: enquiry@ciltuk.org.uk
   Website: www.ciltuk.org.uk

   On production of a copy of the degree certificate graduates will be eligible for Chartered Membership of the Institute providing they have at least four years experience in a management role, including at least two years at the level required by international criteria.

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

3. Chartered Management Institute:

Management House
Cottingham Road
Corby,
Northants
NN17 1TT
Tel: 01536 204 222
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. Students who successfully complete the Managing Acquisition Change module will be eligible to receive the CMI Level 5 qualification in 'Professional Consulting'. The Centre for Defence Acquisition is also able to provide the CMI Level 7 qualification in 'Professional Consulting', for students who have achieved a minimum of 50% in all relevant modules - Managing Acquisition Change, Leading Acquisition Change and Personal and Organisational Development, along with a further portfolio of additional evidence from the work-place.

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 the following range of students:

Officers of the Armed Forces (both UK and overseas).
MOD civil servants.
Senior and experienced non-Commissioned personnel, in acquisition related posts in Defence.
Staff from within the defence and security sectors - private and public - (UK and overseas).
Other government departments (UK and overseas).

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 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:	
All pathways: Module 1	nil credits
ELECTIVE MODULES:	
Modules: Any 6 modules, but can only include one of the optional elements	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:	
General Acquisition Pathway: Module 1 Modules: 2, 3, 4, 5, 6, 7 Modules: 8, 9, 10, 15, 19 **Through Life Support Pathway:** Module 1 Modules: 2, 3, 4, 5, 6, 7 Modules: 8, 14, 15, 16, 19 **Commercial Pathway:** Module 1 Modules: 2, 3, 4, 5, 6, 7 Modules: 8, 11, 12, 13, 19	All pathways: Module 1: nil credits All other modules 10 credits each
ELECTIVE MODULES:	
General Acquisition Pathway: Select one module from: 14, 16, 17, 18, 20 **Through Life Support Pathway:** Select one module from: 9, 17, 18, 20 **Commercial Pathway:** Select one module from: 14, 17, 18, 20	All pathways: 10 credits for each module
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:	
General Acquisition Pathway: Module 1 Modules: 2, 3, 4, 5, 6, 7 Modules: 8, 9, 10, 15, 19 Module 21a and 21b Thesis **Through Life Support Pathway:** Module 1 Modules: 2, 3, 4, 5, 6, 7 Modules: 8, 14, 15, 16, 19 Module 21a and 21b Thesis	All pathways: Module 1: nil credits All other modules 10 credits each, except: Module 21a (Research Methods) 4 credits; and Module 21b (Thesis) 76 credits

Commercial Pathway: Module 1 Modules: 2, 3, 4, 5, 6, 7 Modules: 8, 11, 12, 13, 19 Module 21a and 21b Thesis	
ELECTIVE MODULES:	
General Acquisition Pathway: Select one module from: 14, 16, 17, 18, 20 **Through Life Support Pathway:** Select one module from: 9, 17, 18, 20 **Commercial Pathway:** Select one module from: 14, 17, 18, 20	All pathways: 10 credits
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);[1] [2]
- **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);

[1] 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).

[2] 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%).

- 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 five 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 November 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 November of year two, students will commence the research (thesis) phase, beginning with attendance on the Research Methods Module in December. 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 early April of year four. During the research phase, students are expected to maintain regular contact with their allocated supervisor.

Course modules[3]

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	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)	Residential' Start Date	Residential' End Date	Minimum Mark[6] - 40% or 50%	Type of Assessment	Weighting within module[7] (%) of Independent assessments	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	12	0	0	N	09/01/17	09/01/17	10/01/17	n/A	AO	N/A					N/A
8	R-DAM-LAC	Leading Acquisition Change	30	0	10	N	02/01/17	09/01/17	13/01/17	50	ICW GCW	70 30				20/02/17 13/01/17	Tba
2	R-DAM-SMIA	Strategic Management and Introduction to Acquisition	30	0	10	N	16/01/17	23/01/17	27/01/17	40	ICW GCW	80 20				06/03/17 27/01/17	Tba

[3] Please see Senate Handbook for Setting Up a New Taught Course for guidance on completing this table
[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%. This will be at the Board of Examiners discretion.
[7] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[8] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[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; AO - attendance only

Module Number	Module code	Title	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)	Residential' Start Date	Residential' End Date	Minimum Mark[6] - 40% or 50%	Type of Assessment	Weighting within module7 (%) of Independent assessments	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
10	R-DAM-SNAM	Supply Network Analysis and Modelling	30	0	10	N	20/02/17	27/02/17	03/03/17	40	EX ICW	50 50				11/04/17 03/03/17	04/07/17
14	R-DAM-SD	Sustainability in Defence	30	0	10	N	20/02/17	27/02/17	03/03/17	40	ICW GPRES	80 20				10/04/17 03/03/17	Tba
3	R-DAM-FA	Financing Acquisition	30	0	10	N	27/02/17	06/06/17	10/03/17	40	EX GPRES	70 30				11/04/17 10/03/17	04/07/17
11	R-DAM-CEF	Cost Estimating and Planning	30		10	N	27/02/17	06/03/17	10/03/17	40	ICW	100				10/04/17	Tba
4	R-DAM-PPM	Programme and Project Management	30	0	10	N	17/04/17	24/04/17	28/04/17	50			100	ICW GCW	80 20	05/06/17 05/06/17	Tba
15	R-DAM-ARMS	Availability, Reliability, Maintainability and Supportability	30	0	10	N	27/03/17	24/04/17	28/04/17	40	ICW	100				05/06/17	Tba
12	R-DAM-AN	Advanced Negotiation	30	18	10	N	17/04/17	24/04/17	28/04/17	40	ICW	100				05/06/17	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; AO - attendance only

Module Number	Module code	Title	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)	Residential' Start Date	Residential' End Date	Minimum Mark[6] - 40% or 50%	Type of Assessment	Weighting within module7 (%) of Independent assessments	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
6	R-DAM-MAC	Managing Acquisition Change	30	0	10	N	05/06/17	12/06/17	16/06/17	40	ICW	100				24/07/17	Tba
16	R-DAM-EETLS	Efficient and Effective Through Life Support	30	0	10	N	05/06/17	12/06/17	16/06/17	40	ICW	100				24/07/17	Tba
9	R-DAM-SNMCE	Supply Network Management in Defence and the Commercial Environment	30	0	10	N	05/06/17	19/06/17	23/06/17	40	ICW	100				31/07/17	Tba
13	R-DAM-CRDE	Commercial Relationships in the Defence Environment	30	9	10	N	12/06/17	19/06/17	23/06/17	40	ICW	100				31/07/17	Tba
5	R-DAM-SSII	Sourcing Strategies and the Industrial Interface	30	0	10	N	Not due to run in 2017			50	EX	100				N/A	
17 (E)	R-DAM-IDDA	The International Dimensions of Defence	30	0	10	N	24/07/17	31/07/17	04/08/17	40	ICW	100				11/09/17	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; AO - attendance only

Module Number	Module code	Title	Contact hours[4]	Total hours delivered by Visiting Lecturers[5]	Credits	Is the module shared? Y/N	Calendar			Assessment							
							Module Start Date (eg Pre-course task)	Residential' Start Date	Residential' End Date	Minimum Mark[6] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
											Type of Assessment	Weighting within module7 (%) of Independent assessments	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
		Acquisition (Occ B16)															
18 (E)	R-DAM-CRS	Capability Requirements & Systems (Occ B16)	30	0	10	N	24/07/17	31/07/17	04/08/17	40	ICW	100				11/09/17	Tba
20 (E)	R-DAM-POD	Personal and Organisational Development (Occ B16)	30	0	10	N	24/07/17	31/07/17	04/08/17	40	ICW	100				11/09/17	Tba
7	R-DAM-MKIDA	Knowledge in Defence	30	0	10	N	Not due to run in 2017			40	ICW	100				N/A	
19	R-DAM-DCM	Defence Capability Management	30	4	10	N	11/09/17	18/09/17	22/09/17	50	ICW	100				30/10/17	Tba
21a	R-DAM-RM	Research Methods[11]	25	0	0	N	04/12/17	04/12/17	08/12/17	N/A	AO	100				09/01/18	
21b	R-DAM-DISS	Thesis	0	N/A	76	N	A:09/01/17 B:08/05/17	N/A	N/A	50	THESIS	100				A:20/04/18 B:13/08/18	

[11] Students that embark on the Thesis from January 2018 will do an 80credit module; the compulsory Research Methods modules will be AO from December 2017.

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; AO - attendance only

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; AO - attendance only

7. 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 pathway the student chooses. There are 3 pathways: General Acquisition (GA); Through Life Support (TLS); and Commercial (Com). During the taught phase, students can expect to sit 2 or 3 examinations and write 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

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.)

	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									
3	GPRES	EX	EX GPRES												
4	GCW	ICW	ICW GCW	GCW	ICW GCW	ICW GCW	GCW		GCW	GCW					
5			EX	EX		EX	EX								
6		ICW	ICW		ICW	ICW	ICW								
7			ICW	ICW		ICW									
8			ICW / GCW	ICW / GCW		ICW / GCW			ICW / GCW	ICW / GCW		ICW		ICW	ICW / GCW
9			ICW		ICW			ICW	ICW	ICW			ICW		
10			EX / ICW								EX / ICW			ICW	
11		ICW	ICW	ICW		ICW			ICW	ICW	ICW			ICW	
12			ICW				ICW							ICW	ICW
13			ICW	ICW	ICW	ICW	ICW	ICW	ICW	ICW	ICW		ICW	ICW	
14	GPRE		GPRES			GPRE			GPRES/		GPRES		GPRES	GPRES	

	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
	S / ICW		/ ICW			S / ICW			ICW		/ICW		/ICW	/ICW	
15	ICW		ICW			ICW			ICW	ICW	ICW		ICW		
16			ICW			ICW		ICW	ICW		ICW		ICW	ICW	
17(E)	ICW			ICW		ICW		ICW	ICW	ICW		ICW			
18(E)			ICW			ICW			ICW		ICW		ICW		
19		ICW	ICW			ICW			ICW	ICW					
20(E)		ICW	ICW		ICW			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**
21a	**N/A**	**N/A**	**N/A**
21b	THESIS	THESIS	THESIS

8. 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 qualified Secretary who acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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.

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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining), which emphasises that 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.

9. 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: MSc in Defence Cyber Masters Programme

Date of first publication/latest revision: 19/08/16

1. What is the course?

Course information

Course Title	Defence Cyber Masters Programme
Course code	MSCSOPTR, MSCDIPTR, PDCSOPTR, PDCDIPTR, PCCSOPTR, PCCDIPTR, SPCSOPTR, SPCDIPTR
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert Cyber Defence and Information Assurance (CDIA) MSc. PgDip, PgCert Cyberspace Operations (CSOps)
Exit routes	MSc Cyber Defence and Information Assurance (CDIA) PgDip Cyber Defence and Information Assurance PgCert Cyber Defence and Information Assurance MSc Cyberspace Operations (CSOps) PgDip Cyberspace Operations PgCert Cyberspace Operations
Mode of delivery	Part-time Flexible learning
Location of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Centre for Electronic Warfare, Information and Cyber
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	1st or 2nd class honours degree; 3rd class degree with three years relevant experience; pass degree with five years relevant experience; HND/C with seven years relevant experience. Exceptional candidates may be accepted with 10 years relevant experience, where relevant experience is gained in Information Security, Information Operations, information risk or related role. Students whose first language is not English must also attain an IELTS score of 6.5. Owning to security classification, and course purpose, only UK Government sponsored and security-cleared students with a justifiable interest in cyberspace operations will be

	enrolled on the CSOps named award or its two modules on planning in the full spectrum context and cyber in the C2 battle.
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Part-time MSc - up to five years, Part-time PgCert - up to three years, Part-time PgDip - up to four years (For MOD status students the duration may vary, subject to annual review.)
Course Start Month(s)	September

Institutions delivering the course
This course is delivered by Cranfield Defence and Security where the research interests associated with this course include Cyber and Information Security and Information Operations

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

- Guest lecturers are drawn from other academic institutions and the practitioner community
- The course has a notable external advisory panel, chaired by Sir Edmund Burton, and is supported by the Cabinet office and the Office of Cyber Security and Information Assurance.

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

Cyber Defence and Information Assurance MSc holds provisional accreditation from GCHQ which should be confirmed following the graduation of Cohort 1 (July 2017). Other accreditation will be sought as appropriate.

2. <u>What are the aims of the course?</u>

Cranfield University offers this programme in order to achieve the following aims related to the two named Masters level awards noted above:

- Cyber Defence and Information Assurance (CDIA) - To develop professionals who can effectively manage and exploit the threats and opportunities of cyberspace at the organisational level.
- Cyberspace Operations (CSOps) - To develop professionals to support manoeuvres in cyberspace, in contested operations and as part of integrated planning.

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:

<u>CDIA</u>

- Government, corporate and critical information infrastructure staff who are one or more of the following:
  - Managers who need to understand information risk and respond to cyber threats
  - Technicians who wish to understand the operational and business context
  - Procurement staff commissioning critical or sensitive projects

- Policy and planning staff interested in computer network and security operations
- Personnel interested in social media and associated concepts such as cyber mobilization.
- Those charged with accreditation and assessment of security measures

CSOps

- Military and other Government personnel charged with supporting operations in Cyberspace, in their current or anticipated role. These staff may also carry out one or more of the roles listed above for CDIA.

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

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

A. Postgraduate Certificate common to both named awards

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

ILO 1. Critically assess an organisation's Information Security and Information Assurance policy, strategy and plans, with a view to improvement.

ILO 2. Critically appraise approaches to measuring risk.

ILO 3. Evaluate the opportunities and limitations afforded by emergent security technologies.

ILO 4. Develop security requirements in the context of acquisition.

ILO 5. Determine effective approaches to managing and exploiting social media and pervasive technologies

Specific to CDIA

ILO 6. Appraise best practice in network defence and security operations management in the context of interdependence and critical infrastructure.

ILO 7. Evaluate the human dimension of security technologies, processes and behavioural change programmes and plan for improvement in an organisational context.

Specific to CSOps

ILO 8. Appraise the main elements and key management issues in the planning and conduct of Cyberspace Operations in the full-spectrum context.

ILO 9. Assess theories of decision-making and sense-making and evaluate their utility in effects planning in the C2 context.

ILO 10. Assess cyber technical approaches that support military effect.

B. Postgraduate Diploma

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

ILO 11. Critically evaluate a range of approaches to understanding complex and changing cyber environments.

ILO 12. Appraise the techniques that can be used to design investigation, problem formulation and structuring, and interpretation of data.

ILO 13. Analyse and scope a complex cyber problem-space with a view to action and improvement.

ILO 14. Judge ethics and ethicality at each stage of planning and activity.

ILO 15. Develop problem definition, analysis and problem solving skills to address challenges faced in cyber issues.

ILO 16. Argue coherently and demonstrate knowledge of personal strengths and weaknesses.

ILO 17. For CSOps only – Assess operational impact of proposed interventions.

ILO 18. For CDIA only – Assess business impact of proposed interventions.

C. MSc

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

ILO 19. Display evidence of independent learning and originality in a topic related to the student's named award.

ILO 20. Demonstrate self-direction and originality in developing and delivering successful independent research projects relating to the student's named award.

ILO 21. Make informed judgements regarding cyber issues on potentially incomplete data.

4. <u>How is the course taught?</u>

The course is taught through a flexible blend of residential courses, VLE activities and interaction and project based learning. It has three components:

- A taught component comprising six ten-credit modules
- A 20 credit module entitled 'Developing Cyber Thinking and Practice' followed by a 40 credit work based project
- An 80 credit dissertation

Of the first six taught modules of each named award, five are delivered through attendance on an 18-hour residential. This is followed by 18 hours of directed learning on the VLE, typically consisting of three 6-hour activities. One of the modules (Understanding Risk) is delivered entirely online as part of the flexible approach offered to part-time students.

The second year double-module will be presented over two residential periods combined with online activities. The second residential is intended to facilitate an assessed reflective presentation on the coursework to date. The 40-credit work-based project, as described in section 3, will be assessed through presentation and written report.

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

- Full physical and electronic access to resources in the Barrington library
- Collaborative and reflective learning in a cohort of practitioners has proven successful in other courses and it is intended to utilise this approach on this course. In this, students will be encouraged to draw on and share their experiences. Students will be asked to conduct activities that will require them to tackle realistic scenarios and to reflect on how the course literature, teaching and learning shapes their professional practice.

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 in Cyber Defence and Information Assurance

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

Description	Credits
COMPULSORY MODULES:	
Understanding Risk Cyber Defence - Governance and Management Cyber Attack – Threats and Opportunities Social Technologies The Human Dimension Critical Networks and Process Control	10 10 10 10 10 10
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

B. Postgraduate Certificate in Cyberspace Operations

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

Description	Credits
COMPULSORY MODULES:	
Understanding Risk Cyber Defence - Governance and Management Cyber Attack – Threats and Opportunities Social Technologies Planning in the full spectrum context Cyber in the C2 Battle	10 10 10 10 10 10
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

C. Postgraduate Diploma in Defence and Information Assurance

The accumulation of 120 credits through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Understanding Risk Cyber Defence - Governance and Management Cyber Attack – Threats and Opportunities Social Technologies The Human Dimension Critical Networks and Process Control Developing Cyber Thinking and Practice Work-Based project	10 10 10 10 10 10 20 40
ELECTIVE MODULES:	
N/A	
TOTAL:	**120**

D. Postgraduate Diploma in Cyberspace Operations

The accumulation of 120 credits through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	
Understanding Risk and Information Assurance Cyber Defence - Governance and Management Cyber Attack – Threats and Opportunities Social Technologies Cyber in the C2 Battle Planning in the Full Spectrum Context Developing Cyber Thinking and Practice Work-Based project	10 10 10 10 10 10 20 40
ELECTIVE MODULES:	
N/A	
TOTAL:	**120**

E. MSc in Cyber Defence and Information Assurance

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:	
Understanding Risk Cyber Defence - Governance and Management Cyber Attack – Threats and Opportunities Social Technologies The Human Dimension Critical Networks and Process Control Developing Cyber Thinking and Practice Work-Based project Dissertation	10 10 10 10 10 10 20 40 80
ELECTIVE MODULES:	
TOTAL:	**200**

F. MSc in Cyberspace Operations

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:	
Understanding Risk Cyber Defence - Governance and Management Cyber Attack – Threats and Opportunities Social Technologies Planning in the Full Spectrum Context Cyber in the C2 Battle Developing Cyber Thinking and Practice Work-Based project Dissertation	10 10 10 10 10 10 20 40 80
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);[1] [2]
- **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.

This course is only offered on a part-time basis and delivered in a flexible learning style. In the normal course of events students will study six modules over the first 12 months in three teaching blocks. In each teaching block, students will participate in two modules concurrently. Students are required to attend a residential lecture series at the Defence Academy and undertake remote directed study. This remote activity will be facilitated through the CDS virtual learning environment (VLE) (Moodle).

The second year comprises a 20 credit taught module with two short residential periods and a 40 credit work-based project. The project will require attendance at two short residential sessions and completion of an online workbook. The 80-credit dissertation in the third year is supported by individual supervision and tuition. The quickest time for completion of the whole Masters is 3 to 3.5 years.

[1] 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).

[2] 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%).

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	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	R-DEFCY-UR	Understanding Risk	36		10		05/09/16	N/A	N/A	40	ICW		100	RP ⊗ Essay	30 70	06/12/16 03/01/17	05/12/17 02/01/218
2	R-DEFCY-CD	Cyber Defence – Governance and Management	36		10		05/09/16	05/09/16	09/09/16	40	ICW		100	RP ⊗ Essay	30 70	06/12/16 03/01/17	28/11/17 02/01/18
3	R-DEFCY-CA	Cyber Attack – Threats and Opportunities	36		10		09/01/17	30/01/17	01/02/17	40	ICW		100	RP ♦ Essay	30 70	28/03/17 11/04/17	20/03/18 10/04/18

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
							Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
											Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
4	R-DEFCY-ST	Social Technologies	36		10		16/01/17	01/02/17	03/02/17	40	ICW		100	RP ♦ Essay	30 70	28/03/17 18/04/17	27/03/18 17/04/18
5	R-DEFCY-CN	Critical Networks and Process Control	36		10		24/04/17	15/05/17	17/05/17	40	ICW		100	RP * Essay	30 70	11/07/17 01/08/17	03/07/18 31/07/18
6	R-DEFCY-HD	The Human Dimension	36		10		01/05/17	17/05/17	19/05/17	40	ICW		100	RP * Essay	30 70	11/07/17 08/08/17	10/07/18 07/08/18
7	R-DEFCY-PSC	Planning in the Full Spectrum Context	36		10		24/04/17	15/05/17	17/05/17	40	ICW		100	RP ♣ Essay	30 70	11/07/17 01/08/17	03/07/18 31/07/18
8	R-DEFCY-CC2B	Cyber in the C2 Battle	36		10		01/05/17	17/05/17	19/05/17	40	ICW		100	RP ♣ Essay	30 70	11/07/17 08/08/17	10/07/18 07/08/18
9	R-DEFCY-DCTP	Developing Cyber Thinking and Practice	64		20		**A** 14/09/16	14/09/16 24/10/16	16/09/16 26/10/16	40	ICW		100	Poster RP Essay	30 20 50	18/10/16 03/01/17 24/01/17	17/10/17 02/01/18 23/01/18
							B 08/02/17	08/02/17 20/03/17	10/02/17 22/03/17	40	ICW			Poster RP	30 20	14/03/17 30/05/17	13/03/18 29/05/18

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

Module Number	Module code	Title	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar				Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
															Essay	50	20/06/17	19/06/18
10	R-DEFCY-PROJ	Work-based Project	35		40		**A**	26/10/16	26/10/16 03/07/17	27/10/16 03/07/17	50			100	Pres Report	20 80	27/06/17 18/07/17	EXAMINERS DISCRETION
							B	22/03/17	22/03/17 04/12/17	23/03/17 04/12/17	50				Pres Report	20 80	28/11/17 19/12/17	EXAMINERS DISCRETION
11	R-DEFCY-DISS	Dissertation	44		80		A - 30/09/16 B - 31/01/17 C - 31/03/17 D - 31/07/17		30/09/16 31/01/17 31/03/17 31/07/17	29/09/17 31/01/18 29/03/18 31/07/18	50	THESIS	100				29/09/17 31/01/18 29/03/18 31/07/18	EXAMINERS DISCRETION

Please note there will be a compulsory Dissertation Workshop running 04/07/17 - 06/07/17 or 05/12/17 - 07/12/17. You must attend the workshop before submitting your proposal.

⊗ - One RP to cover both modules
♦ - One RP to cover both modules
∗ - One RP to cover both modules

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

♣- One RP to cover both modules

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

7. How are the ILOs assessed?

The following assessment types are utilised:

Formative Assessment: Throughout the course each student will conduct a number of online activities, case studies and small 'project' like activities. As part of their online activities their contributions will be subject to peer review by fellow students, visiting lecturers and module leaders. A variety of approaches will be utilised for peer to peer collaboration including presentation of information gathering and analysis undertaken, essays, problem solving, analysis of case study scenarios (including: 'dilemma', 'puzzle', 'discussion', 'how to', and historical cases).

Summative Assessment: As per the module descriptors, each 10-credit taught module will require two pieces of course work consisting of one large assignment and one smaller relating to their learning journey. As part of each reflective portfolio the student will undertake a self-marking exercise, where they will be asked to highlight the strengths and weaknesses of their work and any areas on which they need specific feedback. This exercise contributes to the persistent requirement for self-reflection throughout the course and is both beneficial as an educational tool and as a personal reflective skill to be used in their professional practice. The 40 credit workbased project is assessed through presentation and written submission. The dissertation is assessed via a written submission.

Please note that the maximum classification level for assignment submission is Secret.

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.)

For Example:

Award ILOs / ***Module No.***	***ILO 1.***	***ILO 2.***	***ILO 3.***	***ILO 4.***	***ILO 5.***	***ILO 6.***	***ILO 7.***	***ILO 8.***	
98	*ICW*				*EX*	*EX*	*ICW*		
99	*ICW1*		*ICW1*	*ICW2*					

A. Postgraduate Certificate

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

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

Title	Modules Covered	Assessment	
		Type	Weight (%)
Reflective Portfolio	Cyber Defence Governance and Management	RP	30%
	Understanding Risk	RP	30%
Reflective Portfolio	Cyber Attack - Threats and Opportunity	RP	30%
	Social Technology	RP	30%
Reflective Portfolio	Critical Networks and Process Control	RP	30%
	The Human Dimension	RP	30%
Reflective Portfolio	Cyber in the C2 Battle	RP	30%
	Planning in the Full Spectrum Context	RP	30%

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. <u>What opportunities are graduates likely to have on completing the course?</u>

The course aims to ensure that graduates are better prepared to tackle the current and emerging demands of cyberspace. Given the rapidly changing nature of the threat and capability landscape this education will allow graduates to recognise emerging threats 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 CVs of those wishing to move into strategic and operational positions in defence and businesses enabled by the information revolution.

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: PgCert in Defence Equipment Engineering (Land)

Date of first publication/latest revision: 12/08/16

1. What is the course?

Course information

Course Title	Defence Equipment Engineering (Land)
Course code	PCDEEPTR
Academic Year	2016-2017
Valid entry routes	PgCert
Exit routes	N/A
Mode of delivery	Part-time
Location of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Centre for Defence Engineering
Awarding Body	Cranfield University
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	Maximum of 3 years
Course Start Month(s)	September

Institutions delivering the course

This course is delivered by Cranfield Defence and Security (CDS) where the research interests include mobility, lethality and support systems for Defence. The Course is managed by the Centre for Defence Engineering and teaching is provided by several of the CDS Centres at Shrivenham.

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

- Students undertake visits to military venues.
- Teaching will be supplemented by speakers from MOD and other industry partners.
- The course is sponsored by DE&S
- On development to PgDip and MSc it is intended that the course will achieve an active Industrial Advisory Panel/Customer Liaison Group who will visit the course, interact with students, view course and project work, and offer ideas for course and syllabus 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 not accredited by any external bodies.*

The Course Team in partnership with DE&S recognises that the perceived value of a course is greatly enhanced if a professional body accredits it. Accreditation will be formally sought for the PgCert and subsequent PgDip and MSc from the Institute of Mechanical Engineers and Institute of Engineering and Technology after the first cohort of students has attended the course. However students should check with the relevant institute directly as to their individual requirements.

2. <u>What are the aims of the course?</u>

Cranfield University offers this course in order to:

- Provide graduates with the technical qualities, transferable skills and independent learning ability necessary to make them effective in organisations that design, develop, procure or operate military vehicles and soldier systems (in the “Land” environment.) Such organisations include, but are not limited to, the Course Customer DE&S, other elements of MOD, other elements of the Civil Service and the defence industry.

A Postgraduate Certificate (PgCert) exit route is the current provision for students. Subject to funding being secured by DE&S the provision of PgDip and MSc routes are the aspiration of the Customer and Course Team.

The programme is intended for the following range of students:

- DE&S Engineers who have completed their graduate training programme
- MOD and wider industry employees for CPD
- Who are or will be working with Land System Equipment including soldier systems, weapon and vehicle development, procurement, integration and support.

This programme is intended for the following range of students:

- DE&S Engineers who have completed their graduate training programme
- MOD and wider industry employees for CPD
- Who are or will be working with Land System Equipment including soldier systems, weapon and vehicle development, procurement, integration and support.

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

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

A. Postgraduate Certificate in Defence Equipment Engineering (Land)

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

ILO 1. Defend the choice of military vehicle, weapon or soldier system given a scenario.

ILO 2. Critically assess the mechanical design of land equipment using appropriate calculations

ILO 3. Appraise a systematic approach and apply engineering judgement to the design and integration of land equipment

ILO 4. Quantify the engineering and physical limitations to the performance of land systems in relation to their design

ILO 5. Propose the appropriate technique and/or tools to analyse and evaluate a particular system

ILO 6. Justify a practical and sound engineering approach to problem solving

ILO 7. Assess data from experiments, case studies and wider sources

4. How is the course taught?

In addition to the teaching methods outlined in section 3 above, students will be supported in their learning and personal development by:

- The use of the Virtual Learning Environment (VLE) where additional resources will be added to complement those used directly in the taught modules.
- The introduction of personal tutors to act as a point of contact for any academic and pastoral issues that student's may have during their studies.
- Discussion sessions regarding new technology and developments of current military equipment.
- Participation on the modules of senior serving Military Officers and DE&S staff, which are able to raise current issues and comment on the latest developments.

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:	
1. Reliability and Systems Effectiveness 2. Systems Engineering Introduction 3. Trials Management for Defence Equipment Engineering 4. Defence Equipment Engineering and Deployment 5. Case Study for Defence Equipment Engineering	10 10 10 20 10
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

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);[1] [2]
- **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?

[1] 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).

[2] 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%).

Please see the course structure document for details on the individual elements of the course.

This course is only offered on a part-time basis. Students have up to 3 years to complete the PgCert.

A 10-credit module is taught over a period of one week with 20-credit modules pro-rata. The exception is the Case Study Module which is a 10-credit module run over 2 weeks to allow the students un-interrupted time to complete the written assessment part of the module with the resources and staff available. The sponsor was particularly concerned that time be formally allowed within the Case Study module to ensure completion without distraction by the work environment, and the completion of the module within the time frame allowed.

Course modules

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

Module Number	Module code	Title	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	R-ESD-RSE	Reliability and Systems Effectiveness	31	0	10	Y	22/08/16	26/09/16	30/09/16	40	ICW	100	N/A	N/A	N/A	7/11/16	9/1/17
2	R-DEE-SEI	Systems Engineering Introduction (SEI)	35	0	10	N	12/12/16	23/01/17	27/01/17	50	EX	100	N/A	N/A	N/A	27/02/17	25/4/17
3	R-DEE-TMDEE	Trials Management for Defence	32	3	10	N	N/A	15/05/17	19/05/17	50	N/A	N/A	100	EX ICW	80 20	20/06/17 18/07/17	12/9/17

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
		Equipment Engineering (TMDEE)															
4	R-DEE-DEED	Defence Equipment Engineering and Deployment (DEED)	67	0	20	N	21/05/17	18/06/17	29/06/17	50	N/A	N/A	100	OR ICW	40 60	In Module 13/08/17	26/09/17 24/09/17
5	R-DEE-CSDEE	Case Study for Defence Equipment Engineering (CSDEE)	45	0	10	N	12/09/16	24/10/16	4/11/16	50	N/A	N/A	100	ORIC W	25 75	In Module In Module	Next AY 4-weeks after marks released

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
R-ESD-RSE	Reliability and Systems Effectiveness	Vehicle and Weapon Engineering Programme	Vehicle and Weapon Engineering Programme

7. How are the ILOs assessed?

The following assessment types are utilised:

The students will undertake a range of examinations both written and oral, assessed coursework and group exercises. The mix of coursework and examination has been set accordingly to the suitability of the material covered with each module. Assessment will cover a range of question styles, including descriptive, technical discussions, analysis of engineering problems, and simulation of engineering systems using computer aided engineering tools. The oral examinations will also introduce peer assessment.

This approach has been adopted in order to represent the responsibilities of the student in their current respective roles.

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.)

For Example:

Award ILOs / Module No.	***ILO 1.***	***ILO 2.***	***ILO 3.***	***ILO 4.***	***ILO 5.***	***ILO 6.***	***ILO 7.***	***ILO 8.***	
98	*ICW*				*EX*	*EX*	*ICW*		
99	*ICW1*		*ICW1*	*ICW2*					

A. Postgraduate Certificate

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

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

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

Title	Modules Covered	Assessment	
		Type	Weight (%)
1	R-ESD-RSE	ICW	100

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

Students are sponsored on the course by their employer (DE&S). The main reason for the sponsor providing this support is to ensure they (the students) are equipped to undertake senior positions within Land Equipment teams in the organisation and able to progress to Chartered Engineers.

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: MSc Defence Leadership**:**

Date of first publication/latest revision: October 2016

1. What is the course?

Course information

Course Title	Defence Leadership
Course code	MSDLSPTR – PDDLSPTR – PCDLSPTR - SPDLSPTR
Academic Year	2016-17
Valid entry routes	PgCert, PgDip, MSc
Additional exit routes	PgCert, PgDip,
Mode of delivery	Part-time
Location of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Leadership and Management
Centre	Centre for Leadership and Management
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
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	5 Years, MSc, 4 Years PG Dip, 3 Years PG Cert
Course Start Month(s)	January

Institutions delivering the course

This course is delivered by the 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 remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

Students, after completing the first six modules, will be invited to take up Student Membership of the ILM, the cost of which will be borne by Cranfield University. Student membership lasts for approximately twelve months, during which time students can access ILM online resources. Upon successful completion of the Postgraduate Diploma stage, students will also be awarded the ILM Level 7 in Strategic Leadership and become eligible for corporate ILM membership at the level of Fellow.

The Institute of Leadership and Management (ILM) has accredited the degree as meeting the requirements of the Level 7 Award in Strategic 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 the defence sector.

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 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. Exhibit a conceptual awareness and knowledge of their own leadership styles, behaviours and preferences.

ILO 3. Describe and critically evaluate examples of leadership failure and success, in the defence sector.

ILO 4. Evaluate the influence and impact of both external and internal contexts and actors on defence leadership.

ILO 5. 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 6. Demonstrate awareness of the critical role of contexts and situations in the success and failure of leadership in the defence sector.

ILO 7. Critically evaluate the leadership development needs of others in the defence sector.

ILO 8. Show a thorough awareness of contemporary theories and models of leadership in the defence sector.

ILO 9. Demonstrate knowledge of the ability to develop the frameworks which inform defence leadership styles and behaviours for particular situations.

ILO 10. Show the development of practical skills to select, develop and appraise successfully the leadership of others in the defence sectors.

ILO 11. Demonstrate a critical awareness of 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 12. Comprehend the underpinning academic subject matter relating to leadership in the defence sector.

ILO 13. Critically appraise the role of leadership in defence

ILO 14. Design and conduct an individual research project to address defence leadership issues.

ILO 15. Demonstrate the application of sound social science research methods to explore a particular defence related research question.

ILO 16. Display transferable skills in interview and questionnaire techniques.

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 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 1-6	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-DISS	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 <u>not</u> have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[1] [2]
- **For Taught Assessments,** the minimum mark for each individual taught assessment <u>on the first attempt</u> for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **<u>up to 30 learning credits</u>**, you will be permitted to re-take all of those assessments (except for circumstances where a resit

[1] 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).

[2] 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%).

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 **<u>any additional learning credits</u>** 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 <u>not</u> 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. <u>How is the course structured?</u>

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 to five years. Whilst students are registered for five years, the normal time to complete the course is three. 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.
PgDip Students also register for the course in January; this variant is normally completed in two years.

Course modules[3]

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	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)	'Residential' Start Date	'Residential' End Date	Minimum Mark[6] - 40% or 50%	Type of Assessment	Weighting within module[7] (%) of Independent assessments	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-DL-IS	Introduction Introductory Studies & Critical thinking	20		10	N	08/01/17	08/01/17	10/01/17	50	ICW	100				28/02/17	Next Assessment Opportunity
2	R-DL-LSCM	Leadership Studies - Classical &	20	2	10	N	11/01/17	11/01/17	13/01/17	50	ICW	100				10/04/17	Next Assessment Opportunity

[3] Please see Senate Handbook for Setting Up a New Taught Course for guidance on completing this table
[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%. This will be at the Board of Examiners discretion.
[7] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[8] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[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

Module Number	Module code	Title	Contact hours[4]	Total hours delivered by Visiting Lecturers[5]	Credits	Is the module shared? Y/N	Calendar			Assessment							
							Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[6] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
											Type of Assessment	weighting within module7 (%) of Independent assessments	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
		Modern															
3	R-DL-SMD	Strategic Management in Defence	20	2	10	N	07/05/17	07/05/17	09/05/17	50	ICW	100				26/06/17	Next Assessment Opportunity
4	R-DL-PL	The Psychology of Leadership	20	0	10	N	01/10/17	01/10/17	03/10/17	50	ICW	100				20/11/17	Next Assessment Opportunity
5	R-DL-DSOB Occ B	Defence Sector & Organisational Behaviour	20	0	10	N	10/05/17	10/05/17	12/05/17	50	ICW	100				07/08/17	Next Assessment Opportunity
6	R-DL-PPM	Programme & Project Management	20	0	10	N	04/10/17	04/10/17	06/10/17	50	ICW	100				01/02/18	Next Assessment 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

Module Number	Module code	Title	Contact hours[4]	Total hours delivered by Visiting Lecturers[5]	Credits	Is the module shared? Y/N	Calendar			Assessment							
							Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[6] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
											Type of Assessment	weighting within module7 (%) of Independent assessments	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-DL-LCI	Leading Change and Innovation	20	2	10	N	05/02/17	05/02/17	07/02/17	40	ICW	100				27/03/17	Next Assessment Opportunity
8	R-DL-NSRC	National Security: Resilience and Crisis	20	4	10	N	08/02/17	08/02/17	10/02/17	40	ICW	100				05/05/17	Next Assessment Opportunity
9	R-DL-GSCC	Global Security: Culture and Complexity	20	1	10	N	21/05/17	21/05/17	23/05/17	40	ICW	100				10/07/17	Next Assessment Opportunity
10	R-DL-GSEC	Global Security: Emerging Challenges	20	0	10	N	24/05/17	24/05/17	26/05/17	40	ICW	100				28/08/17	Next Assessment Opportunity
11	R-DL-LDD	Leadership Development in Defence	20	12	10	N	19/11/17	19/11/17	21/11/17	40	ICW	100				10/01/18	Next Assessment 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

Module Number	Module code	Title	Contact hours[4]	Total hours delivered by Visiting Lecturers [5]	Credits	Is the module shared? Y/N	Calendar			Assessment								
							Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[6] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
											Type of Assessment	weighting within module7 (%) of Independent assessments	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
12	R-DL-CDLS	Contemporary Defence Leadership Studies	20	6	10	N	22/11/17	22/11/17	24/11/17	40	ICW	100				27/02/18	Next Assessment Opportunity
13	R-DL-RM	Research Methods	20	0	10	N	16/01/17	16/01/17	20/01/17	50	ICW	100				29/01/17	
14	R-DL-DISS	Dissertation	30	0	70	N	20/01/17	N/A	N/A	50	THESIS	100				30/01/18	

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

Please list all course elements that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
N/A			

6. How are the ILOs assessed?

The following assessment types are utilised:

Examinations (open note, open book and closed book), and individual course work

This approach has been adopted because:

It presents a balanced assessment, meeting a range of learning styles as also addresses the limitation of individual and group presentations as methods of assessment.

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 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
5: DSOB	ICW			ICW	ICW
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: Diss	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			

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. <u>What opportunities are graduates likely to have on completing the course?</u>

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.

COURSE TITLE: PgCert Defence Leadership – US Military

Date of first publication/latest revision: January 2017

1. What is the course?

Course information

Course Title	Defence Leadership
Course code	PCDLSPTR - SPDLSPTR
Academic Year	2016 - 2017
Valid entry routes	PgCert
Additional Exit routes	N/A
Mode of delivery	Part Time
Location of Study	Shrivenham
School(s)	CDS
Theme	Leadership and Management
Centre	CDML
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FEHQ Level 7 (Masters)
Benchmark Statement(s)	Not applicable
Registration Period(s) available	1 Year
Course Start Month(s)	April

Institutions delivering the course

This course is delivered by the 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 remains fully responsible for the quality of the delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

The parent degree is accredited by the Institute of Leadership and Management as meeting the requirements of Level 7 Award in Strategic Management. After completing the PgCert students are eligible for Student Membership of the ILM. Student membership lasts for approximately twelve months, during which time students can access ILM online resources.

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 the defence sector.

This programme is intended students from the US Army and the US National Guard who will be able to add real value to the examination of defence leadership in general and to their subsequent appointments.

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. Exhibit a conceptual awareness and knowledge of their own leadership styles, behaviours and preferences.

ILO 3. Describe and critically evaluate examples of leadership failure and success, in the defence sector.

ILO 4. Evaluate the influence and impact of both external and internal contexts and actors on defence leadership.

ILO 5. Critically analyse the application of leadership ideas, theories and concepts to a specific defence context.

4. How is the course taught?

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, academe, 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 above. 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 1-6	10 credits per module
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

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);[1] [2]

[1] 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).

- **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?

The course's residential phase is taught between the 15th February and the 10th March 2016. The assessments for each module are undertaken between March and November 2016 in 6 week periods. These 6 week periods allow time for independent learning, reflection and the completion of assignments. The Assignments will be posted on the VLE at the conclusion of each taught module.

[2] 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%).

Course modules[3]

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

Module Number	Module code	Title	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)	'Residential' Start Date	'Residential' End Date	Minimum Mark[6] - 40% or 50%	Type of Assessment	Weighting within module7 (%) of Independent assessments	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-DL-IS	Introduction/Registration Introductory Studies & Critical thinking	20		10	N	24/04/17	24/04/17	26/04/17	50	ICW1	100				30/06/17	Retake 15/12/17
2	R-DL-LSCM	Leadership Studies - Classical & Modern	20	2	10	N	27/04/17	27/04/17	01/05/17	50	ICW	100				11/08/17	Next available assessment opportunity

[3] Please see Senate Handbook for Setting Up a New Taught Course for guidance on completing this table
[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%. This will be at the Board of Examiners discretion.
[7] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[8] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[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: 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

Module Number	Module code	Title	Contact hours[4]	Total hours delivered by Visiting Lecturers [5]	Credits	Is the module shared? Y/N	Calendar			Assessment							
							Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[6] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
											Type of Assessment	Weighting within module7 (%) of Independent assessments	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
3	R-DL-SMD	Strategic Management in Defence	20	2	10	N	7/05/17	7/05/17	9/05/17	50	ICW	100				22/09/17	Next available assessment opportunity
4	R-DL-PL	The Psychology of Leadership	20	0	10	N	2/05/17	2/05/17	4/05/17	50	ICW	100				10/11/17	Next available assessment opportunity
5	R-DL-DSOB	Defence Sector & Organisational Behaviour	20	0	10	N	10/05/17	10/05/17	12/05/17	50	ICW	100				15/12//17	Next available assessment opportunity
6	R-DL-PPM	Programme & Project Management	20	0	10	N	15/05/17	15/05/17	18/05/17	50	ICW	100				2/02/18	Next available assessment opportunity

Assessment Types: 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

Please list all course elements that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
N/A			

7. How are the ILOs assessed?

The following assessment types are utilised:

Individual course work

.The PgCert is assessed by written assignment to develop critical thinking and argument.

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 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
5: DSOB	ICW			ICW	ICW
6: PPM	ICW	ICW	ICW	ICW	ICW

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that external examining is one of the principal means for maintaining UK threshold academic standards within autonomous higher education institutions.

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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.

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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.

9. <u>What opportunities are graduates likely to have on completing the course?</u>

Takes students on to 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/USDOD.

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: MDes in Design and Innovation for Sustainability

Date of first publication/latest revision: 14/09/16

1. What is the course?

Course information

Course Title	Design and Innovation for Sustainability
Course code	MNDISFTC, MNDISPTC, PDDISFTC, PDDISPTC, PCDISFTC, PCDISPTC
Academic Year	2016/17
Valid entry routes	MDes, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Water
Centre	Cranfield Centre for Competitive Creative Design (C4D)
Course Director	Dr Mariale Moreno
Awarding Body	Cranfield University
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 PgCert - one year, Part-time PgCert - two years, Full-time PgDip - one year, Part-time PgDip - two years Full-time MDes – one year, Part-time MDes – three years
Course Start Month(s)	October

Institutions delivering the course

This course is delivered by the Centre for Competitive Creative Design where the research interests include development of design-led thinking and open (collaborative) innovation within engineering and management sectors – developing innovation in the development of areas of environmental and social responsibility, evaluation of design effectiveness and methods and applications for design futures.

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, Xerox, Herman-Miller and the NHS, 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 not accredited by any external bodies.*

Applying for accreditation from the Chartered Society of Designers.The initial accreditation meeting will take place in October 2017.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- Establish study in multi-disciplinary working to effectively integrate social, technological, environmental and economical approaches to design and innovation.
- Develop research and consultancy linking technology, management user-centred design and sustainable development.
- Produce professionals who are able to lead multi-disciplinary operations through sustainable design-led development, design and business innovation strategies

This programme is intended for the following range of students:

- Graduates from design and engineering sectors
- Industry professionals who wish to develop engagement with multi-disciplinary sustainable development
- International graduates and professionals who wish to positioned at the forefront of design-led innovation

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

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

A. Postgraduate Certificate in Design and Innovation for Sustainability

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

ILO 1. Demonstrate conceptual understanding of sustainable development (design and business innovation strategies)

ILO 2. Demonstrate a knowledge of ways in which products and services are developed within industry

ILO 3. Critically evaluate theory and practice in reframing problems to generate more sustainable design-led innovation

ILO 4. Apply key user-centred approaches and evaluation tools in the development of sustainable products, services and systems

B. Postgraduate Diploma in Design and Innovation for Sustainability

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

ILO 5. Develop working/application knowledge of using current tools and methods used in user-centred design, sustainable and management practices and make informed comparisons and judgements

ILO 6. Facilitate systematic understanding and mapping of sustainability issues onto design-led activities

ILO 7. Integrate knowledge, understanding and skills from the taught modules in a real-life situation.

ILO 8. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

C. MDes in Design and Innovation for Sustainability

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

ILO 9. Develop successful independent project appropriate to chosen organisations

ILO 10. Enhanced critical appreciation of own and others work

ILO 11. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 12. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

4. <u>How is the course taught?</u>

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

There are three phases that make up the course (taught, group project/ dissertation and individual thesis project.
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 an appreciative learning and action based approach to maximise the benefit of the multi-disciplinary nature of 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 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:	
Any 6 taught modules from 2 - 9	60
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:	
8 compulsory taught modules (2 – 9) Group Project (Full-time) or Dissertation (Part-time)	80 40 or 40
ELECTIVE MODULES:	
TOTAL:	**120**

C. MDes

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

Description	Credits
COMPULSORY MODULES:	
8 compulsory taught modules (2 – 9) Group Project (Full-time) or Dissertation (Part-time) Individual Thesis Project	80 40 or 40 80
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);[1] [2]
- **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).

[1] 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).

[2] 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%).

6. How is the course structured?

The full time course is structured in three phases:

- The taught phase between October and January taking eight compulsory modules
- The group project phase runs between March and the following September;
- The thesis phase between March and the following September.

The part time course is structured in three phases:

- The taught phase between October and January taking eight compulsory modules (typically within the registration period)
- The dissertation phase is organised with a supervisor and typically delivered between years one and two.
- The thesis phase is typically completed as the final delivery of their course and would start after the taught phase and dissertation has been completed.

Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-DES-INWK	Induction *(compulsory)*	L.Williams	50		0	N		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	Paul Burgess	26		10	Y		10/10/16	14/10/16	40	ICW	100				FT-22/10/16 PT-29/10/16	
3	I-DFS-A1028	Whole System Design	M Moreno	27		10	Y		24/10/16	28/10/16	40	ICW	100				FT-19/11/16	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
																	PT-26/11/16	
4	I-ICI-A1020	Managing Innovation and New Product Development	C Savory	35		10	Y		31/10/16	04/11/16	40	GCW	100				FT-26/11/16 PT-03/12/16	
5	I-ICI-A1009	Creative Enterprise & Entrepreneurship	M Van Der Kamp	36		10	Y		07/11/16	11/11/16	40	GCW	100				FT-17/12/16 PT-03/01/17	
6	I-DFS-A1521	Design and Brand Management -	L Williams	40		10	Y		28/11/16	02/12/16	40	ICW	100				FT-03/01/17 PT-07/01/17	
7	I-DSL-A1021	Consumer Trends	M Moreno	30		10	Y		05/12/16	09/12/16	40	GCW	100				FT-07/01/17 PT-14/01/17	

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								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
8	I-EMB-A1128	Technology, Environment and Society	P Longhurst	25		10	Y		23/01/17	27/01/17	40	ICW	100				FT-11/02/17 PT-18/02/17	
9	I-ICI-A1007	Programme & Project Management	J Algar	20		10	Y		06/02/17	10/02/17	40 40	GCW ICW	60 40				FT-18/02/17 PT-25/02/17	
10	I-DES-GRRP	Group Project For Full-Time Students	Supervisors	16		40	Y		20/02/17	06/05/17	50	GPROJ ICW	80 20				02/05/17 06/05/17	
11	I-DES-DISS	Dissertation For Part-time Students	Supervisors	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/17	
12	I-DES-THESIS	Individual Research Project	Supervisors	20		80	Y		08/05/17	04/09/17	50	THESIS OR	90 10				04/09/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-DIS-A1021	Consumer Trends	Design and Innovation for Sustainability	• Design Strategy and Leadership • Innovation for Creativity in Industry • Digital Design and Strategic Communication • Design and Innovation for Sustainability
I-DFS-A1028	Whole System Design	Design and Innovation for Sustainability	• Cost Engineering • Design Strategy and Leadership • Digital Design and Strategic Communication • Innovation and Creativity in the Industry • Design and Innovation for Sustainability
I-DFS-A1521	Design and Brand Management	Design and Innovation for Sustainability	• Design Strategy and Leadership • Digital Design and Strategic Communication • Innovation and Creativity in Industry • Knowledge Management for Innovation
I-EMB-A1122	Principles of Sustainability – C4D	• Environmental Management for Business	• Economics for Natural Resource and Environmental Management • Environment and Public Policy • Land Reclamation and Restoration • Energy Supply for Low Carbon Futures • Design and Innovation for Sustainability • Renewable Energy Technology
I-EMB-A1128	Technology, Environment and Society	• Environmental Management for Business	• Economics for Natural Resource and Environmental Management • Environment and Public Policy • Design and Innovation for Sustainability

I-ICI-A1007	Programme & Project Management	Innovation and Creativity in Industry	• Design and Strategy for Leadership • Digital Design and Strategic Communication
I-ICI-A1020	Managing Innovation and New Product Development	Innovation for Creativity in the Industry	• Design Strategy and Leadership • Design and Innovation for Sustainability • Digital Design and Strategic Communication • Global Product Development and Management • Manufacturing Technology and Management
I-ICI-A1009	Creative Enterprise & Entrepreneurship	Innovation and Creativity in the Industry	• Design Strategy and Leadership • Digital Design and Strategic Communication • Design and Innovation for Sustainability

7. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

The C4D centre is funded by HEFCE in collaboration with UAL in order to produce post – graduates who are able to take leadership positions in the private and public sectors embedding creative and innovation techniques into all areas. This is a needs-based profile supported by industries, and the course graduates are expected to find an appreciation of their abilities in the employment market. The profile is being developed in a variety of countries including Europe and America due to this identified need. C4D are part of a Design Council educational committee called the 'Interdisciplinary Design Network' at which this context is discussed and developed. The multidisciplinary development undertaken by this programme is key to engaging organisations with global sustainability issues and agendas, specifically in relation to successful adoption of design-led innovation across disciplinary boundaries.

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: MSc in Design of Rotating Machines

Date of first publication/latest revision: 09/09/16

1. What is the course?

Course information

Course Title	Design of Rotating Machines
Course code	MSDRMFTC, MSDRMPTC, PDDRMFTC, PDDRMPTC, PCDRMFTC, PCDRMPTC
Academic Year	2016/17
Valid entry routes	MSc
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location 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
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 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 currently going through the accreditation procedure for:
- Institution of Mechanical Engineers (IMechE).
- Royal Aeronautical Society *(*RAeS)*.*

2. <u>What are the aims of the course?</u>

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).

MSc in Design of Rotating Machines

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

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

ILO 2. Demonstrate ability to conduct the analysis of the stability of a range of rotating machines and be able to suggest remedial solutions in cases 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. Demonstrate ability to conduct the 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. Show evidence of the effective application of theories and software to the evaluation and determination of fatigue and fracture mechanics of engineering materials & structures.

ILO 6. Demonstrate knowledge of some key structural analysis techniques and theories in support of the design and evaluation of rotating equipment and its components.

ILO 7. Demonstrate an ability to undertake independent learning, especially via the systematic and creative use of information retrieval systems. Demonstrate self-direction and originality in tackling and solving problems, and act autonomously in planning and implementing tasks in a professional or equivalent level.

ILO 8. Apply effectively mechanical transmission techniques and theories in support of the selection, design and evaluation of a range of technically significant gearing equipment.

ILO 9. Demonstrate knowledge of some key technical management principles, including project management, people management, technology marketing, product development and finance.

ILO 10. Demonstrate ability to undertake independent learning, particularly via the effective use and critical appraisal of technical and/or commercial literature. Communicate effectively, via oral and written presentations and in the form of extended engineering reports. Communicate effectively in writing. Demonstrate good time management, successful work to deadlines. Operate effectively in a team.

ILO 11. Integrate knowledge, understanding and skills from the taught modules in a real-life situation.

ILO 12. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

ILO 13. Demonstrate a critical awareness of current research activities in selected topics in the area of rotating machines engineering. Demonstrate professional ability to undertake a critical appraisal of technical and/or commercial literature. Demonstrate the ability to manage research studies, and plan and execute projects in the design and analysis of rotating machinery and/or its components.

ILO 14. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 15. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

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 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 2, 3, 5, 6, 7, 8, 9	
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 N-DRM-GD Gear Design N-DRM-RD Rotor Dynamics G-MTI Management for Technology N-AME-SI Structural Integrity N-DRM-RESS Rotating Equipment Systems and Selection N-DRM-VDM Vibration and Diagnostics of Rotating Machines N-AME-ESA Engineering Stress Analysis: Theory and Simulations N-DRM-SARMC Stress Analysis of Rotating Machines Group Project/Dissertation (PT only)	10 10 10 10 10 10 10 10 0 40
ELECTIVE MODULES:	
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 N-DRM-GD Gear Design N-DRM-RD Rotor Dynamics G-MTI Management for Technology N-AME-SI Structural Integrity N-DRM-RESS Rotating Equipment Systems and Selection N-DRM-VDM Vibration and Diagnostics of Rotating Machines N-AME-ESA Engineering Stress Analysis: Theory and Simulations N-DRM-SARMC Stress Analysis of Rotating Machines Group project/Dissertation Individual research project	10 10 10 10 10 10 10 10 0 40 80
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);[1] [2]
- **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 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.

[1] 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).

[2] 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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENE-INWK	Induction	G Drew	24		0	y		03/10/16	07/10/16	N/A	N/A					N/A	
2	N-DRM-BD	Bearing Design	A Addali	33		10	N		10/10/16	21/10/16	40	EX	100				12/12/16	
4	N-DRM-GD	Gear Design	J Amaral Teixeira	30		10	N		31/10/16	04/11/16	40	ICW	100				10/12/16 FT 07/01/17 PT	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
6	N-DRM-RD	Rotordynamics	J Amaral Teixeira	50		10	N		21/11/16 & 09/01/17	25/11/16 & 13/01/17	40			100	EX ICW	70 30	20/02/17 28/01/17 FT 11/02/17 PT	
10	G-MTI	Management for Technology	S Carver	50		10	Y		13/02/17	17/02/17	40 40	EX GCW	50 50				20/03/17 25/03/17	
8	N-DRM-VDM	Vibration and Diagnostics of Rotating Machines	A Addali	30		10	N		16/01/17	20/01/17	40	EX	100				W/C 20/02/17	
3	N-DRM-RESS	Rotating Equipment Systems and Selection	J Amaral Teixeira	35		10	N		24/10/16	28/10/16	40	ICW	100				12/11/16 FT 26/11/16 PT	
9	N-AME-SI	Structural Integrity	A Mehmanparast	38.5		10	Y		30/01/17	03/02/17	40	EX	100				W/C 20/02/17	
7	N-AME-ESA	Engineering Stress Analysis: Theory and Simulations	A Mehmanparast	32		10	Y		28/11/16	02/12/16	40	ICW	100				07/01/17 FT 14/01/17 PT	
5	N-DRM-	Stress Analysis of	A Addali	30		0	N		14/11/16	18/11/16	N/A	N/A	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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
	SARMC	Rotating Machine Components																
11	I-ENE-GRPP	Group Project	16	20		40	Y		27/02/17	05/05/17	50	GPROJ ICW	80 20				02/05/17 06/05/17	
12	I-ENE-DISS	Dissertation (Part-Time option only)	Supervisor	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/17	
13	I-ENE-THESIS	Energy Individual Research Project	Supervisor	20		80	Y		08/05/17	08/09/17	50	OR THESIS	10 90				04/09/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
N-AME-SI	Structural Integrity	Advanced Mechanical Engineering	• Flow Assurance for Oil and Gas Production • Materials for Energy Systems • Offshore and Ocean Technology With Offshore Materials Engineering • Offshore and Ocean Technology With Pipeline Engineering • Offshore and Ocean Technology With Offshore Renewable Energy • Offshore and Ocean Technology With Risk Management • Offshore and Ocean Technology With Subsea Engineering MSc in Renewable Energy Engineering • Safety Accident & Investigation • Design of Rotating Machines
N-AME-ESA	Engineering Stress Analysis: Theory and Simulations	Advanced Mechanical Engineering	• Offshore and Ocean Technology With Offshore Materials Engineering • Offshore and Ocean Technology With Pipeline Engineering • Offshore and Ocean Technology With Risk Management • Offshore and Ocean Technology With Offshore Renewable Energy • Offshore and Ocean Technology With Subsea Engineering • Renewable Energy Engineering • Design of Rotating Machines
G-MTI	Management for Technology	School of Management	• Materials for Energy Systems, • Advanced Mechanical Engineering Biofuels Process Engineering

			• Energy Supply for Low Carbon Futures • Gas Energy • Offshore and Ocean Technology With Offshore Materials Engineering, • Offshore and Ocean Technology With Pipeline Engineering • Offshore and Ocean Technology With Offshore Renewable Energy • Offshore and Ocean Technology With Risk Management • Offshore and Ocean Technology With Subsea Engineering • Renewable Energy Engineering • Renewable Energy Technology • Flow Assurance for Oil and Gas Production • Carbon Capture and Storage • Energy Systems and Thermal Processes • Process Systems Engineering, Energy from Waste • Design of Rotating Machines

7. 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.

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. 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: MDes in Design Strategy and Leadership

Date of first publication/latest revision: 14/9/16

1. What is the course?

Course information

Course Title	Design Strategy and Leadership
Course code	PCDSLFTC, PCDSLPTC, PDDSLFTC, PDDSLPTC, MNDSLFTC, MNDSLPTC
Academic Year	2016/17
Valid entry routes	MDes,PgDip, PgCert
Additional exit routes	MDes, PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment (SWEE)
Theme	Water
Centre	Centre for Competitive Creative Design (C4D)
Course Director	Dr Adriana Encinas-Oropesa
Awarding Body	Cranfield University
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 PgCert - one year, Part-time PgCert - two years, Full-time PgDip - one year, Part-time PgDip - two years Full-time MDes - one year, Part-time MDes 3 years
Course Start Month(s)	Full-time: October Part-time: throughout the year

Institutions delivering the course

This course is delivered by the Cranfield Centre for Competitive Creative Design (C4D) located within the Water theme in the School of Water, Energy and Environment. The research interests include development of design-led thinking and open (collaborative) innovation within design, engineering and management sectors, and evaluation of design effectiveness and methods and applications for design futures, as well as design leadership and development. Teaching is also provided by Cranfield School of Management, including The Praxis Centre.

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, Xerox, Herman-Miller and the NHS, 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 not accredited by any external bodies.

Applying for accreditation for the Chartered Society of Designers. The initial accreditation meeting will take place in October 2017.

Elements of the course will seek to review accreditation with appropriate professional bodies, including the Institute of Marketing, the Association for Project Management, the Design Management Institute, the Chartered Society of Designers, the Design Business Association, and those bodies whose areas of specialisation may be relevant to the scope of the content of the course.

1. <u>What are the aims of the course?</u>

Cranfield University offers this course in order to:

Respond to the need, highlighted by the UK Design Council's Design Skills Alliance, and The Cox Review of Creativity in Business, for a high value M-level course for mid-career professionals, which engages with the subject areas of creative leadership, strategic design management, financial and business planning, design thinking and innovation strategy.

- Expand research and consultancy, linking creative industries with corporate rationale and logics.
- Expand collaborative activities between disciplines and Schools within Cranfield University.

This programme is intended for UK, European and International mid-career industry professionals who wish to undertake career development in order to:

- Move from small creative enterprises to medium sized enterprises (change in scale).
- Move from creative industries to corporate environments and vice versa (change in sector)

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

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

A. **Postgraduate Certificate in Design Strategy and Leadership**

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

ILO1	Demonstrate conceptual understanding of strategic design and leadership
ILO2.	Demonstrate knowledge of how creativity and innovation are used to forge
ILO3	Align business and design theory and practices
ILO4	Apply strategic design thinking, innovation and ideation tools and methodologies to analyse and synthesise issues and opportunities
ILO5	Critically evaluate their own work and the work of their peers
ILO6	Make effective (oral, written & visual media) communications/presentations of their work to a range of audiences

B. Postgraduate Diploma in Design Strategy and Leadership

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

ILO7	Develop working knowledge of the application of project management, process and administrative tools and practices
ILO8	Facilitate a deep understanding and mapping of financial and business planning issues
ILO9	Develop and work with creative industry business models
ILO10	Integrate knowledge, understanding and skills from the taught modules in a real-life situation
ILO11	Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

C. MDes in Design Strategy and Leadership

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

ILO12	Develop a successful independent project appropriate to chosen organisations
ILO13	Enhanced critical appreciation of their own work and the work of their peers
ILO14	Facilitate multi-disciplinary activity and working practice in the service of design strategy and leadership
ILO15	Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.
ILO16	To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation

4. <u>How is the course taught?</u>

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

- Course delivery will be the responsibility of SWEE. Module delivery will be shared between SWEE and the School of Management (SoM). Students are encouraged to reflect on the experience of this learning at the C4D centre within the creative modules, the group project, and specifically organised sessions.
- There are three phases that make up the course (taught, group project/dissertation and individual thesis project.
- The course applies these creative learning methods to provide and to foster an applied design thinking learning experience.

- The curriculum will be delivered through the development of an appreciative learning and action based approach to maximise the benefit of the multi-disciplinary nature of 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 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:	
Any 6 compulsory taught modules from 2 - 9	60
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:	
8 compulsory taught modules (2 - 9). Group Project (Full-time) or Dissertation (Part-time)	80 40 or 40
ELECTIVE MODULES:	
TOTAL:	**120**

C. MDes

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

Description	Credits
COMPULSORY MODULES:	
8 compulsory taught modules (2 - 9). Group Project (Full-time) or Dissertation (Part-time) Individual Thesis Project	80 40 or 40 80

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);[1] [2]
- **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 will register for the course in September/October. Part-time students can register at any time throughout the year and are expected to complete the course within two or three years.

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[1] 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).

[2] 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 full-time course is structured in three phases:

- The **taught phase** between October and January taking eight compulsory modules
- The **group project phase** runs between March and the following September;
- The **thesis phase** between March and the following September.

The part time course is structured in three phases:

- The taught phase between October and January taking eight compulsory modules (typically within the registration period)
- The dissertation phase is organised with a supervisor and typically delivered between years one and two.
- The thesis phase is typically completed as the final delivery of their course and would start after the taught phase and dissertation has been completed.

Course modules

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-DES-INWK	Induction)	L Williams	50		0	N		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-DSL-A1010	Personal Leadership & Development	A Encinas-Oropesa	35		10	N		10/10/16	14/10/16	40	ICW	100				FT-22/10/16 PT-29/10/16	
3	I-DFS-A1028	Whole System Design	M Moreno	27		10	Y		24/10/16	28/10/16	40	ICW	100				FT-19/11/16 PT-26/11/16	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
4	I-ICI-A1020	Managing Innovation & New Product Development	C Savory	35		10	Y		31/10/16	04/11/16	40	GCW	100				FT-26/11/16 PT-03/12/16	
5	I-ICI-A1009	Creative Enterprise & Entrepreneurship	M Van Der Kamp	36		10	Y		07/11/16	11/11/16	40	GCW	100				FT-17/12/16 PT-03/01/17	
6	I-DFS-A1521	Design & Brand Management	L Williams	40		10	Y		28/11/16	02/12/16	40	ICW	100				FT-03/01/17 PT-07/01/17	
7	I-DSL-A1021	Consumer Trends	M Moreno	30		10	Y		05/12/16	09/12/16	40	GCW	100				FT-07/01/17 PT-14/01/17	
8	I-DSL-A1011	Strategic Management and Leadership	P Reinmoeller	30		10	N		09/01/17	13/01/17	40	ICW	100				FT-21/01/17 PT-28/01/17	
9	I-ICI-A1007	Programme & Project Management	J Algar	20		10	Y		30/01/17	03/02/17	40 40	GCW ICW	60 40				FT-18/02/17 PT-25/02/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
10	I-DES-GRPP	Group Project For Full-Time Students	Supervisors	16		40	N		06/02/17	06/05/17	50	GPROJ ICW	80 20				06/05/17	
11	I-DES-DISS	Dissertation For Part-time Students	Supervisors	10		40	N		03/10/16	30/09/17	50	IPROJ	100				30/09/17	
12	I-DES-THESIS	Individual Research Project	Supervisors	20		80	N		08/05/17	04/09/17	50	THESIS OR	90 10				04/09/17	

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

Please list all modules that are shared with another existing course.

Module code	Module title	Course that owns the module	Course(s)/programme(s) that share the module
I-DSL-A1021	Consumer Trends	Design Strategy and Leadership	Design & Innovation for Sustainability Innovation & Creativity in the Industry Digital Design and Strategic Communication
I-ICI-A1009	Creative Enterprise & Entrepreneurship	Innovation & Creativity in the Industry/ SOM programme- Bettany Centre for Entrepreneurship	Design & Innovation for Sustainability Design Strategy & Leadership Digital Design and Strategic Communication
I-DFS-A1521	Design and Brand Management	Design & Innovation for Sustainability	Design Strategy & Leadership Innovation & Creativity in the Industry Digital Design and Strategic Communication
I-ICICA1020	Managing Innovation and New Product Development	Innovation & Creativity in the Industry/ SOM programme- Centre for Innovative Products and Services	Design & Innovation for Sustainability Design Strategy & Leadership Digital Design and Strategic Communication
I-ICI-A1007	Programme & Project Management	SOM Programme- Project Management	Design & Innovation for Sustainability Design Strategy & Leadership Innovation & Creativity in the Industry Digital Design and Strategic Communication
I-DFS-A1028	Whole System Design	Design & Innovation for Sustainability	Cost Engineering Design Strategy and Leadership Digital Design and Strategic Communication Innovation and Creativity in the Industry Design and Innovation for Sustainability

7. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

The C4D centre is funded by HEFCE in collaboration with UAL in order to produce post-graduates who are able to take leadership positions in the private and public sectors, embedding creative and innovation techniques into all areas. This is a needs-based profile

supported by industries, and the course graduates are expected to find an appreciation of their abilities in the employment market. The profile is being developed in a range of locations, including Europe and America, arising from this identified need. C4D is part of a Design Council educational committee, the Interdisciplinary Design Network, at which this context is discussed and developed. The multidisciplinary development undertaken by this programme is key to engaging organisations with global agendas for successful adoption of design-led innovation across disciplinary boundaries. Additionally, for mid-career graduates, the course offers opportunities for enhancement of creative and managerial skills, underpinned by a career development plan.

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: MSc in Economics for Natural Resource and Environmental Management

Date of first publication/latest revision: 11/01/16 – 07/09/16

1. What is the course?

Course information

Course Title	Economics for Natural Resource and Environmental Management
Course code	MSENRFTC, MSENRPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Cranfield Institute for Resilient Futures
Course Director	Dr Nazmiye Ozkan
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	•1st or 2nd class UK honours degree or equivalent; in a social science, natural science or engineering subject; in • 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

Institutions delivering the course

This course is delivered by the Institute for Environment, Health, Risks and Future where the research interests include economics for natural resource and environmental management.

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

The Course has an Industrial Advisory Panel that formally meets each year. Current members of the Industrial Advisory Panel include: Oakdene Hollins, ADAS, IAgrE, FWAG, Waste Recycling Group, Cresswell Associates, RSPB, Atkins, ERM, Natural England, Derbyshire County Council, and the National Trust

The course benefits from links to a significant number of European Universities through the Cranfield University European Partnership 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 2017.*

2. What are the aims of the course?

ENREM aims to meet the growing need for applied economists working in the public and private sector with responsibility for policy design, implementation and operational management. Discussions with Government organisations such as Defra and the Environment Agency indicated that there is a shortage of suitably qualified personnel as environmental objectives and market based approaches are given more prominence.

The aims of the MSc course are:

- to meet UK, EU and international need for people with economic skills to support decision making for the effective and efficient management of natural resources and the environment;
- to provide students with systematic knowledge and understanding of the fundamental principles of economics;
- to provide students with comprehensive knowledge and understanding of advanced environmental economics and natural resource economics;
- to provide students with systematic knowledge and a conceptual understanding of the range of techniques used by economists engaged in natural resource and environmental management;
- to prepare students for a professional career as an economist engaging in natural resource and environmental management, providing them with skills that will enable them to find employment in either the private or public sector;
- to develop the students' skills necessary for working in groups in a professional context, through an extended group project;
- to prepare students for further research in these areas, providing them with the ability to work independently, and to plan, execute and report research projects.

The course is intended to produce professional economists who work on issues associated with natural resource and environmental management in the following settings:

- Nationally or internationally within firms, governments, and government agencies.
- Research and consultancy.

- The NGO sector.

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

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

***A.* Postgraduate Certificate in Economics for Natural Resource and Environmental Management**

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

ILO 1. Demonstrate economic skills to support decision making for the effective and efficient management of natural resources and the environment

ILO 2. Demonstrate a systematic understanding of the principles of economics and how these apply to the management of natural resources and the environment

ILO 3. Demonstrate a comprehensive knowledge and understanding of natural resource and environmental economics

ILO 4. Demonstrate a conceptual understanding of and apply the range of techniques used by economists engaged in natural resource and environmental management

***B.* Postgraduate Diploma in Economics for Natural Resource and Environmental Management**

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

ILO 5. Demonstrate the ability to plan and undertake a short study in which economic theory and techniques are used to support decision making for effective and efficient natural resource and environmental management, and to present the work in the form of a presentation and a written report

ILO 6. Integrate knowledge, understanding and skills from the taught modules in a real-life situation

ILO 7. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

***C.* MSc in Economics for Natural Resource and Environmental Management**

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

ILO 8. Plan, undertake, and critically evaluate an extended piece of research in which economic theory and techniques are used to support decision making for effective and efficient natural resource and environmental management

ILO 9. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 10 To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

ILO 10.

4. How is the course taught?

The MSc course is taught in three sections: taught modules (40%), group project (20%), and an individual research project (40%). The taught modules are typically delivered in two-week blocks between October and February. The course material is delivered within the first week, with the second week focussed on assimilation and the completion of an assignment. The teaching methods include debates, practical classes, field visits, lectures, seminars, and presentations. The Group Projects are group-based activities typically undertaken between February and May. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation. 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.

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. During the group projects students will be given training in group-working and will reflect on their personal development.

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:	
Any 6 taught modules	60
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 Modules 2-9 Group project Module 11 in place of module 10 (Part time students)	0 80 40 40
ELECTIVE MODULES:	
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 Modules 2-9 Group Project Individual thesis project Module 11 in place of module 10 (Part time students)	0 80 40 80 40
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);[1] [2]
- **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 MSc 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. One example is to complete five taught modules in year 1, three taught modules and a work-based project in year 2, and a thesis and oral presentation in year 3. An alternative is to complete the autumn term modules in year 1, to complete a research thesis between January and December, and then to complete the remaining two taught modules and group project between January and May.

[1] 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).

[2] 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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENV-INWK	Induction module	T Brewer	33		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	P Burgess	26		10	Y		10/10/16	14/10/16	40	ICW	100				F 22/10/16 P 29/10/16	
3	I-EEM-A1184	Environmental Valuation	N Ozkan	27		10	Y		24/10/16	28/10/16	40	ICW	100				F 12/11/16 P 19/11/16	
4	I-EEM-A1185	Environmental Econometrics	M Rivas-Casado	21		10	N		07/11/16	11/11/16	40			100	GCW GPRE	80% 20%	F 19/11/16 P 26/11/16	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
															S			
5	I-EMB-FEA	Financial and Economic Appraisal	P Burgess	25		10	Y		21/11/16	25/11/16	40	ICW	100				F 3/12/16 P 10/12/16	
6	I-EEM-A1186	Natural Resource Economics	A Graves	25		10	N		05/12/16	09/12/16	40	EX	100				05/01/17	
7	I-ERM-A2006	Environmental Policy and Risk Governance	S Jude	30		10	Y		09/01/17	13/01/17	40	ICW	100				F 21/1/17 P 28/1/17	
8	I-EMB-A1128	Technology, Environment and Society	P Longhurst	25		10	Y		23/01/17	27/01/17	40	ICW	100				F 4/2/17 P 11/2/17	
9	I-EPP-EE	Energy Economics	N Ozkan	35		10	Y		06/02/17	10/02/17	40	ICW	100				F 18/2/17 P 25/2/17	
PROJECTS																		
10	I-ENV-GRPP	Group Project	Supervisors	16		40	Y		20/02/17	05/05/17	50	GPROJ ICW	80 20				GPROJ 2/5/17 ICW 6/5/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
11	I-ENV-DISS	Dissertation (part time students)	Supervisors	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/16	
12	I-ENV-THESIS	Individual Research Project	Supervisors	20		80	Y		08/05/17	08/09/17	50	THESIS OR	90 10				4/9/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-EMB-A1122	Principles of Sustainability	Environmental Management for Business	• Economics of Natural Resource and Environmental Management • Environment and Public Policy • Land Reclamation and Restoration • Design and Innovation for Sustainability • Energy Supply for Low Carbon Futures • Renewable Energy Technology
I-EMB-FEA	Financial and Economic Appraisal	Environmental Management for Business	• Environment and Public Policy • Economics of Natural Resource and Environmental Management
I-ERM-A2006	Environment Policy & Risk Governance	Environmental Risk Management	• Economics of Natural Resource and Environmental Management • Environment and Public Policy • Environmental Management for Business • Environmental Water Management
I-EMB-A1128	Technology, Environment and Society	Environmental Management for Business	• Environment and Public Policy • Economics of Natural Resource and Environmental Management • Design and Innovation for Sustainability
I-EPP-EE	Energy Economics	Environment and Public Policy	• Economics of Natural Resource and Environmental
I-EEM-A1184	Environmental Valuation	MSc in Economics of Natural Resource and Environmental Management	• Environment and Public Policy • Environmental Management for Business • Renewable Energy Technology

7. How are the ILOs assessed?

The following assessment types are utilised:

Students on the MSc can typically expect to have one written examination, seven pieces of individual assessment by submitted work, one piece of group project work, and one element assessed by a thesis and an oral presentation.

This approach has been adopted in order to assess the ability of the student to demonstrate their ability in a range of environments.

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

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

The course is intended to produce professional economists who work on issues associated with natural resource and environmental management in the following settings:

- Nationally or internationally within firms, governments, and government agencies.
- Research and consultancy.
- The NGO sector.

ENREM graduates have found employment within all the sectors identified above.

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: MSc in Energy from Waste

Date of first publication/latest revision: 14/01/16 – 13/09/16

1. What is the course?

Course information

Course Title	Energy from Waste
Course code	MSEFWFTC, MSEFWPTC, PDEFWFTC, PDEFWPTC, PCEFWFTC, PCEFWPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location 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
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	QAA FHEQ Level 7 (Masters)

Framework Level	
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

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 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 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 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 contract 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. Develop problem definition, hypothesis setting, analysis and problem solving skills to address challenges faced by professionals in the resource management and energy from waste sector.

ILO 9. Integrate knowledge, understanding and skills from the taught modules in a real-life situation.

ILO 10. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate 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 11. Develop and deliver successful independent research projects relevant to appropriate public and private sector organizations.

ILO 12. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 13. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

4. How is the course taught?

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

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 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:	
Module 1 Module 6	0 10
ELECTIVE MODULES:	
Any five chosen from modules 2 – 5, 7, 8 (to the value of 50 credits)	50
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 Modules 2-8 Group Project Dissertation in place of the Group Project for part time students	0 80 40 40
ELECTIVE MODULES:	
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:	
Module 1 Modules 2-8 Group Project Dissertation in place of the Group Project for part time students Thesis Project	0 80 40 40 80
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);[1] [2]
- **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

[1] 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).

[2] 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%).

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).

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.

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.

								Calendar			Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates	
9	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENE-INWK	Induction	G Drew	24		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-ERM-A2005	Environmental Risks: Hazard, Assessment and Management	S Jude	24.5		10	Y		10/10/16	14/10/16	40	ICW	100				FT 22/10/16 PT 29/10/16	
3	I-WRM-CRM	Circular Waste Management: Recycle, Recover and Dispose	R Villa	52		20	Y		24/10/16 &	28/10/16 &	40	ICW	100				05/11/16 FT 12/11/16 PT 19/11/2016 FT	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

9	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
									07/11/16	11/11/16							26/11/2016 PT	
5	N-BPE-EFB	Energy from Biomass and Waste: Thermochemical Processes	B Fernandez Fidalgo	30		10	Y		28/11/16	02/12/16	40	EX	100				W/C 12/12/16	
6	I-MES-A2033	Energy Production, Emissions Control, Carbon Capture and Transport	K Patchigolla	25		10	Y		09/01/17	13/01/17	40			100	ICW OR	50 50	28/01/17 FT 11/02/17	
4	I-EFW-EWO	Energy from Waste Operations	S Wagland	30		10	N		21/11/16	25/11/16	40	ICW	100				10/12/16 FT 07/01/17 PT	
7	I-MES-A2031	Renewable Energy Technologies: Design case studies	S Wagland	28		10	Y		30/01/17	03/02/17	40			100	GPRES ICW	25 75	18/02/17 FT 04/03/17	
8	G-MTI	Management for Technology	S Carver	50		10	Y		13/02/17	17/02/17	40	EX GCW	50 50				20/03/17 25/03/17	
9	I-ENE-GRPP	Group Project	Supervisor	16		40	Y		27/02/17	05/05/17	50	GPROJ ICW	80 20				02/05/17 06/05/17	

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

9	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
10	I-ENE-DISS	Dissertation (PT))	Supervisor	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/17	
11	I-ENE-THESIS	Individual thesis project	Supervisor	20		80	Y		08/05/17	08/09/17	50	THESIS OR	90 10				04/09/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-ERM-A2005	Environmental Risks and Hazards	• Environmental Risk Management	• Environmental Data Science • Waste and Resource Management • Energy from Waste
I-WRM-CRM	Circular Waste Management: Recycle, Recover and Dispose	Environment	• Environmental Engineering • Water and Resource Management • Energy from Waste
N-BPE-EFB	Energy from Biomass: Thermochemical Processes	Biofuels Process Engineering	• Biofuels Process Engineering • • Energy from Waste
I-MES-A2033	Energy Production, Emissions Control, Carbon Capture and Transport	Materials for Energy Systems	• Materials for Energy Systems • Gas Energy • Energy Supply for Low Carbon Futures • Atmospheric Emission Technology • Renewable Energy Technology • Energy from Waste
I-MES-A2031	Renewable Energy Technologies: Design case studies	Materials for Energy Systems	• Renewable Energy Technology • Energy from Waste
G-MT	Management for Technology	School of Management	• Advanced Mechanical Engineering • Biofuels Process Engineering • Carbon Capture and Storage • Design of Rotating Machines • Energy Supply for Low Carbon Futures • Energy Systems and Thermal Processes • Flow Assurance for Oil and Gas Production • Gas Energy, Materials for Energy Systems • Offshore and Ocean Technology With Offshore Materials Engineering • Offshore and Ocean

			Technology With Offshore Renewable Energy • Offshore and Ocean Technology With Pipeline Engineering • Offshore and Ocean Technology With Risk Management • Offshore and Ocean Technology With Subsea Engineering • Process Systems Engineering • Renewable Energy Engineering • Renewable Energy Technology • • Energy from Waste

7. 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.

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. <u>What opportunities are graduates likely to have on completing the course?</u>

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.

COURSE TITLE: MSc in Energy Supply for Low Carbon Futures

Date of first publication/latest revision: 14/01/16 – 13/09/16

1. What is the course?

Course information

Course Title	Energy Supply for Low Carbon Futures
Course code	MSESLFTC, MSESLPTC, PDESLFTC, PDESLPTC, PCESLFTC, PCESLPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy & Environment
Theme	Energy & Power
Centre	Centre for Offshore Renewable Energy Engineering
Course Director	Prof Vasilije Manovic
Awarding Body	Cranfield University
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, 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

Institutions delivering the course

This course is delivered by Combustion and Carbon Capture and Storage Centre where the research interests include specialist research in fossil fuel power generation, energy conversion technologies, gas cleaning, CO_2 capture and transport, wet and dry renewable energy, biomass conversion and energy from waste, materials for energy systems, amenity impacts, contaminated land landfill science, life cycle engineering, policy appraisal and implementation, sustainable resource recovery, process simulation, pipeline engineering, offshore materials engineering, subsea engineering, risk management and reliability engineering.

The Energy Supply for Low Carbon Futures MSc course exists alongside the current course programmes within the Department of Environmental Science and Technology

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

The course is part of the suite of the MSc courses currently provided within CERT. Current members of the Industrial Advisory Panel (chosen from among EoN, EDF, RWEnpower, BP, Environ, WRG, Shanks, CIWEM, CIWH, Doosan Energy Systems, Alstom Power, Siemens, Rolls Royce, Caterpillar, BOC/Linde, Air Products, Shell, AMEC, Mott MacDonald) will also help in steering and updating the course content.

Cranfield University also actively seeks sponsorship and support for individual thesis projects from the energy sector employers to provide professional experience and development opportunities for students through group study project and thesis sponsorships.

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.

Several of the modules have been derived from established courses that are already accredited by different Chartered Institutions. Full course accreditation will be sought with the Energy Institute

2. <u>What are the aims of the course?</u>

Cranfield University offers this course in order to:

- Prepare science and engineering graduates to meet the increasing demand of industry, consultancies and the public sector for engineers in the energy production and demand management sectors
- Acquire an advanced theoretical and specialist understanding of processes and practices central to low carbon emissions energy production technologies
- Select and apply appropriate existing and emerging energy production technologies that can achieve lower environmental impacts via an integrated and cross-disciplinary approach
- Enable the application of scientific, technical and engineering principles, economic consequences and risks of energy production technologies 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 or related engineering degrees keen to pursue careers in low carbon energy production technologies

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

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

A. Postgraduate Certificate in Energy Supply for Low Carbon Futures

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

ILO 1. Explain in broad terms the key concepts and issues appertaining to the availability and use of non-renewable and renewable energy resources together with the engineering principles and technologies that underpin the production, distribution and use of energy.

ILO 2. Analyse the principal sources and control of pollution arising from energy production, along with the importance of carbon control methods to include carbon capture

ILO 3. Explain the principles of maintaining the reliability of energy production and distribution systems and their asset management.

ILO 4. Apply the concepts and principles of energy demand management to improve and enhance policy development and systems design

ILO 5. Appraise the mechanisms involved in carbon markets and futures and their potential influence on the availability, affordability of energy and future energy policy development

ILO 6. Analyse relevant energy engineering problems and design appropriate solutions taking account of social, environmental, technical, regulatory and commercial constraints

ILO 7. Communicate effectively their work via oral and written presentations and reports

B. Postgraduate Diploma in Energy Supply for Low Carbon Futures

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

ILO 8. Develop problem definition, hypothesis setting, analysis and problem solving skills to address challenges faced by environmental engineers

ILO.9 Integrate knowledge, understanding and skills from the taught modules in a real-life situation

ILO 10 Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients;

collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

C. MSc in Energy Supply for Low Carbon Futures

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

ILO 11. Develop and deliver successful independent research projects relevant to appropriate public and private sector organizations.

ILO 12 Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 13 To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

4. How is the course taught?

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

The MSc course will be taught in three sections: taught modules (40%), a group project (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.

The Group Projects are founded on group-based research programmes 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.
The PgDip course consists of two of these sections: taught modules (66.7%) and group projects (33.3%).

The PgCert course consists of one of these sections: taught modules (100%). Candidates are required to pass three compulsory modules and three optional modules (out of the eight taught 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 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:	
Induction Module I-MES-2020, I-MES-RETF & I-MES-RETS	0 30
ELECTIVE MODULES:	
Three modules selected from the modules I-EMB-A1122, I-MES-A2032, I-EDI-A1127, I-MES-A2033, G-MTI	30
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 Modules 2-9 Group project or dissertation (PT)	0 80 40
ELECTIVE MODULES:	
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 Modules 2-9 Group project or dissertation (PT) Individual thesis project	0 80 40 80
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);[1] [2]
- **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.

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.

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[1] 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).

[2] 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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENE-INWK	Induction	G Drew	24		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	P Burgess	26		10	Y		10/10/16	14/10/16	40	ICW	100				22/10/16 FT 29/10/16 PT	
3	I-MES-A2020	Introduction to Materials Engineering for Energy Systems	J Sumner	32		10	Y		17/10/16	21/10/16	40	EX	100				W/C 02/01/17	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
4	I-MES-RETF	Renewable Energy Technologies - Fundamentals	S Wagland	30		10	Y		14/11/16	18/11/16	40	ICW	100				26/11/16 FT 03/12/16 PT	
5	I-MES-A2032	Fuels and Energy Conversion	B Fidalgo Fernandez	27		10	Y		28/11/16	02/12/16	40	EX	100				W/C 12/12/16	
6	I-EDI-A1127	Evaluating Sustainability through lifecycle approaches	P Goglio	30		10	Y		05/12/16	09/12/16	40	ICW	100				FT & PT 07/01/17	
8	I-MES-RETS	Renewable Energy Technologies: Systems	G Di Lorenzo	25		10	Y		16/01/17	20/01/17	40	ICW	100				11/02/17 FT 18/02/17 PT	
7	I-MES-A2033	Energy Production, Emissions Control, Carbon Capture and Transport	K Patchigolla	25		10	Y		09/01/17	13/01/17	40			100	ICW OR	50 50	28/01/17 FT 11/02/17 PT	
9	G-MTI	Management for Technology	S Carver	50		10	Y		13/02/17	17/02/17	40	EX GCW	50 50				20/03/17 25/03/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
10	I-ENE-GRPP	Group Project	Supervisor	16		40	Y		27/02/17	05/05/17	50	GPROJ ICW	80 20				02/05/17 06/05/17	
11	I-ENE-DISS	Dissertation (for part-time student)	Supervisor	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/17	
12	I-ENE-THESIS	Individual Thesis Project	Supervisor	40		80	Y		08/05/17	08/09/17	50	OR THESIS	10 90				04/09/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-EMB-A1122	Principles of Sustainability	Environmental Management for Business	• MSc in Renewable Energy Technology • MSc in Environment and Public Policy • MSc in Economics for Natural Resource and Environmental Management • MSc in Environmental Management for Business • Land Reclamation and Restoration • Design and Innovation for Sustainability • Energy Supply for Low Carbon Futures
I-MES-RETF	Renewable Energy Technologies: Fundamentals	Materials for Energy Systems	• Renewable Energy Technology • Materials for Energy Systems • Energy Supply for Low Carbon Futures
I-MES-RETS	Renewable Energy Technologies: Systems	Materials for Energy Systems	• Energy Systems and Thermal Processes • Materials for Energy Systems • Renewable Energy Technology • Energy Supply for Low Carbon Futures
I-EDI-A1127	Evaluating Sustainability through Lifecycle Approaches	Environmental Management for Business	• Biofuels Process Engineering • Environmental Management for Business • Environmental Risk Management • Waste and Resource Management • Energy Supply for Low Carbon Futures
I-MES-2020	Introduction to Materials Engineering for Energy Systems	Materials for Energy Systems	• Gas Energy • Materials for Energy Systems • Energy Supply for Low Carbon Futures
G-MTI	Management for Technology	School of Management	• Materials for Energy Systems • Advanced Mechanical

			Engineering • Biofuels Process Engineering • Design of Rotating Machines • Gas Energy • Offshore and Ocean Technology With Offshore Materials Engineering • Offshore Ocean Technology With Pipeline Engineering • Offshore Ocean Technology With Offshore Renewable Energy • Offshore Ocean Technology With Risk Management • Offshore Ocean Technology With Subsea Engineering • Renewable Energy Engineering • Renewable Energy Technology • Flow Assurance for Oil and Gas Production • Carbon Capture and Storage • Energy Systems and Thermal Processes • Process Systems Engineering • Energy from Waste • Energy Supply for Low Carbon Futures

7. 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) or examination in December and January.
- the group project (20%) is assessed by means of a written group report and an oral presentation.
- the research project (40%), is assessed by a thesis and an oral examination

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

Title	Modules Covered	Assessment

		Type	Weight (%)

8. <u>How will the University assure the quality of the provision?</u>

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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

On completion, graduates will have a broad network of global contact and increased opportunities for individual specialism in their chosen career in the energy production and demand management industries.

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: MSc in Energy Systems and Thermal Processes

Date of first publication/latest revision: September 2016

1. What is the course?

Course information

Course Title	Energy Systems and Thermal Processes
Course code	MSESPFTC, MSESPPTC
Academic Year	2016/17
Valid entry routes	MSc
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-Time, Part-Time
Location of Study	Cranfield University
School(s)	School of Water, Energy and Environment
Theme	Energy & Power
Centre	Centre for Oil and Gas Engineering
Course Director	Dr Ilai Sher
Awarding Body	Cranfield University
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

Institutions delivering the course
This course is delivered by the School of Energy, Environment and Agrifood, Energy Theme, Centre for Power Engineering where the research interests include:

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

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

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

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course was accredited formally by the Institution of Mechanical Engineers (IMechE) until the end of the academic year 2014-15 and the Energy Institute (EI) and the Royal Aeronautical Society (RAeS) until the end of the academic year 2013-14. The course is currently applying for re-accreditation by IMechE.

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

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

ILO 1. Demonstrate competence in the current concepts theories governing energy flows, heat transfer and energy conversion.

ILO 2. Demonstrate an in-depth understanding of 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. Apply effectively the knowledge gained to analyse complicated energy systems/thermal processes and to achieve a cost-effective conservation of energy.

ILO 4. Make effective use of 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 good time management and work effectively to deadlines.

ILO 6. Demonstrate knowledge of some key technical management principles, including project management, people management, technology marketing, product development and finance.

ILO 7. Communicate effectively both orally and in writing.

ILO 8. Operate effectively in a team.

ILO 9. Integrate knowledge, understanding and skills from the taught modules in a real-life situation.

ILO 10. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

ILO 11. Demonstrate an ability to undertake independent learning, especially via the effective use of information retrieval systems.

ILO 12. Demonstrate a competent and professional approach to problem solving and an ability to undertake a critical appraisal of technical and/or commercial literature.

ILO 13. Demonstrate an ability to manage research studies, and plan and execute energy-related projects.

ILO 14. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 15. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

4. How is the course taught?

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

- A dedicated electronic Blackboard site
- One-day workshop in MATLAB training
- Arrangement of attendance of relevant modules offered by other MSc programmes

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:	
Induction	0
ELECTIVE MODULES:	
6 modules from 2, 3, 4, 5, 6, 7, 8, 9, 10, 11	60
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 Heat Transfer Industrial Heating Systems Power Generation Systems Thermal Systems Operation and Design Renewable Energy Technologies: Systems Management for Technology Group Project	0 10 10 10 10 10 10 40
Dissertation in place of group project (for part time students)	40
ELECTIVE MODULES:	
2 modules from:	20 (10 credits each)

Computational Fluid Dynamics for Industrial Processes Advanced Control Systems Carbon Capture Technologies Process Measurement Systems	
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 Heat Transfer Industrial Heating Systems Power Generation Systems Thermal Systems Operation and Design Renewable Energy Technologies: Systems Management for Technology Group Project Individual research project	0 10 10 10 10 10 10 40 80
Dissertation in place of group project (for part time students)	40
ELECTIVE MODULES:	
2 modules from: Computational Fluid Dynamics for Industrial Processes Advanced Control Systems Carbon Capture Technologies Process Measurement Systems	20 (10 credits each)
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 <u>not</u> have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[1] [2]

[1] 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).

- **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.

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. MSc research projects are commonly undertaken in collaboration with the candidate's place of work.

Each module is taught over one week, with the second week largely free of structured teaching to allow time for more independent learning and reflection.

[2] 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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENE-INWK	Induction	G Drew	10		0	Y		03/10/16	07/10/16		AO					N/A	
2	N-PSE-HT	PSE15 Heat Transfer	I Sher	30		10	N		10/10/16	14/10/16	40	EX	100				w/c 12/12/16	
4	N-PSE-IHS	PSE18 Industrial Heating Systems	I Sher	30		10	N		07/11/16	11/11/16	40 40	EX EX	50 50				Both w/c 12/12/16	
3	N-PSE-PGRES	PSE16 Power Generation Systems	G Di Lorenzo	30		10	Y		24/10/16	28/10/16	40	ICW	100				FT05/11/16 PT12/11/16	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
6	N-PSE-TSOD	PSE19 Thermal Systems Operation and Design	I Sher	30		10	Y		28/11/16	02/12/16	40			100	EX EX	50 50	both w/c 02/01/17	
7	N-PSE-CETIP	PSE17 Computational Fluid Dynamics for Industrial Processes	P Verdin	30		10	Y		05/12/16	09/12/16	40	ICW	100				FT21/01/17 PT28/01/17	
5	N-PSE-ACS	PSE12 Advanced Control Systems	Y Cao	30		10	Y		14/11/16	18/11/16	40	ICW	100				FT26/11/16 PT03/12/16	
8	I-MES-RETS	PSE20 Renewable Energy Technologies: Systems	G Di Lorenzo	25		10	Y		16/01/17	20/01/17	40	ICW	100				FT11/02/17 PT18/02/17	
9	N-CCT-CCT	Carbon Capture Technologies	V Manovic	26		10	Y		30/01/17	03/02/17	40	ICW	100				FT11/03/17 PT18/03/17	
11	G-MTI	PSE02 Management for Technology	S Carver	30		10	Y		13/02/17	17/02/17	40 40	EX GCW	50 50				20/03/17 25/03/17	

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

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								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
10	N-PSE-PMS	PSE10 Process Measurement Systems	L Lao	30		10	Y		06/02/17	10/02/17	40	ICW	100				FT18/03/17 PT25/03/17	
12	I-ENE-GRPP	Group Project	Supervisor	16		40			27/02/17	05/05/17	50 50	GPROJ ICW	80 20				02/05/17 06/05/17	
13	I-ENE-DISS	Dissertation for part time students	Supervisor	10		40			03/10/16	30/09/17	50	THESIS	100				30/09/17	
14	I-ENE-THESIS	Energy Individual Research Project (IRP)	Supervisor	20		80			08/05/17	08/09/17	50 50	OR THESIS	10 90				04/09/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
G-MTI	Management for Technology	School of Management	• Materials for Energy Systems • Advanced Mechanical Engineering • Biofuels Process Engineering • Design of Rotating Machines • Energy Supply for Low Carbon Futures • Gas Energy • Offshore and Ocean Technology With Offshore Materials Engineering • Offshore and Ocean Technology With Pipeline Engineering • Offshore and Ocean Technology With Offshore Renewable Energy • Offshore and Ocean Technology With Risk Management • Offshore and Ocean Technology With Subsea Engineering • Renewable Energy Engineering • Renewable Energy Technology • Flow Assurance for Oil and Gas Production • Carbon Capture and Storage • Process Systems Engineering • Energy Systems and Thermal Processes
N-PSE-ACS	Advanced Control Systems	Process Systems Engineering	• Advanced Mechanical Engineering • Biofuels Process Engineering • Flow Assurance for Oil and Gas Production • Carbon Capture and Storage • Energy Systems and Thermal Processes
N-PSE-	Computational Fluid	Process Systems	• Flow Assurance for Oil

CETIP	Dynamics for Industrial Processes	Engineering	and Gas Production • Carbon Capture and Storage • Energy Systems and Thermal Processes
N-PSE-PMS	Process Measurement Systems	Process Systems Engineering	• Flow Assurance for Oil and Gas Production • Carbon Capture and Storage • Energy Systems and Thermal Processes
N-PSE-TSOD	Thermal Systems Operation and Design	Process Systems Engineering	• Energy Systems and Thermal Processes
I-MES-RETS	Renewable Energy Technologies: Systems	Materials for Energy Systems	• Energy Supply for Low Carbon Futures • Renewable Energy Technology • Energy Systems and Thermal Processes
N-CCT-CCT	Carbon Capture Technologies	Carbon Capture and Storage	• Energy Systems and Thermal Processes
N-PSE-PGRES	Power Generation Systems	Process Systems Engineering	• Advanced Mechanical Engineering • Carbon Capture and Storage • Energy Systems and Thermal Processes

7. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types. Students can expect to have 6 written examinations, 10 pieces of assessment by submitted work and 2 elements of assessment by presentation or viva.

This approach has been adopted in order to:

- 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

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

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. 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.

COURSE TITLE: MSc in Engineering and Management of Manufacturing Systems

Date of first publication/latest revision: December 2016

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	2016/17
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	Not Applicable
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield University
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Manufacturing
Centre	Sustainable Manufacturing Systems Centre
Course Director	Professor Charalampos (Harris) Makatsoris
Awarding Body	Cranfield University
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	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. <u>How is the course taught?</u>

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 MSc students undertake a Group Project (full time students) or produce a Dissertation (part time students). 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. For part-time students, a Dissertation replaces the Group Project. 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 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 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:

Description	Credits
COMPULSORY MODULES:	
Modules 2-9 Group Project for full-time students (10a) or Dissertation for part-time students (10b)	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 for full-time students (10a) or Dissertation for part-time students (10b) 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);[1] [2]
- **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

[1] 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).

[2] 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%).

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 Dissertation in year 1 and the remainder of the modules plus the Thesis in year two and/or year 3.

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.

October Intake

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-MAN-INWK	Induction	Dr Konstantinos Salonitis	22		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-MNU-A1034	Operations Management	Prof Charalampos (Harris) Makatsoris	32		10	Y		10/10/16	14/10/16	40	EX	100				11/11/16	September 2017
3	I-MNU-A1031	Enterprise Systems	Dr Essam Shehab	32		10	Y		17/10/16	21/10/16	40	EX	100				02/12/16	September 2017

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
4	I-MNU-A1029	Operations Analysis	Dr Konstantinos Salonitis	32	8	10	Y		31/10/16	04/11/16	40	EX	100				12/12/16	September 2017
5	I-MNU-A1018	General Management	Dr Yuchun Xu	32		10	Y		14/11/16	18/11/16	40	EX	100				06/01/17	September 2017
6	I-MNU-A1027	Manufacturing Systems Engineering	Prof Charalampos (Harris) Makatsoris	32		10	Y		21/11/16	25/11/16	40	ICW	100				09/01/17	September 2017
7	I-MNU-A1021	Management of Technology and Innovation	Dr Leon Williams	32		10	Y		05/12/16	09/12/16	40	ICW	100				16/01/17	September 2017
8	I-MNU-A1038	Supply Chain Management	Dr Chris Turner	32		10	Y		16/01/17	20/01/17	40	ICW	100				03/02/17	September 2017
9	I-MNU-A1019	Manufacturing Strategy	Dr Patrick McLaughlin	35		10	Y		23/01/17	27/01/17	40			100 MULTI	GPRES GCW ICW	30 50 20	10/02/17	September 2017
10a	I-MNU-GRPP	Group Project for Full Time Students	Dr David Ayre	20		40	Y		06/02/17	28/04/17	50			80 MULTI 20 MULTI	GPRES GPROJ ICW observed behaviour	16 64 10 10	28/04/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
10b	I-MNU-DISS	Dissertation for Part Time Students	Dr Konstantinos Salonitis	20		40	Y		01/02/17	31/08/17	50	ICW	100				31/08/17	
11	I-MNU-THESIS	Individual Research Project	Dr Yuchun Xu	20		80	Y		02/05/17	04/09/17	50	THESIS OR	90 10				04/09/17	

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

March Intake

Module Number	Module code	Title	Module Leader	Contact hours[10]	Total hours delivered by Visiting Lecturers[11]	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[12] - 40% or 50%	Type of Assessment	Weighting within module13 (%) of Independent assessments	Weighting within module of multi-part assessments[14](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[15]	Assessment Submission and/or exam date[16]	Assessment / Exam Retake date
1	I-MAN-INWK	Induction	Dr Konstantinos Salonitis	22		0	Y		27/03/17	31/03/17	N/A	AO	N/A				N/A	
2	I-MNU-A1034	Operations Management	Prof Charalampos (Harris) Makatsoris	32		10	Y		03/04/17	07/04/17	40	EX	100				TBC (May 2017)	November 2017
3	I-MNU-A1031	Enterprise Systems	Dr Essam Shehab	32		10	Y		24/04/17	28/04/17	40	EX	100				TBC (June 2017)	December 2017
4	I-MNU-A1029	Operations Analysis	Dr Konstantinos Salonitis	32	8	10	Y		08/05/17	12/05/17	40	EX	100				TBC (June 2017)	December 2017

[10] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[11] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[12] 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.
[13] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[14] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[15] 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.
[16] 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

Module Number	Module code	Title	Module Leader	Contact hours[10]	Total hours delivered by Visiting Lecturers[11]	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[12] - 40% or 50%	Type of Assessment	Weighting within module13 (%) of Independent assessments	Weighting within module of multi-part assessments[14](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[15]	Assessment Submission and/or exam date[16]	Assessment / Exam Retake date
5	I-MNU-A1018	General Management	Dr Yuchun Xu	32		10	Y		15/05/17	19/05/17	40	EX	100				TBC (July 2017)	January 2018
6	I-MNU-A1027	Manufacturing Systems Engineering	Prof Charalampos (Harris) Makatsoris	32		10	Y		30/05/17	02/06/17	40	ICW	100				30/06/17	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required.
7	I-MNU-A1021	Management of Technology and Innovation	Dr Leon Williams	32		10	Y		12/06/17	16/06/17	40	ICW	100				14/07/17	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required.
8	I-MNU-A1038	Supply Chain Management	Dr Chris Turner	32		10	Y		26/06/17	30/06/17	40	ICW	100				28/07/17	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		03/07/17	07/07/17	40			100 MULTI	GPRES GCW	30 50	18/07/17	Re-assessment date to be set by agreement of

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

Module Number	Module code	Title	Module Leader	Contact hours[10]	Total hours delivered by Visiting Lecturers[11]	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[12] - 40% or 50%	Type of Assessment	Weighting within module13 (%) of Independent assessments	Weighting within module of multi-part assessments[14](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[15]	Assessment Submission and/or exam date[16]	Assessment / Exam Retake date
															ICW	20		Course Director and Module Leader as/when required.
10a	I-MNU-GRPP	Group Project for Full Time Students	Dr David Ayre	20		40	Y		24/07/17	27/10/17	50			80 MULTI 20 MULTI	GPRES GPROJ ICW observed behaviour	16 64 10 10	w/c 23/10/17	
10b	I-MNU-DISS	Dissertation for Part Time Students	Dr Konstantinos Salonitis	20		40	Y		24/07/17	30/03/18	50	ICW	100				w/c 26/03/18	
11	I-MNU-THESIS	Individual Research Project	Dr Yuchun Xu	20		80	Y		30/10/17	30/03/18	50	THESIS OR	90 10				w/c 26/03/18	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-MAN-INWK	Induction	Engineering and Management of Manufacturing Systems	Management and Information Systems, Manufacturing Consultancy, Knowledge Management for Innovation, 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, Manufacturing Consultancy, Cost Engineering, Aerospace Manufacturing, Cyber-Secure Manufacturing
I-MNU-A1031	Enterprise Systems	Management and Information Systems	Management and Information Systems, Knowledge Management for Innovation, Cost Engineering, Manufacturing Consultancy
I-MNU-A1029	Operations Analysis	Engineering and Management of Manufacturing Systems	Manufacturing Consultancy, Aerospace Manufacturing
I-MNU-A1018	General Management	Engineering and Management of Manufacturing Systems	Advanced Materials, Applied Nanotechnology, Manufacturing Technology and Management, Global Product Development and Management, Management and Information Systems, Manufacturing Consultancy, Knowledge Management for Innovation
I-MNU-A1027	Manufacturing Systems Engineering	Engineering and Management of Manufacturing Systems	Manufacturing Consultancy, Aerospace Manufacturing, Cyber-Secure Manufacturing
I-MNU-A1021	Management of Technology and Innovation	Engineering and Management of Manufacturing Systems	Cost Engineering
I-MNU-A1038	Supply Chain Management	Engineering and Management of Manufacturing Systems	Manufacturing Consultancy, Aerospace Manufacturing
I-MNU-A1019	Manufacturing Strategy	Engineering and Management of Manufacturing Systems	Manufacturing Consultancy, Aerospace Manufacturing
I-MNU-DISS	Dissertation for Part Time Students	Manufacturing Systems and Management	Manufacturing Consultancy, Management and Information Systems, Knowledge

		Programme	Management for Innovation, Aerospace Manufacturing, Global Product Development and Management
I-MNU-GRPP	Group Project for Full Time Students	Manufacturing Systems and Management Programme	Manufacturing Consultancy, Management and Information Systems, Knowledge Management for Innovation, Aerospace Manufacturing, Global Product Development and Management, Cyber-Secure Manufacturing
I-MNU-THESIS	Individual Research Project	Manufacturing Systems and Management Programme	Manufacturing Consultancy, Management and Information Systems, Knowledge Management for Innovation, Aerospace Manufacturing, Global Product Development and Management, Cyber-Secure Manufacturing

7. 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	EX	EX						
4		EX	EX	EX	EX		EX	EX
5	EX				EX			
6		ICW	ICW	ICW			ICW	ICW
7		ICW				ICW		
8	ICW				ICW	ICW		

Award ILOs / Module No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO.8
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 (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. <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.

COURSE TITLE: MSc in Environment and Public Policy

Date of first publication/latest revision: 18/01/16 – 07/09/16

1. What is the course?

Course information

Course Title	Environment and Public Policy
Course code	MSEPPFTC, MSEPPPTC, PDEPPFTC, PDEPPPTC, PCEPPPFTC, PCEPPPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Exit routes	PgDip, PgCert
Mode of delivery	Full-time and Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Institute for Environment, Health, Risks and Future
Course Director	Dr Anil Graves
Awarding Body	Cranfield University
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, 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

Institutions delivering the course

This course is delivered by School of Energy, Environment and Agrifood where the research interests include technical policy development for environmental policy, environmental regulation, environmental risk governance, evidenced-based policy support and environmental futures analysis.

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

It is anticipated that the Environment and Public Policy MSc will make use of the many links it already has with Government clients, utilities, NGO, OEMs and their supply chains. Alongside a solid technology and engineering offer, the University has an influential work stream advising Government departments and their agencies (e.g. Defra, DECC, BIS, MOD, Environment Agency, Natural England, Food Standards Agency, Health Protection Agency etc.), think tanks (e.g. Green Alliance, Aldersgate Group) and NGOs (e.g. World Bank, UNEP, WHO, WaterAid, Oxfam).

We intend to use these links to engage students directly with current thinking and activities relating to the environment and public policy as well as to acquaint them with potential employers in a range of sectors, for roles as policy advisors, high-end lobbyists, NGO directors, regulatory affairs officers and influential spokespeople for the environment agenda.

We envisage making use of these links throughout the course.

A visit to London, is to be included in the Induction programme, and will as far as is possible make use of these links.

Students will be encouraged to attend selected open meetings throughout the year on issues of relevance to the course (e.g. hydraulic fracturing, climate change adaptation) and we will invite colleagues from partner organisations to speak to the students.

We intend the group project and individual theses to be linked to partner organisations either through research and consultancy held at Cranfield, or directly with the relevant organisations themselves.

The Environmental advocacy and discourse module will be delivered by an external consultant.

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.*

ESM will seek accreditation from the Chartered Institution of Water and Environmental Management and IEMA at the next reaccreditation round for the Environment and Energy programmes.

2. <u>What are the aims of the course?</u>

Cranfield University offers this course in order to:

- prepare high quality, Cranfield-trained, policy specialists, literate in environmental technology, management and engineering able to secure, in time, leading positions within Government, think-tanks, and NGOs;
- further strengthen the University's relationship and support to policy advisors, high-end lobbying organisations, NGO directors, regulatory affairs executives and influential spokespeople on the environment agenda – as the provider of choice for robust scientific evidence;
- provide a solid pipeline of candidates for a growing research and consulting portfolio in environmental policy and regulation at Cranfield, as elsewhere.

This programme is intended for the following range of students:

- environmental scientists, technologists and engineers seeking roles requiring them to provide well-founded evidence to environmental organisations operating in the political arena;
- environmental specialists seeking work in the civil service;
- environmental scientists, technologists and engineers planning to undertake policy-focussed research;
- policy-focussed individuals seeking to move into the environmental sector;
- environmental scientists, technologists and engineers seeking an intensely applied postgraduate experience and connections to the applied policy field.

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

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

A. Postgraduate Certificate in Environment and Public Policy

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

enter text here

ILO 1. Produce concise executive briefings of environmental policy impacts to inform government policy, corporate decisions, and position statements.

ILO 2. Critically appraise environmental policy options and the evidence that supports their development

ILO 3. Integrate social, economic, political, and technical understanding to construct evidence-based policy, and/or regulator features for the design, implementation, and review of of environmental policies

ILO 4. ILO 4. Develop a long-term, strategic perspective on policy choice, interpreting the implications of social, political, and technical trends on environmental policy formulation and regulation

B. Postgraduate Diploma in Environment and Public Policy

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

ILO 1.

ILO 2.

ILO 3.

ILO 4.

ILO 5. Integrate knowledge, understanding and skills from the taught modules in a real-life situation

ILO 6. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

ILO 7.

C. MSc in Environment and Public Policy

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

enter text here

ILO 8. ILO 7. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions

ILO 9. ILO 8. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

4. How is the course taught?

The MSc course will be taught in three sections: taught modules (40%), a group project (20%), and an individual research project (40%) in line with the School teaching strategy. The taught modules are typically delivered in one-week blocks between October and February. The course material is delivered within one week with a second week focussed on assimilation and the completion of an assignment. The teaching methods include debates, practical sessions, field visits, lectures, seminars, and presentations. The Group Project is a group-based activity typically undertaken between February and April. The project is designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation, relating to research issues in public policy and the environment. For the individual research project, each student is allocated a supervisor. Individual projects are selected to relate to research issues in public policy and the environment. Guidance sessions are provided as to what is required from the thesis and oral presentation. The group project and individual theses are typically linked to partner organisations, such as Defra, Natural England, or the Environment Agency, either through research and consultancy held at Cranfield University, or directly with the relevant organisations themselves.

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. During the group project students will be given training in group-working and will reflect on their personal development.

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

- A visit programme to Government Departments, think tanks, NGO head offices, or corporate head offices in London, to be included in the Induction programme. This is an exposure programme and is not formally assessed.

- Encouraging students to attend selected open meetings throughout the year on issues of relevance to the course (e.g. hydraulic fracturing, climate change adaptation).

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:	
Induction Module Core modules 2-7	0 60
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 Core modules 2-8 Group project Module 12 in place of module 11 (Part time students)	0 70 40 40
ELECTIVE MODULES:	
1 from modules 9 or 10	10
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 Core modules 2-8 Group project Individual thesis project Module 12 in place of module 11 (Part time students)	0 70 40 80 40
ELECTIVE MODULES:	
1 from modules 9 or 10	10
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);[1] [2]
- **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 MSc 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. One example is to complete five taught modules in year 1, three taught modules and a work-based project in year 2, and a thesis and oral presentation in year 3. An alternative is to complete the autumn term modules in year 1,

[1] 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).

[2] 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%).

to complete a research thesis between January and December in year 2, and then to complete the remaining three taught modules and group project between January and May in year 3.

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENV-INWK	Induction	T Brewer	33		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of sustainability	P Burgess	26		10	Y		10/10/16	14/10/16	40	ICW	100				F 22/10/16 P 29/10/16	
3	I-EEM-A1184	Environmental valuation	N Ozkan	27		10	Y		24/10/16	28/10/16	40	ICW	100				F 12/11/16 P 19/11/16	
4	I-EPP-A1004	Environmental advocacy and	A Graves	25	22.5	10	Y		31/10/16	04/11/16	40	ICW	100				F 07/01/17 P 14/01/17	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
		discourse																
5	I-EMB-FEA	Financial and economic appraisal	P Burgess	25		10	Y		21/11/16	25/11/16	40	ICW	100				F 3/12/16 P 10/12/16	
6	I-EPP-A1005	Environmental horizon scanning and futures research	F Lickorish	30		10	Y		05/12/16	09/12/16	40	ICW	100				F 17/12/16 P 3/1/17	
7	I-ERM-A2006	Environmental policy and risk governance	S Jude	30		10	Y		09/01/17	13/01/17	40	ICW	100				F 21/1/17 P 28/1/17	
8	I-EMB-A1128	Technology, environment and society	P Longhurst	25		10	Y		23/01/17	27/01/17	40	ICW	100				F 4/2/17 P 11/2/17	
Electives																		
9	I-EPP-EE	Energy economics	N Ozkan	35		10	Y		06/02/17	10/02/17	40	ICW	100				F 18/2/17 P 25/2/17	
10	I-EMB-EMP	Environmental management in practice	G Drew	20		10	Y		06/02/17	10/02/17	40	ICW	100				F 18/2/17 P 04/03/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
Projects																		
11	I-ENV-GRPP	Group project	Supervisors	16		40	Y		20/02/17	05/05/17	50	GPROJ ICW	80 20				GPROJ 2/5/17 ICW 6/5/17	
12	I-ENV-DISS	Dissertation in place of group project for part time students	Supervisors	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/2017	
13	I- ENV-THESIS	Individual Research Project	Supervisors	20		80	Y		08/05/17	08/09/17	50	THESIS OR	90 10				4/9/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-EMB-A1122	Principles of sustainability	MSc in Environmental Management for Business	• MSc in Land Reclamation and Restoration • MSc in Economics of Natural Resource and Environmental Management • MSc in Environment and Public Policy • MSc in Design and Innovation for Sustainability • MSc in Energy Supply for Low Carbon Futures • MSc in Renewable Energy Technology
I-EEM-A1184	Environmental Valuation	MSc in Economics of Natural Resource and Environmental Management	• MSc in Environmental Management for Business • MSc in Environment and Public Policy • Renewable Energy Technology
I-EPP-A1004	Environmental advocacy and discourse	MSc in Environment and Public Policy	• MSc in Environment and Public Policy • MSc in Future Food Sustainability
I-EMB-FEA	Financial and Economic Appraisal	MSc in Environmental Management for Business	• MSc in Economics of Natural Resource and Environmental Management • MSc in Environment and Public Policy
I-EPP-A1005	Environmental horizon scanning and futures research	MSc in Environment and Public Policy	• MSc in Environment and Public Policy • MSc in Future Food Sustainability
I-ERM-A2006	Environmental Policy and Risk Governance	MSc in Environmental Risk Management	• MSc in Economics of Natural Resource and Environmental Management • MSc in Environmental Management for Business • MSc in Environment and Public Policy • MSc in Environmental Water Management
I-EMB-A1128	Technology, Environment and	MSc in Environmental	• MSc in Economics of Natural Resource and

	Society	Management for Business	Environmental Management • MSc in Environment and Public Policy • MSc in Design and Innovation for Sustainability
I-EPP-EE	Energy economics	MSc in Economics of Natural Resource and Environmental Management	• MSc in Economics of Natural Resource and Environmental Management • MSc in Environment and Public Policy
I-EMB-EMP	Environmental Management in Practice	MSc in Environmental Management for Business	• MSc in Environment and Public Policy

7. How are the ILOs assessed?

The following assessment types are utilised:

The course will use a range of assessment types. Students on this MSc can typically expect to have eight pieces of individual assessment by submitted work, one group project, assessed by a group project report and a reflective assessment, and an individual project, assessed through a individual project report and individual presentation.

This approach has been adopted in order to assess the ability of the student to demonstrate their ability in a range of environments.

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

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. <u>What opportunities are graduates likely to have on completing the course?</u>

The environmental goods and services sector is substantive and growing at 5% per annum. Globally it is a £3.3 trillion market, £122bn in the UK, employing just short of 1 million full time equivalent in 52,000 organisations. Implicated organisations include government departments and their agencies (e.g. Defra, DECC, BIS, MOD, Environment Agency, Natural England, Food Standards Agency, Health Protection Agency etc.), think tanks (e.g. Green Alliance, Aldersgate Group) and NGOs (e.g. World Bank, UNEP, WHO, WaterAid, Oxfam).

High among the needs of these organisations are top notch influencing skills; examples include policy negotiation during EU statute development; international treaties and consensus on issues such as water safety, sanitation, climate change, carbon financing and development funding (World Bank); corporate environmental engagement; the leadership of local authority environmental partnerships; lobbying and the drafting of think-tank 'white papers'.

For this reason, the sector has seen an emergence, in recent years, of 'environment policy officer' roles. These act as entry level positions and typically, they grow into senior policy officer roles, directors of policy posts and ultimately managing director positions. The career trajectory for senior positions often follows a path through various NGOs, government departments, or mixed private/public sector positions.

A firm grounding in the technical environmental landscape is required, coupled with an appreciation of organisational and environmental politics and the discipline of informed advocacy. Good policy advisors are grounded in environmental technology, and able to position their messages in the political landscape understood by boards, executives, political advisors/politicians, ministers, and NGOs. The aim of this course is to prepare high quality policy specialists, literate in environmental technology, management and engineering, who will be able to secure, in time, leading positions in the 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.

COURSE TITLE: MSc in Environmental Data Science

Date of first publication/latest revision: 18/01/16 – 13/09/16

1. What is the course?

Course information

Course Title	Environmental Data Science
Course code	MSEDSFTC, MSEDSFPTC, PDEDSFTC, PDEDSPTC, PCEDSFTC, PCEDSPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Exit routes	MSc, PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Agri-informatics
Course Director	Dr Stephen Hallett
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	A first or second class UK Honours degree in a relevant science, engineering or related discipline, or the international equivalent of these UK qualifications. Other relevant qualifications, together with significant 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 - 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 (Depending upon previous experience.)

Institutions delivering the course

This course is delivered by the School of Energy, Environment and Agrifood where the research interests include analysing environmental big dataset for many environmental applications including coastal change, subsidence risk, environmental water management, landscape change, vegetation change, climate change impacts, etc.

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

Through the DREAM Centre for Doctoral Training (http://www.dream-cdt.ac.uk/) we work with the following universities: Cambridge, Newcastle and Birmingham.

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's aim with this course is to provide a focus for the growing concept of environmental data science, whereby large datasets of spatial and temporal information are assembled and manipulated in order to improve our understanding and management of environmental systems. The sheer volume of data (termed 'big data') challenges traditional methods for structuring, manipulating and outputting information for decision makers. Such data is gathered by modern real-time sensors and data loggers, satellite and aerial remote observation platforms, machinery, and supplies graduates with the contemporary, practical skills and capabilities necessary to manage and manipulate such 'big data' to provide effective information tailored to the management of particular environmental systems.

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:

The environmental data science course is designed to prove appealing both to domestic UK and overseas students; likewise to recent graduates as well as post-experience students. The requirements, challenges and skills for managing and manipulating large datasets which will be apparent to post-experience students. The course targets technical, quantitative students from such backgrounds as computer science, maths, statistics, engineering and the environmental sciences.

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

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

A. Postgraduate Certificate in Environmental Data Science

In completing this course, and achieving the associated award, a diligent student should be able to:
Develop appropriate and sustainable environmental informatics solutions to the management of 'big data', relevant across a range of disciplines, but focussing on natural and man-made environments, at a range of spatial scales, with due regard to the technical, social and institutional constraints imposed by the environment.

ILO 1.

ILO 2. Assemble and organize data for prescribed analysis and modelling approaches.

ILO 3. Appraise and apply data mining techniques, identify underlying data structures.

ILO 4. Formulate and construct process and statistical models that reproduce observed relationships and represent environmental phenomena

ILO5. Design and build appropriate GIS database structures and manipulate data and metadata within and between database management systems and incorporating the application of systems analysis methodologies to data.

ILO 6. Demonstrate effectiveness in communication, numeracy and IT skills, thinking and creativity, and project and time management.

B. Postgraduate Diploma in Environmental Data Science

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

ILO 4. ILO 7. Integrate, within the context of a specific project, appropriate elements of the component technologies to produce and communicate quality-assured and innovative informatics solutions.

ILO 5. ILO 8. Demonstrate knowledge of and reflect upon personal strengths and weaknesses.

ILO 6. ILO 9 Integrate knowledge, understanding and skills from the taught modules in a real-life situation

ILO 7. ILO 10 Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

C. MSc in Environmental Data Science

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

ILO 11. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 12. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.
ILO 13. Display evidence of independent learning and originality.

4. How is the course taught?

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

The MSc course will be taught in three sections: taught modules (40%), a group project (20%), and an individual research project (40%) in line with the School teaching strategy. The taught modules are typically delivered in one-week blocks between October and February. The course material is delivered within one week with a second week focussed on assimilation and the completion of an assignment. The teaching methods include debates, practical sessions, field visits, lectures, seminars, and presentations. The Group Project is a group-based activity typically undertaken between February and May. The project is designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation. 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.

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. During the group project students will be given training in group-working and will reflect on their personal development.

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:	
Module 1	0
ELECTIVE MODULES:	
Any modules chosen from 2-9	60
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 Modules 2-9 Module 10 Module 11 in place of module 10 (Part time students)	0 80 40 40
ELECTIVE MODULES:	
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:	
Module 1 Modules 2-9 Module 10 (Group project) Module 12 (Thesis project) Module 11 in place of Module 10 (Part time students)	0 80 40 80 40
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 <u>not</u> have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[1] [2]

[1] 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).

[2] 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?

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

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

Each module is taught over a two week period where week 1 comprises lectures, practical classes and guided learning. Week 2 is largely free of structured teaching to allow time for independent learning, coursework preparation and reflection.

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENV-INWK	Induction Week	Tim Brewer	33	N/A	0	Y	N/A	03/10/16	07/10/16	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
2	I-ERM-A2005	Environmental Risks- hazard, assessment and management	S Jude	24.5	N/A	10	Y	N/A	10/10/16	14/10/16	40	ICW	100	N/A	N/A	N/A	F 22/10/16 P 29/10/16	
3	I-GIM-A1131	GIS Fundamentals	T Brewer	42	N/A	10	Y	N/A	24/10/16	28/10/16	40	ICW	100	N/A	N/A	N/A	F 5/11/16 P 12/11/16	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
4	I-GIM-A1134	Spatial Data Management	S Hallett	33	N/A	10	Y	N/A	07/11/16	11/11/16	40	ICW	100	N/A	N/A	N/A	F 19/11/16 P 26/11/16	
5	I-EI-A1001	Modelling Environmental Processes	R Corstanje	26	N/A	10	Y	N/A	21/11/16	25/11/16	40	IPRES	100	N/A	N/A	N/A	FT/PT 3/12/16	
6	I-EI-A1002	Applied Environmental Informatics	M Rivas Casado	45	N/A	10	N	N/A	05/12/16	09/12/16	40	ICW	100	N/A	N/A	N/A	F 17/12/16 P 3/1/17	
7	I-BIX-JAV	Programming Using Java	F Mohareb	25	N/A	10	Y	N/A	09/01/17	13/01/17	40	ICW	100	N/A	N/A	N/A	F 21/1/17 P 28/1/17	
8	I-GIM-A1133	Environmental Resource Survey	T Farewell	40	3	10	Y	N/A	23/01/17	27/01/17	40	ICW	100	N/A	N/A	N/A	F 4/2/17 P 11/2/17	
9	I-GIM-A1136	Spatial Data and the Internet	S Hallett	36.5	N/A	10	Y	N/A	06/02/17	10/02/17	40	ICW	100	N/A	N/A	N/A	F 18/2/17 P 25/2/17	
10	I-ENV-GRPP	Group Project	Supervisors	16	N/A	40	Y	N/A	20/02/17	05/05/17	50	GPROJ ICW	80 20	N/A	N/A	N/A	GPROJ 2/5/17 ICW 6/5/17	
11	I-ENV-DISS	Dissertation (part time	Supervisors	10	N/A	40	Y	N/A	03/10/16	30/09/17	50	IPROJ	100	N/A	N/A	N/A	30/09/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
		students)																
12	I-ENV-THESIS	Individual Research Project	Supervisors	20	N/A	80	Y	N/A	08/05/17	08/09/17	50	THESIS OR	90 10	N/A	N/A	N/A	4/9/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-GIM-A1131	GIS Fundamentals	Geographical Information Management	• Geographical Information Management • Environmental Risk Management • Integrated Landscape Ecology • Land Reclamation and Restoration
I-GIM-A1133	Environmental Resource Survey	Geographical Information Management	• Geographical Information Management • Integrated Landscape Ecology
I-ERM-A2005	Environmental Risks-hazard, assessment and management	Environmental Risk Management	• Environmental Risk Management • Waste and Resource Management • Energy from Waste
I-GIM-A1136	Spatial Data and the Internet	Geographical Information Management	• Geographical Information Management
I-GIM-A1134	Spatial Data Management	Geographical Information Management	• Geographical Information Management

7. How are the ILOs assessed?

The following assessment types are utilised:

The course will use a range of assessment types. Students on the MSc can typically expect to have eight pieces of individual assessment by submitted work, one group project, and one element assessed by a thesis and an oral presentation.

This approach has been adopted because:

This approach has been adopted in order to assess the ability of the student to demonstrate their ability in a range of environments.

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

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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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.

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

The UK has one of the world's strongest digital markets, and data in all its forms is now so important in organisations that analysts rate it as a major competitive advantage (The Independent, Nov 2011). The ICT, software and digital content sectors are together worth £100bn. The UK digital economy is estimated to be larger per head than in any other country and it is expected to grow to 10% of GDP by 2015 (Technology Strategy Board). In Europe as a

whole, ‘Big Data’ is estimated to generate significant financial value to the tune of EUR 250bn per year across the public sector (McKinsey Global Institute). In the UK, there are estimates in which the digital economy accounts for nearly £1 in every £10 that the UK economy produces each year (Dept. for Culture, Media and Sport). There are clear government efforts (e.g. cross-research council ‘Digital Economy’ or Technology Strategy board ‘Connected Digital Economy Catapult’ to promote and support the digital economy).

The UK and global Digital Economy requires graduates with the technical skills to manage, manipulate and visualize large datasets (IT technology and engineering) and interpret and represent this data as information (science and mathematics), contributing to knowledge. However, currently a ‘significant constraint on realising value from big data will be a shortage of talent’ (McKinsey Global Institute). Cranfield graduates from this course can expect to follow a wide range of careers paths in academic research or professional environmental management; environmental consultancy with private firms, non-profit organizations and government. Environmental informatics will furthermore provide for an enhancement of skill sets for mid-career professionals because it represents an emerging set of quantitative tools which achieve concrete solutions to trans-disciplinary problems.

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: MSc in Environmental Engineering

Date of first publication/latest revision: 18/01/16 – 06/09/16

1. What is the course?

Course information

Course Title	Environmental Engineering
Course code	MSEENFTC, MSEENPTC, PDEENFTC, PDEENPTC, PCEENFTC, PCEENPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Exit routes	MSc, PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Institute for Resilient Futures
Course Director	Dr Mark Pawlett
Awarding Body	Cranfield University
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

Institutions delivering the course
This course is delivered by School of Energy, Environment and Agrifood where the research interests include municipal and hazardous waste management, process emissions, contaminated land, water, wastewater treatment and waste disposal.

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

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.

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 2018.

2. <u>What are the aims of the course?</u>

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 and global scales. Specifically, the MSc will equip students with a 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.

These courses are 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. Develop a comprehensive knowledge of 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 of pollution generation and their impact on ecosystems, along with the importance of pollution control and the principles of energy and materials use.

ILO 3. Conceptually appraise and apply the principles of health and safety regulations and environmental sustainability to a range of industrial and commercial contexts.

ILO 4. Demonstrate a systematic understanding of environmental engineering concepts and principles in order to design practical environmental management solutions

ILO 5. Critically evaluate relevant environmental engineering problems and design appropriate solutions taking account of social, environmental, technical, regulatory and commercial constraints

ILO 6. Effectively describe and appraise the remedial processes for the treatment of pollution such as the clean-up of air, soil, sludge, contaminated land, solid waste and wastewater

B. Postgraduate Diploma in Environmental Engineering

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

ILO 7. Continue to advance their knowledge and understanding of environmental issues and develop problem definition, hypothesis setting, analysis and problem solving skills to address challenges faced by environmental engineers

ILO 8. Integrate knowledge, understanding and skills from the taught modules in a real-life situation

ILO 9. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate 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 10. Demonstrate self-direction and originality in developing and delivering successful independent research projects relevant to appropriate public and private sector organisations.

ILO 11. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 12. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

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 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:	
Any 6 modules from the taught component	60
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 Modules 2-8 Group project Dissertation in place of a Group Project (Part time)	0 80 40 40
ELECTIVE MODULES:	
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 Modules 2-8 Group project Individual thesis project Dissertation in place of a Group Project (Part time)	0 80 40 80 40
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);[1] [2]

[1] 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).

[2] 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%

- **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.

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.

(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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENV-INWK	Induction	T Brewer	33		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-WSC-A1096	Water & Wastewater Treatment Principles	J MacAdam	30		10	Y		10/10/16	14/10/16	40	ICW	100				FT - 22/10/2016 PT - 29/10/2016	
3	I-WRM-CRM	Circular Waste Management: Recycle, Recover &	R Villa	52		20	Y		24/10/16 07/11/16	28/10/16 11/11/16	40	ICW	100%				FT - 05/11/2016 PT -	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
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								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
		Dispose															12/11/2016 19/11/2016 FT 26/11/2016 PT	
4	I-WSC-A1095	Risk Management and Reliability Engineering	J MacAdam	28		10	Y		21/11/16	25/11/16	40	ICW	100				FT - 03/12/2016 PT - 10/12/2016	
5	I-LAM-A1145	Land Engineering & Water Management	L Deeks	30		10	Y		05/12/16	09/12/16	40	ICW	100				FT - 17/12/2016 PT - 03/01/2017	
6	I-IWM-A1500	Process Emissions and Control	I Mead	25		10	Y		09/01/17	13/01/17	40	ICW	100				FT - 21/01/2017 PT - 28/01/2017	
7	I-LAM-A1523	Soil Erosion Control for Catchment	R Simmons	40		10	Y		23/01/17	27/01/17	40	GCW	100				FT/PT - 04/02/2017	

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												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
		Management																
8	I-IWM-A1061	Pollution Prevention and Remediation Technologies	FCoulon	29		10	Y		06/02/17	10/02/17	40	ICW	100				FT - 18/02/2017 PT - 25/02/2017	
9	I- ENV-GRPP	Group Project	Supervisors	16		40	Y		20/02/17	05/05/17	50	GPROJ ICW	80 20				GPROJ - 02/05/2017 ICW - 06/05/2017	
10	I-ENV-DISS	Dissertation (for part time students)	Supervisors	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/17	
11	I-ENV-THESIS	Individual Research Project	Supervisors	20		80	Y		08/05/17	08/09/17	50	THESIS OR	90 10				4/9/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-WSC-A1096	Water & Wastewater Treatment Principles	Water and Wastewater Engineering	•
I-WRM-CRM	Circular Waste Management: Recycle, Recover and Dispose	Waste and Resource Management	• Energy from Waste course (Energy programme)
I-WSC-A1095	Risk Management and Reliability Engineering	Water and Wastewater Engineering	•
I-IWM-A1061	Pollution Prevention and Remediation Technologies	Waste and Resource Management	• Environmental Risk Management
I-IWM-A1500	Process Emissions and Control	Waste and Resource Management	•
I-LAM-A1145	Land Engineering & Water Management	Land Reclamation and Restoration	•
I-LAM-A1523	Soil Erosion Control for Catchment Management	Land Reclamation and Restoration	•

7. 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) 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

This approach has been adopted because:

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

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

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. <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 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

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: MSc in Environmental Management for Business

Date of first publication/latest revision: 18/01/16

1. What is the course?

Course information

Course Title	Environmental Management for Business
Course code	MSEMBFTC, MSEMBPTC, PDEMDFTC, PDEMBPTC, PCEMBFTC, PCEMDPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Cranfield Institute for Resilient Futures
Course Director	Dr David Parsons
Awarding Body	Cranfield University
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 resource 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	N/A

Statement(s)	
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 Institute for Resilient Futures where the research interests include environmental risk analysis, life cycle analysis, ecosystem service assessment, environmental modelling and institutional resilience

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 2018.

2. What are the aims of the course?

Cranfield University offers this course
To provide students with the knowledge and understanding of environmental policy, and the ability to develop and implement strategies in response to those policies;
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. Analyse environmental issues and contribute to the economic and policy decision making process in both the private and public sector at all levels

ILO 2. Develop and implement best practice strategies which lead to environmentally and socially responsible products and services

ILO 3. Monitor and evaluate business practice through the use of environmental auditing and other assessment methods

ILO 4. Produce detailed analyses of strategic issues and problems and appropriate proposals and recommendations as an outcome of such analysis

ILO 5. Apply key management functions and scientific principles to business, as a result of analysis of the economic, legal and political framework which defines environmental obligations and opportunities

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 6. Develop problem definition, hypothesis setting, analysis and problem solving skills to address challenges faced by environmental managers.

ILO 7. Integrate knowledge, understanding and skills from the taught modules in a real-life situation

ILO 8. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate 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 9. Develop and deliver successful independent research projects relevant to appropriate public and private sector organizations.

ILO 10. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 11. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

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 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:	
Any 6 taught modules	60
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 Modules 2-9 Group Project	0 80 40

Module 11 in place of module 10 (Part time students)	40
ELECTIVE MODULES:	
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 Modules 2-9 Group Project Individual Thesis Project Module 11 in place of module 10 (Part time students)	0 80 40 80 40
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 <u>not</u> have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[1] [2]
- **For Taught Assessments,** the minimum mark for each individual taught assessment <u>on the first attempt</u> for the significant majority of the taught assessments, noting that:

[1] 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).

[2] 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 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.

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.

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENV-INWK	Induction	T Brewer	33		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	P Burgess	26		10	Y		10/10/16	14/10/16	40	ICW	100				F 22/10/16 P 29/10/16	
3	I-EEM-A1184	Environmental Valuation	N Ozkan	27		10	Y		24/10/16	28/10/16	40	ICW	100				F 12/11/16 P 19/11/16	
4	I-ERM-A2014	Risk Communication	S Rocks	25		10	Y		07/11/16	11/11/16	40			100	ICW GCW	70 30	F 19/11/16 P 26/11/16	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
		and Perception																
5	I-EMB-FEA	Financial and Economic Appraisal	P Burgess	25		10	Y		21/11/16	25/11/16	40	ICW	100				F 3/12/16 P 10/12/16	
6	I-EDI-A1127	Evaluating Sustainability through life cycle approaches	P Goglio	30		10	Y		05/12/16	09/12/16	40	ICW	100				FT & PT 07/01/17	
7	I-ERM-A2006	Environmental Policy and Risk Governance	S Jude	30		10	Y		09/01/17	13/01/17	40	ICW	100				F 21/1/17 P 28/1/17	
8	I-EMB-A1128	Technology, Environment and Society	PLonghurst	25		10	Y		23/01/17	27/01/17	40	ICW	100				F 4/2/17 P 11/2/17	
9	I-EMB-EMP	Environmental Management in Practice	G Drew	20		10	Y		06/02/17	10/02/17	40	ICW	100				F 18/2/17 P 04/03/17	
PROJECTS																		
10	I-ENV-GRPP	Group Project	Supervisors	16		40	Y		20/02/17	05/05/17	50	GPROJ	80				GPROJ 2/5/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
												ICW	20				ICW 6/5/17	
11	I-ENV-DISS	Dissertation (part time students)	Supervisors	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/17	
12	I-ENV-THESIS	Individual Research Project	Supervisors	20		80	Y		08/05/17	08/09/17	50	THESIS OR	90 10				4/9/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-EEM-A1184	Environmental Valuation	ENREM	• Economics for Natural Resource and Environmental Management • Environment and Public Policy • Renewable Energy Technology
I-ERM-A2006	Environmental Policy and Risk Governance	ERM	• Environmental Risk Management • Environmental Water Management • Economics for Natural Resource and Environmental Management • Environment and Public Policy
I-ERM-A2014	Risk Communication and Perception	ERM	• Environmental Risk Management
I-EMB-EMP	Environmental Management in Practice	EMB	• Environment and Public Policy
I-EDI-A1127	Evaluating Sustainability	EMB	• Waste Resource Management • Environmental Risk Management • Energy Supply for Low Carbon Futures • Biofuels Process Engineering
I-EMB-FEA	Financial and Economic Appraisal	EMB	• Economics for Natural Resource and Environmental Management • Environment and Public Policy
I-EMB-A1122	Principles of Sustainability	EMB	• Environment and Public Policy • Land Reclamation and Restoration • Economics for Natural Resource and Environmental Management • Design and Innovation for Sustainability • Energy supply for Low

			Carbon Futures • Renewable Energy Technology
I-EMB-A1128	Technology, Environment and Society	EMB	• Economics for Natural Resource and Environmental Management • Environment and Public Policy • Design and Innovation for Sustainability

7. 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 principles studied, and class tests, 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.

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

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

Successful students develop diverse and rewarding careers in government ministries, non-governmental organisations (NGOs), environmental and business consultancies, public sector organisations, such as environmental protection agencies, and the manufacturing and service industries in the private sector.

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.

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: MSc in Environmental Risk Management

Date of first publication/latest revision: 20/07/16 – 07/09/16

1. What is the course?

Course information

Course Title	Environmental Risk Management
Course code	MSERMFTC, MSERMPTC, PDERMFTC, PDERMPTC, PCERMFTC, PCERMPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Institute for Environment, Health , Risks and Future
Course Director	Miss Fiona Lickorish
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Master)
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

Institutions delivering the course
This course is delivered by the Institute for Environment, Health, Risk and Future where the research interests include risk science, policy, toxicology and environmental impacts. Some modules are shared with other courses within the Environment Programme

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

The main aim of the programme will be to provide government bodies with staff with a fundamental understanding of risk assessment and related topics, therefore government departments will be approached for their recommendation.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

The course has accreditation from the Chartered Institution of Water and Environmental Management (CIWEM) until September 2018.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- Provide a comprehensive foundation course appropriate to individuals wishing to take up an environmental risk assessment or management role within industry or government;
- Demonstrate the application of theoretical information to specific scenarios;
- Draw upon current research within SAS to support teaching practices and communicate identified good practices.

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

This programme is intended for the following range of students:

- Students currently employed within a risk assessment or management team that wish to support their current role;
- Students who are currently employed within related roles and wish to support their current knowledge for employment within this area; and
- Students who already have higher education degrees (e.g. MSc or PhD) in other areas and wish to broaden their knowledge base.

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

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

A. Postgraduate Certificate in Environmental Risk Management

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

ILO 1. Demonstrate an understanding of environmental modelling and interpretation

ILO 2. ILO 2.Critically evaluate evidence and provided information and apply evidence to (a) assess environmental risks and (b) inform decision making processes, recognising other influences (e.g. economic and social)

ILO 3. Demonstrate an in-depth knowledge of risk assessment and critically evaluate the appropriate applications of risk assessment methodologies

ILO 4. Demonstrate an awareness of a risk management processes and their applications

ILO 5. Demonstrate an understanding of frameworks and techniques including lifecycle assessment

ILO 6. Discuss their work and relate it to the work of others.

ILO 7. Demonstrate the ability to communicate the outcomes of an environmental risk assessment and selection of the appropriate risk management strategies as dictated by current regulations and procedures.

B. Postgraduate Diploma in Environmental Risk Management

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

ILO 8. Demonstrate the breadth and depth of knowledge needed to be credible when undertaking risk assessments

ILO 9. Integrate knowledge, understanding and skills from the taught modules in a real-life situation

ILO 10. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

C. MSc in Environmental Risk Management

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

ILO 11. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 12. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

4. <u>How is the course taught?</u>

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

The majority of the course will take place as one week modules followed by a “reading week” in order to enable the students to reflect and revise the issues raised during the teaching week as well as further their work in the area. Teaching will take the form of:

- Traditional lecturing practices where the lecturer leads and directs the students to new information;
- Group project work where the students are expected to behave in a professional manner whilst designing an approach to address a research question (with help from the academic team) and delivering the research project to set deadlines and to a professional standard in a small team;

- Student-centred learning work where the students in small groups are presented with a scenario for the week and asked to address particular points within the scenario. Whilst this approach does not involve a large amount of traditional lecturing, the students are provided with extensive feedback (both oral and written) and are supported during the process; and
- Deriving insight from case studies either individually or as small groups.

Students will be required to acquire and use knowledge independently and critically for the duration of the course, both during the taught programme, group project/dissertation (PGDip) and also the individual thesis project (MSc). This will involve the use of library based resources such as books and journal material, web based literature, management 'games' and industrial interaction. Students will learn how to work independently and treat this material critically and in an organised way, so as to draw their own conclusions and make decisions. The taught modules are organised in such a way as to facilitate this process.

Skill acquisition in many other areas will be reinforced in the individual thesis project which forms the last part of the MSc course. Important skills used during this period in virtually all cases will be: written communication, oral communication, numeracy, computer literacy, retrieval of networked information resources, and project and time management.

Oral communication will also be encouraged and practised throughout, in particular by active discussion sessions. Presentation skills will be practised and assessed on a number of occasions including formal presentation of the group project (FT MSc & FT PGDip) and the individual thesis project (MSc only).

Other communication skills practised on an on-going basis throughout the course will include inter-personal skills and the ability to communicate in a group environment. These skills, although often described as 'soft', are key to the success of any professional within their chosen field. So these skills will be emphasised in this course. Specifically, team working and communication will be practised and assessed throughout the taught programme by active student based group work, and by an individual thesis project.

In addition to the teaching methods outlined in section 3 above, students will be supported in their learning and personal development by:

- a personal development plan that will be drawn up by the student after consultation with the course director at the beginning of the year and revisited at least once during the course;
- a strong academic team with ongoing research in relevant areas that will provide teaching, personal support and mentoring;
- individual projects (MSc) linked with industrial or government partners, or current research within SEEA.

The MSc is designed to provide a holistic 'rounded' education in the discipline. It touches on all the obviously relevant areas, but the intention is for it to do more. It is expected that graduates will leave Cranfield as responsible professionals with a high level of integrity, with a respect both for their particular discipline and for the people and environment that they will interact with in the future. It is to be hoped that these qualities will arise from their overall experience at Cranfield, including their interaction with Cranfield staff and their colleagues, as facilitated by Cranfield staff.

5. <u>What do students need to achieve in order to graduate?</u>

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:	
Any 6 Taught modules	60
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 Modules 2-9 Group Project Module 11 in place of module 10 (Part time students)	0 80 40 40
ELECTIVE MODULES:	
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 Modules 2-9 Group Project Individual Thesis project Module 11 in place of module 10 (Part time students)	0 80 40 80 40
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);[1] [2]
- **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.

This course is also offered on a part-time basis. Students would instead register for the course in October but be expected to complete the course within 24 calendar months.

Each module is taught over two weeks, with the second week largely free of structured teaching to allow time for more independent learning and reflection.

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[1] 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).

[2] 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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENV-INWK	Induction	T Brewer	33		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-ERM-A2005	Environmental Risks - Hazard, Assessment, Management	S Jude	24.5		10	Y		10/10/16	14/10/16	40	ICW	100				F 22/10/16 P 29/10/16	
3	I-GIM-A1131	GIS Fundamentals	T Brewer	42		10	Y		24/10/16	28/10/16	40	ICW	100				F 5/11/16 P 12/11/16	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
4	I-ERM-A2014	Risk Communication and Perception	S Rocks	25		10	Y		07/11/16	11/11/16	40			100	ICW GCW	70 30	F 19/11/16 P 26/11/16	
5	I-EI-A1001	Modelling Environmental Processes	R Corstanje	26		10	Y		21/11/16	25/11/16	40	IPRES	100				FT/PT 3/12/16	
6	I-EDI-A1127	Evaluating Sustainability through life cycle approaches	P Goglio	30		10	Y		05/12/16	09/12/16	40	ICW	100				FT & PT 7/1/17	
7	I-ERM-A2006	Environmental Policy and Risk Governance	S Jude	30		10	Y		09/01/17	13/01/17	40	ICW	100				F 21/1/107 P 28/1/17	
8	I-EDI-A1057	Risk, Toxicology, Exposure and Health	S Rocks	30		10	Y		23/01/17	27/01/17	40	EX	100				w/c 20/02/17	
9	I-IWM-A1061	Pollution prevention and remediation technologies	F Coulon	29		10	Y		06/02/17	10/02/17	40	ICW	100				F 18/2/17 P 25/2/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
PROJECTS																		
10	I-ENV-GRPP	Group Project	Supervisors	16		40	Y		20/02/17	05/05/17	50	GPROJ ICW	80 20				GPROJ 2/5/17 ICW 6/5/17	
11	I-ENV-DISS	Dissertation (part time students)	Supervisors	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/16	
12	I-ENV-THESIS	Individual Research Project	Supervisors	20		80	Y		08/05/17	08/09/17	50	THESIS OR	90 10				4/9/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-IWM-A1061	Pollution Prevention and Remediation Technologies	Waste and Resource Management	• Waste and Resource Management
I-GIM-A1131	GIS Fundamentals	Geographical Information Management	• Geographical Information Management • Environmental Data Science • Integrated Landscape Ecology • Land Reclamation and Restoration
I-EDI-A1127	Evaluating Sustainability	Environmental Management for Business	• Environmental Management for Business • Waste and Resource Management • Energy Supply for Low Carbon Futures • Biofuels Process Engineering
I-ERM-A2006	Environmental Policy and Risk Governance	Environmental Risk Management	• Environment and Public Policy • Economics for Natural Resource and Environmental Management • Environmental Management for Business
I-ERM-A2005	Environmental Risks-Hazard, Assessment and Management	Environmental Risk Management	• Waste and Resource Management • Environmental Data Science • Energy from Waste
I-EI-A1001	Modelling Environmental Processes	Environmental Data Science	• Waste and Resource Management • Environmental Data Science
I-ERM-A2014	Risk Communication and Perception	Environmental Risk Management	• Environmental Management for Business
I-EDI-A1057	Risk, Toxicology, Exposure and Health	Environmental Risk Management	• Waste and Resource Management

7. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types. Students can expect to have one written examination, 7 pieces of assessment by submitted work and elements of assessment by presentation or viva.

This approach has been adopted in order to enable students to demonstrate a holistic understanding of the subject matter presented, and to ensure that the professional presentation and communication skills necessary within this field are achieved.

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

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

This course will provide the breadth of knowledge required to be able to move into environmental risk assessment and management positions within consultancies, companies, and government bodies (e.g. Environment Agency and Defra). It is anticipated that this course will provide a foundation for individuals wishing to move into these areas.

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: MSc in Environmental Water Management

Date of first publication/latest revision: 19/01/16 – 19/09/16

1. What is the course?

Course information

Course Title	Environmental Water Management
Course code	MSEWGFTC, MSEWGPTC, PDEWGFTC, PDEWGPTC, PCEWGFTC, PCEWGPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert,
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	Water
Centre	Cranfield Water Sciences Institute
Course Director	Dr Robert Grabowski
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	**enter here**
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Minimum 2nd class UK honours degree or equivalent or relevant industrial experience. Language proficiency for non-UK students: TOEFL: 237 (computer version), 580 (paper version), or TOEIC: 830, or IELTS: 6.5 minimum, or Cambridge certificate: C or above
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)

[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

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

Institutions delivering the course

This course is delivered by the Cranfield Water Sciences Institute where the research interests include the science, engineering and management of water in municipal, industrial and natural environments, encompassing treatment technologies, engineering, irrigation, socioeconomics and policy. Research across the Department also focuses on soil and water sciences in the context of land management for food, fibre and bio-energy crops, environmental services and biodiversity, using expertise in biophysical and social sciences and agricultural engineering.

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

The MSc Environmental Water Management has been developed in collaboration with employers in response to the increased demand for water managers with the appropriate blend of skills and creativity to provide solutions to the complex problems of the future. This programme provides the skills and knowledge required to assess, plan, execute and implement strategies for the sustainable management of water in natural, semi-natural and man-made environments. It addresses the common themes pertaining to water and sanitation in all situations.

Cranfield University actively engages external speakers from across the water sector to deliver the Environmental Water Management course, including from:

- The Environment Agency
- The Open University
- Anglian Water

Cranfield University also actively seeks sponsorship and support for individual thesis projects from water sector employers to provide professional experience and development opportunities for students. Thesis sponsors and supporters include:

- The Environment Agency, Highways Agency, Regional Wildlife Trusts
- Halcrow
- Tyne Rivers Trust
- Anglian Water
- RSPB

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. The EPP provides a feeder-stream of European students to Environmental Water Management and in doing so contributes to the diversity of the class.

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 Institution of Water and Environmental Management (CIWEM) until October 2016.

2. What are the aims of the course?

Cranfield University offers this course in order to:

- Provide the appropriate science & technology background to manage water effectively and efficiently in natural, semi-natural and man-made environments

This programme is intended for the following range of students:

- Graduates with science, engineering, geography or related degrees keen to pursue careers in water 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 Water Management

In completing this course, and achieving the associated award, a diligent student should be able to:
ILO 1. ILO 1. Use independent learning skills to advance personal knowledge of theory and practice

ILO 2. Identify the principal controls on water quantity, water quality and aquatic ecology, and assess the relative importance of natural and anthropogenic factors

ILO 3. Interpret and critically evaluate the quality of research and data, and determine relevance for application in relation to solving academic and practical problems

ILO 4. Select and apply appropriate analytical, statistical, modelling or decision-support tools to existing environmental data, and interpret the findings in the context of current environmental regulation.

ILO 5. Develop and critically assess appropriate and sustainable solutions to environmental water management problems in natural and man¬made environments with due regard to the technical, social and institutional constraints imposed by the surrounding environment

B. Postgraduate Diploma in Environmental Water Management

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

ILO 7. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

C. MSc in Environmental Water Management

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, and evaluate findings and draw appropriate conclusions.

ILO 9. Communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

4. How is the course taught?

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

- Engaging in formally assessed debates to discuss a range of issues across the water sector from food production through water for rural and urban poor to environmental water management
- Being provided with the opportunity to undertake externally sponsored or supported thesis project research
- Undertaking field and laboratory work within the context of group projects to integrate and apply knowledge and skills

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:	
Induction Any 6 taught modules (from 2-9)	0 60
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 8 Taught Modules (2-9) Group Project (Full-time students) Dissertation - in place of Group Project (Part Time)	0 80 40 40
ELECTIVE MODULES:	
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 8 taught modules (2-9) Group Project (Full-time students) Dissertation in place of Group Project (Part Time) Thesis Project	0 80 40 40 80
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] [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?

Please see the course structure document for details on the individual elements of the course. Each module is taught over two weeks, with the second week largely free of structured teaching to allow time for more independent learning and reflection. One module uses a 'flipped' structure where the independent learning week precedes the structured teaching week. The 'flipped' module requires students to prepare material (data analysis, presentations, etc.) for case-study based workshops the second week. Group projects are located after the taught modules, between February and April. Individual thesis research projects are run from May till the end of August with thesis submission and oral assessment in early September.

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

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.

[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%).

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)	'Residential' Start Date	'Residential' 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[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-WAT-INWK	Induction Week	A Parker	24		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-WAM-A1163	Surface and Groundwater Hydrology	I Holman	27		10	Y		10/10/16	14/10/16	40	EX	100				Exam week (03/01/17)	
3	I-WAM-A1165	Catchment Water Quality	P Campo Moreno	27		10	N		24/10/16	28/10/16	40	ICW	100				FT 05/11/16 PT 12/11/16	

[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.
[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.

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

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)	'Residential' Start Date	'Residential' 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[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
4	I-ILE-AEL	Aquatic Ecosystems in the Landscape	A Gill	30		10	Y		07/11/16	11/11/16	40	ICW	100				FT 19/11/16 PT 26/11/16	
5	I-EI-A1001	Modelling Environmental Processes	R Corstanje	26		10	Y		21/11/16	25/11/16	40	IPRES	100				FT/PT 03/12/16	
6	I-WAM-DWS	Drought and Water Scarcity	J Knox	30		10	N		05/12/16	09/12/16	40	ICW	100				FT 17/12/16 PT 03/01/17	
7	I-WAM-A1175	Flood Risk Management	T Hess	30		10	N		09/01/16	13/01/16	40	ICW	100				FT 21/01/17 PT 28/01/17	
8	I-WAM-WC	Water in Cities	H Smith	20		10	N	23/01/17	30/01/17	03/02/17	40	ICW	100				FT 04/02/17 PT 11/02/17	
9	I-WAM-IRM	Integrated River Basin Management	RGrabowski	20		10	N	06/02/17	13/02/17	17/02/17	40	ICW	100				FT 19/02/17 PT 25/02/17	
PROJECTS																		

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

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)	'Residential' Start Date	'Residential' 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[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
10	I-WAT-GRPP	Group Project	Supervisors	16		40	Y		20/02/17	06/05/17	50	GPROJ ICW	80 20				02/05/17 06/05/17	
11	I-WAT-DISS	Individual Project (PT MSc and PgDip only)	Supervisors	10		40	Y		03/10/17	30/09/17	50	IPROJ	100				30/09/17	
12	I-WAT-THESIS	Individual Research Project	Supervisors	20		80	Y		08/05/17	08/09/17	50	THESIS OR	90 10				04/09/17	

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

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-WAM-A1163	Surface Water & Groundwater Hydrology	• Environmental Water Management	• Community Water and Sanitation
I-ILE-AEL	Aquatic Ecosystems in the Landscape	• Integrated Landscape Ecology	• Environmental Water Management
I-EI-A1001	Modelling Environmental Processes	• Environmental Data Science	• Environmental Data Science • Environmental Risk Management • Environmental Water Management

7. How are the ILOs assessed?

The following assessment types are utilised:

The MSc course is assessed as three elements:

- 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) or examination in January;
- group projects (20%) are assessed by means of a written group report and presentations

.Individual design projects (PTs) are assessed by means of a written dissertation.

-
- the research project (40%), is assessed by a thesis and an oral examination

This approach has been adopted because:

Different types of assessments enable the evaluation of a range of M-level skills. A mixture of both individual and group assessments is important in helping students to develop both individual skill and team work related skills. Group and thesis projects follow the completion of the taught part of the course and at this stage more emphasis is on enquiry based learning and problem solving.

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.)

For Example:

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

98	*ICW*				*EX*	*EX*	*ICW*		
99	*ICW1*		*ICW1*	*ICW2*					

A. enter text here – start with lowest award – e.g., Postgraduate Certificate

Award ILOs / Module No.									

B. enter text here – list next award – e.g., Postgraduate Diploma

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

Award ILOs / Module No.									

C. enter text here – list next award – e.g., MSc

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

Award ILOs / Module No.									

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. 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 specialism in their chosen career, and the capability to make an immediate and real contribution to improved water supply and sanitation. Cranfield Environmental Water Management graduates are highly sought after by employers. Typical employers include:

- Environment Agency
- Wildlife Trusts
- Local Government
- Water utilities e.g. Thames Water, Yorkshire Water
- International engineering consultancies (e.g. MWH, Halcrow, Atkins)

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. Courses are under constant review, however, and the University reserves the right, without notice, to withdraw, update or amend this course specification at any time.

COURSE TITLE: Aviation Management (Executive) Programme

Date of first publication/latest revision: July 2016

1. What is the course?

Course information

Course Title	Executive MSc in Air Transport Management Executive MSc in Air Transport Management (Singapore) Executive MSc in Airport Planning and Management *Executive MSc in Airport Planning and Management (Singapore) -* ***(not currently running)***
Course code	MSATRPTC, PDATRPTC - Executive Air Transport Management MSATSPTC - Executive MSc in Air Transport Management (Singapore) MSAPMPTC, PDAPMPTC - Executive Airport Planning and Management MSANSPTC - Executive MSc in Airport Planning and Management (Singapore) PCAVMPTC - PgCert in Aviation Management
Academic Year	2015/16
Valid entry routes	Executive MSc in Air Transport Management Executive MSc in Air Transport Management (Singapore) Executive MSc in Airport Planning and Management *Executive MSc in Airport Planning and Management (Singapore) - (not currently running)* PgDip in Air Transport Management PgDip in Airport Planning and Management PgCert in Aviation Management
Additional exit routes	PgDip, PgCert in Aviation Management
Mode of delivery	Part-time, Distance
Location of Study	Cranfield University / Singapore Aviation Academy
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Transport Systems
Centre	Centre for Air Transport Management

Course Director	Dr Robert Mayer (Executive Air Transport Management) Dr Pere Suau-Sanchez (Executive Airport Planning and Management)
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	1st or upper 2nd class UK honours degree or equivalent in any relevant discipline. A recognised professional qualification plus a number of years relevant working experience may be accepted as equivalent. For applicants whose first language is not English there is a requirement to achieve the level of 7.0 on IELTS and equivalent grades on other English language qualifications recognised by the University.
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	Not Applicable
Registration Period(s) available	Part-time MSc – up to three years, Part-time PgDip – two years, Part-time PgCert – two years
Course Start Month(s)	July

Institutions delivering the course
This course is delivered by the School of Aerospace, Transport and Manufacturing, Transport Systems Theme, Centre for Air Transport Management where the research interests include:

- Air Transport Management
- Airline and Airport Planning and Operations
- Safety and Air Accident Investigation

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

Teaching and assessment is also provided by the School of Management.

Teaching and assessment for the course in Singapore is primarily (but not completely) held at the Singapore Aviation Academy (SAA). The SAA provides the infrastructure and is involved in marketing the course while teaching and assessment is solely the responsibility of Cranfield University.

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. <u>What are the aims of the course?</u>

Cranfield University offers this course in order to:

- Provide a part-time masters-level programme of learning for individuals either working in the air transport, airport or related industries to develop and enhance their skills in air transport management and/or airport planning and management, offering a mode of study that enables them to combine study with work commitments;

- Provide a part-time masters-level programme of learning to meet the management training needs of existing air transport companies, airport operators, suppliers, aviation and planning consultants and government regulators offering a mode of study that allows their employees to combine study with work commitment.

Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) entrance 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:

- Practitioners in the air transport industry, particularly at middle management level, who are seeking to expand their knowledge and skills in air transport management in order to further develop their careers.
- Practitioners in the related sectors who are seeking to gain an in-depth understanding of the air transport industry.
- Practitioners seeking to pursue doctoral research in air transport management or airport planning and management

Please note that the courses in this programme differ from the full-time variants also offered.

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

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

A. Postgraduate Certificate in Aviation Management

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

ILO 1. Detail the fundamental elements (and the application to current problems in) airline and airport business management and air transport economics and financial management;
ILO 2. Describe and critique the regulatory framework that defines the air transport industry;
ILO 3. Identify, evaluate and apply appropriate statistical and research strategies in industrial and academic research and analysis;
ILO 4. Summarise and critically analyse the concepts of personal/professional development and leadership and demonstrate their application to self and work;
ILO 5. Make effective use of electronic and hardcopy library resources;
ILO 6. Undertake critical appraisal of literature pertaining to the technical, operational and commercial aspects of the air transport industry;
ILO 7. Make effective oral and written presentations of their work;
ILO 8. Work effectively to set deadlines;
ILO 9. Demonstrate the ability to work within teams and possess an understanding and appreciation of the contributions made by other specialists.

B. Postgraduate Diploma in Air Transport Management

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

ILO 10.a Analyse critically practical problems in the air transport and related industries to provide timely solutions, having regard to technical, regulatory, commercial, political, social and environmental constraints;
ILO 11.a Evaluate the complex interrelationships of technical and operational aspects of the air transport industry with the commercial pressures and realities facing its management;
ILO 12.a Undertake group research on a subject relevant to technical, operational or commercial aspects of the air transport or related industries, including a review of

relevant literature, methodological planning, data collection, data analysis, presentation of results, and evaluation and discussion of the results, and the contribution made;

Postgraduate Diploma in Airport Planning and Management

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

ILO 10.b Analyse critically practical problems in the airport and related industries to provide timely solutions, having regard to technical, regulatory, commercial, political, social and environmental constraints;

ILO 11.b Evaluate the complex interrelationships of technical and operational aspects of the airport and related industries with the commercial pressures and realities facing its management;

ILO 12.b Undertake group research on a subject relevant to technical, operational or commercial aspects of the airport, including a review of relevant literature, methodological planning, data collection, data analysis, presentation of results, and evaluation and discussion of the results, and the contribution made.

***C.* Executive MSc in Air Transport Management / Executive MSc in Air Transport Management (Singapore)**
Executive MSc in Airport Planning and Management / Executive MSc in Airport Planning and Management (Singapore) – (Not currently running)

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

ILO 13. Formulate research questions, develop aims and objectives for completing the research task, and setting research hypotheses where appropriate;

ILO 14. Critically assess different methodologies and select an appropriate one to test a particular hypothesis;

ILO 15. Collect primary and/or secondary data and know how to choose appropriate analysis techniques;

ILO 16. Understand the potential biases that may influence researchers and methods to limit such occurrences;

ILO 17. Conduct a literature review and present it in an appropriate style;

ILO 18. Prepare a scientific thesis and present results based upon the techniques listed above;

ILO 19. Give a presentation to examiners about the research project.

4. How is the course taught?

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

- Lectures and workshops delivered by industry practitioners, demonstrating the application of theory to various examples and case studies;
- Training on how to use the library's online resources and bibliographical software undertaken by a Cranfield University librarian;
- Workshops on thesis development and progression.

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 in Aviation Management

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

Description	Credits
COMPULSORY MODULES:	
Modules 1-6	60
ELECTIVE MODULES:	
None	
TOTAL:	60

B. Postgraduate Diploma

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

PgDip in Air Transport Management

Description	Credits
COMPULSORY MODULES:	
Modules 1-6 Group Project (25)	60 30
ELECTIVE MODULES:	
3 or 4 from Modules 7-20 (to the value of 30 credits)	30
TOTAL:	120

PgDip in Airport Planning and Management

Description	Credits
COMPULSORY MODULES:	
Modules 1-6 Group Project (25)	60 30
ELECTIVE MODULES:	
3 or 4 from Modules 9, 10, 12,15-24 (to the value of 30 credits)	30
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:

Executive MSc in Air Transport Management / Executive MSc in Air Transport Management (Singapore)

Description	Credits
COMPULSORY MODULES:	
Modules 1-6 Group Project (25) Thesis (26)	60 30 80
ELECTIVE MODULES:	
3 or 4 from Modules 7-20 (to the value of 30 credits)	30
TOTAL:	200

Executive MSc in Airport Planning and Management / Executive MSc in Airport Planning and Management (Singapore) - (not currently running)

Description	Credits
COMPULSORY MODULES:	
Modules 1-6 Group Project (25) Thesis (26)	60 30 80
ELECTIVE MODULES:	
3 or 4 from Modules 9, 10, 12, 15-24 (to the value of 30 credits)	30
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);[1] [2]

[1] 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).

[2] 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

- **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 July and are expected to complete the course within 3 years.

The majority of modules will be run over a three or four day period. In addition to the standard 10 credit modules, the course offers four modules each carrying 5 credits. These 5 credit modules will be delivered on a distance learning basis, supported by interactive e-learning technologies. Providing these 5 credit modules is a key part of our commitment to facilitating flexible learning. It also reflects the market demand for these subject areas as well as the growing expertise of faculty members. Students may choose no more than two 5 credit modules. With an exceptionally wide portfolio of optional modules, we provide our students with opportunity to tailor the programme to their specific needs and interests, accelerating to a senior management role.

In addition to the optional modules, PgDip students are required to complete a 30 credit supervised group project. This element has consistently proved to be a source of positive feedback (from our students, external examiners and industrial advisory boards) in the full-time version of this course and we want it to be a similarly successful addition to this executive course. The group project will be launched early in year 2 to give students plenty of time to develop and discuss their plans and to carry out background research in advance of coming to Cranfield for two weeks of intensive group work.

As for the PgDip route, in addition, MSc students are required to complete a supervised thesis on a subject of their choice within the field of air transport management. The research is expected to go into much greater depth than that required for the PgDip.

For the Singapore variant of this course the compulsory modules and two optional modules are delivered in Singapore; to complete the course students enrolled on this variant of the course will need to travel to Cranfield Campus.

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%).

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.

Executive MSc in Air Transport Management

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	N-AEX-TALB Occ A	The Airline Business	Dr Keith Mason	20		10	Y	04/07/16	04/07/16	06/07/16	40 40	EX ICW	50 50				06/07/2016/16 05/09/16	At the next available opportunity which may not be until the course runs the following year

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
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2	N-AEX-TAPB Occ A	The Airport Business	Dr Romano Pagliari	20		10	Y	01/12/16	01/12/16	03/12/16	40	ICW	100				06/02/16	At the next available opportunity which may not be until the course runs the following year
3	N-AEX-LC Occ A	Leading Change	Mr Graham Clark	18		10	Y	06/03/17	06/03/17	08/03/17	40	ICW	100				08/05/17	At the next available opportunity which may not be until the course runs the following year
4	N-AEX-PPD Occ A	Professional and Personal Development	Mr Graham Clark	18		10	Y	07/07/16	07/07/16	09/07/16	40	ICW	100				21/11/16	At the next available opportunity which may not be until the course runs the following year
5	N-AEX-ATEFM Occ A	Air Transport Economics and Financial Management	Dr Robert Mayer	25		10	Y	28/11/16	28/11/16	30/11016	40	EX	100				06/03/17	At the next available opportunity which may not be until the course runs the following year

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
6	N-AEX-RM Occ A	Research Methods	Dr Nicola Volta	24		10	Y	09/03/17	09/03/17	11/03/17	40	ICW	100				08/05/17	At the next available opportunity which may not be until the course runs the following year
7	N-AEX-ABS Occ A	Airline Business Simulation	Dr Keith Mason	20		10	N	22/09/16	22/09/16	24/09/16	40 40	ICW GPRES	50 50				21/11/16	At the next available opportunity which may not be until the course runs the following year
8	N-AEX-SFS	Strategies for Success	Dr Frankie O'Connell	20		10	N	19/09/16	19/09/16	21/09/16	40	ICW	100				21/11/16	At the next available opportunity which may not be until the course runs the following year
9	N-AEX-CMBC	Crisis Management and Business Continuity	Mr Dave Barry	24		10	Y	31/10/16	31/10/16	04/11/16	40	ICW	100				09/01/17	At the next available opportunity which may not be until the course runs the following year

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
10	N-ATF-ATM10 Occ B	Air Transport Marketing	Dr Keith Mason	20		10	Y	16/03/17	16/03/17	18/03/17	40	ICW	100				15/05/17	At the next available opportunity which may not be until the course runs the following year
11	N-ATF-AFP10 Occ B	Airline Fleet Planning	Mr Andy Foster	25		10	Y	13/03/17	13/03/17	15/03/17	40	ICW	100				15/05/17	At the next available opportunity which may not be until the course runs the following year
12	N-ATF-RPA10 Occ B	Regulatory Policy and Air Law	Dr Keith Mason	25		10	Y	17/10/16	17/10/16	21/10/16	40	EX	100				28/10/16	At the next available opportunity which may not be until the course runs the following year
13	N-ATF-ATN10	Air Transport and the Environment	Dr Chika Miyoshi	25		10	Y	30/01/17	30/01/17	03/02/17	40	ICW	100				20/03/17	At the next available opportunity which may not be until the

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
																		course runs the following year
14	N-AW-ATEMO	Air Transport Engineering – Maintenance Operations	Cengiz Turkoglu	30		10	Y	20/02/17	20/02/17	24/02/17	40			100	EX ICW	30 70	24/02/17 10/04/17	At the next available opportunity which may not be until the course runs the following year
15	N-APM-APO10	Airport Operations	Mr Richard Moxon	30		10	Y	31/10/16	31/10/16	04/11/16	40	ICW	100				19/12/16	At the next available opportunity which may not be until the course runs the following year
16	N-AEX-ICPRO	In-Company Project	Dr Keith Mason	0		10	Y	TBA[10]	TBA	TBA	40	ICW	100				TBA	At the next available opportunity which may not be until the course runs the following year

[10] Subject to the negotiation with the sponsoring organisation

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
17	N-AEX-AM	Aviation Marketing	Dr Keith Mason	10		5	Y	08/05/17	08/05/17	30/06/17	40	ICW	100				31/07/17	At the next available opportunity which may not be until the course runs the following year
18	N-AEX-ATEM	Air Transport in Emerging Markets	Dr Frankie O'Connell	10		5	Y	05/06/17	05/06/17	28/07/17	40	ICW	100				29/08/17	At the next available opportunity which may not be until the course runs the following year
19	N-AEX-BTM	The Business Travel Market	Dr Keith Mason	10		5	Y	22/05/17	22/05/17	14/07/17	40	ICW	100				14/08/17	At the next available opportunity which may not be until the course runs the following year
20	N-AEX-ATRR	Air Transport in Remote Regions	Dr Romano Pagliari	10		5	Y	15/05/17	15/05/17	07/07/17	40	ICW	100				07/08/17	At the next available opportunity which may not be until the course runs the following year

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
25	N-AEX-GP	Group Project	Mr Andy Foster	10		30	Y	03/07/17	03/07/17	14/07/17	50	GCW GPRES ICW	40 40 20				11/09/17 14/07/17 03/07/17	
26	N-ATF-THES10	Individual Research Project	Dr Romano Pagliari	10		80	Y	15/07/17	15/07/17	May 2018	50	THESIS OR	80 20				Jun 2018	

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

Executive MSc in Air Transport Management (Singapore)

Module Number	Module code	Title	Module Leader	Contact hours[11]	Total hours delivered by Visiting Lecturers[12]	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[13] - 40% or 50%	Type of Assessment	Weighting within module14 (%) of Independent assessments	Weighting within module of multi-part assessments[15](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[16]	Assessment Submission and/or exam date[17]	Assessment / Exam Retake date
1	N-AEX-TALB Occ B	The Airline Business	Dr Keith Mason	20		10	Y	10/07/17	10/07/17	12/07/17	40 40	EX ICW	50 50				12/07/17 11/09/17	At the next available opportunity which may not be until the course runs the following year
2	N-AEX-TAPB Occ B	The Airport Business	Dr Romano Pagliari	20		10	Y	26/09/16	26/09/16	28/09/16	40	ICW	100				28/11/16	At the next available opportunity which may not

[11] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[12] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[13] 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.
[14] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[15] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[16] 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.
[17] 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

Module Number	Module code	Title	Module Leader	Contact hours[11]	Total hours delivered by Visiting Lecturers[12]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[13] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module14 (%) of Independent assessments	Weighting within module of multi-part assessments[15](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[16]	Assessment Submission and/or exam date[17]	Assessment / Exam Retake date
																		be until the course runs the following year
3	N-AEX-LC Occ B	Leading Change	Mr Graham Clark	18		10	Y	13/07/17	13/07/17	15/07/17	40	ICW	100				11/09/17	At the next available opportunity which may not be until the course runs the following year
4	N-AEX-PPD Occ B	Professional and Personal Development	Mr Graham Clark	18		10	Y	29/09/16	29/09/16	01/10/16	40	ICW	100				06/02/17	At the next available opportunity which may not be until the course runs the following year
5	N-AEX-ATEFM Occ B	Air Transport Economics and Financial Management	Dr Robert Mayer	25		10	Y	13/02/17	13/02/17	15/02/17	40	EX	100				10/07/17	At the next available opportunity which may not be until the course runs the following year

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

Module Number	Module code	Title	Module Leader	Contact hours[11]	Total hours delivered by Visiting Lecturers[12]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[13] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module14 (%) of Independent assessments	Weighting within module of multi-part assessments[15](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[16]	Assessment Submission and/or exam date[17]	Assessment / Exam Retake date
6	N-AEX-RM Occ B	Research Methods	Dr Nicola Volta	24		10	Y	16/02/17	16/02/17	18/02/17	40	ICW	100				18/04/17	At the next available opportunity which may not be until the course runs the following year
7	N-AEX-ABS Occ B	Airline Business Simulation	Dr Keith Mason	20		10	N	23/02/17	23/02/17	25/02/17	40 40	ICW GPRES	50 50				27/03/17	At the next available opportunity which may not be until the course runs the following year
8	N-AEX-SFS	Strategies for Success	Dr Frankie O'Connell	20		10	N	19/09/16	19/09/16	21/09/16	40	ICW	100				21/11/16	At the next available opportunity which may not be until the course runs the following year
9	N-AEX-CMBC	Crisis Management and Business Continuity	Mr Dave Barry	24		10	Y	31/10/16	31/10/16	04/11/16	40	ICW	100				09/01/17	At the next available opportunity which may not

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

Module Number	Module code	Title	Module Leader	Contact hours[11]	Total hours delivered by Visiting Lecturers[12]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[13] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module14 (%) of Independent assessments	Weighting within module of multi-part assessments[15](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[16]	Assessment Submission and/or exam date[17]	Assessment / Exam Retake date
																		be until the course runs the following year
10	N-ATF – ATM10 Occ B	Air Transport Marketing	Dr Keith Mason	20		10	Y	16/03/17	16/03/17	18/03/17	40	ICW	100				15/05/17	At the next available opportunity which may not be until the course runs the following year
11	N-AFT-AFP10	Airline Fleet Planning	Mr Andy Foster	25		10	Y	13/03/17	13/03/17	15/03/17	40	ICW	100				15/05/17	At the next available opportunity which may not be until the course runs the following year
12	N-ATF-RPA10	Regulatory Policy and Air Law	Dr Keith Mason	25		10	Y	17/10/16	17/10/16	21/10/16	40	EX	100				28/12/15	At the next available opportunity which may not be until the course runs the following year

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

Module Number	Module code	Title	Module Leader	Contact hours[11]	Total hours delivered by Visiting Lecturers[12]	Credits	Is the module shared? Y/N	Calendar			Assessment								
												Independent Assessment		Multi-part Assessment			Submission dates	
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13	N-ATF-ATN10	Air Transport and the Environment	Dr Chika Miyoshi	20		10	Y	30/01/17	30/01/17	03/02/17	40	ICW	100				20/03/17	At the next available opportunity which may not be until the course runs the following year
14	N-AW-ATEMO	Air Transport Engineering – Maintenance Operations	Cengiz Turkoglu	30		10	Y	20/02/17	20/02/17	24/02/17	40			100	EX ICW	30 70	24/02/17 10/04/17	At the next available opportunity which may not be until the course runs the following year
15	N-APM-APO10 Occ B	Airport Operations	Mr Richard Moxon	30		10	Y	20/02/17	20/02/17	22/02/17	40	ICW	100				27/03/17	At the next available opportunity which may not be until the course runs the following year
16	N-AEX-ICPRO Occ B?	In-Company Project	Dr Keith Mason	10		10	Y	TBA[18]	TBA	TBA	40	ICW	100				TBA	

[18] Subject to the negotiation with the sponsoring organisation

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

Module Number	Module code	Title	Module Leader	Contact hours[11]	Total hours delivered by Visiting Lecturers[12]	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[13] - 40% or 50%	Type of Assessment	Weighting within module14 (%) of Independent assessments	Weighting within module of multi-part assessments[15](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[16]	Assessment Submission and/or exam date[17]	Assessment / Exam Retake date
17	N-AEX-AM	Aviation Marketing	Dr Keith Mason	10		5	Y	08/05/17	08/05/17	30/06/17	40	ICW	100				31/07/17	At the next available opportunity which may not be until the course runs the following year
18	N-AEX-ATEM	Air Transport in Emerging Markets	Dr Frankie O'Connell	10		5	Y	05/06/17	05/06/17	28/07/17	40	ICW	100				29/08/17	At the next available opportunity which may not be until the course runs the following year
19	N-AEX-BTM	The Business Travel Market	Dr Keith Mason	10		5	Y	22/05/17	22/05/17	14/07/17	40	ICW	100				14/08/17	At the next available opportunity which may not be until the course runs the following year
20	N-AEX-ATRR	Air Transport in Remote Regions	Dr Romano Pagliari	10		5	Y	15/05/17	15/05/17	07/07/17	40	ICW	100				07/08/17	At the next available opportunity which may not be until the course runs the following year

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

Module Number	Module code	Title	Module Leader	Contact hours[11]	Total hours delivered by Visiting Lecturers[12]	Credits	Is the module shared? Y/N	Calendar			Assessment								
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[13] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module14 (%) of Independent assessments	Weighting within module of multi-part assessments[15](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[16]	Assessment Submission and/or exam date[17]	Assessment / Exam Retake date
25	N-AEX-GP	Group Project	Mr Andy Foster	10		30	Y	12/09/17	12/09/17	28/09/17	50	GCW GPRES ICW	40 40 20				05/12/17 28/09/17 12/09/17	
26	N-ATF-THES10	Individual Research Project	Dr Romano Pagliari	10		80	Y	12/09/17	12/09/17	Aug 2018	50	THESIS OR	80 20				Sept 2018	

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

Executive MSc in Airport Planning and Management

Module 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)	'Residential' Start Date	'Residential' 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 Submission and/or exam date[25]	Assessment / Exam Retake date
1	N-AEX-TALB Occ A	The Airline Business	Dr Keith Mason	20		10	Y	04/07/16	04/07/16	06/07/16	40 40	EX ICW	50 50				06/07/2016 05/09/2016	At the next available opportunity which may not be until the course runs the following year
2	N-AEX-TAPB Occ A	The Airport Business	Dr Romano Pagliari	20		10	Y	01/12/16	01/12/16	03/12/16	40	ICW	100				06/02/16	At the next available opportunity which may not

[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%. This will be at the Board of Examiners discretion.
[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.

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

Module 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							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[21] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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 Submission and/or exam date[25]	Assessment / Exam Retake date
																		be until the course runs the following year
3	N-AEX-LC Occ A	Leading Change	Mr Graham Clark	18		10	Y	06/03/17	06/03/17	08/03/17	40	ICW	100				08/05/17	At the next available opportunity which may not be until the course runs the following year
4	N-AEX-PPD Occ A	Professional and Personal Development	Mr Graham Clark	18		10	Y	07/07/16	07/07/16	09/07/16	40	ICW	100				21/11/16	At the next available opportunity which may not be until the course runs the following year
5	N-AEX-ATEFM Occ A	Air Transport Economics and Financial Management	Dr Robert Maye	25		10	Y	28/11/16	28/11/16	30/11/16	40	EX	100				06/03/17	At the next available opportunity which may not be until the course runs the following year

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

Module 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)	'Residential' Start Date	'Residential' 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 Submission and/or exam date[25]	Assessment / Exam Retake date
6	N-AEX-RM Occ A	Research Methods	Dr Nicola Volta	24		10	Y	09/03/17	09/03/17	11/03/17	40	ICW	100				08/05/17	At the next available opportunity which may not be until the course runs the following year
21	N-AEX-ACR	Airport Commercial Revenue Workshop	Dr Romano Pagliari	20		10	N	31/10/16	31/10/16	03/11/16	40	ICW	100				09/01/17	At the next available opportunity which may not be until the course runs the following year
22	N-APM-ASP10	Airport Strategic Planning	Mr Richard Moxon	24		10	Y	16/01/17	16/01/17	20/01/17	40	ICW	100				06/03/17	At the next available opportunity which may not be until the course runs the following year
9	N-AEX-CMBC	Crisis Management and Business Continuity	Mr Dave Barry	24		10	Y	31/10/16	31/10/16	04/11/16	40	ICW	100				09/01/17	At the next available opportunity which may not

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

Module 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							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[21] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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 Submission and/or exam date[25]	Assessment / Exam Retake date
																		be until the course runs the following year
23	N-APM-AEP10	Airport Environmental Planning	Dr Thomas Budd	24		10	Y	30/01/17	30/01/17	03/02/17	40 40	ICW GPRES	75 25				20/03/17	At the next available opportunity which may not be until the course runs the following year
12	N-AFT-RPA10	Regulatory Policy and Air Law	Dr Keith Mason	25		10	Y	17/10/16	17/10/16	21/10/16	40	EX	100				28/10/16	At the next available opportunity which may not be until the course runs the following year
24	N-APM-ADE10	Airport Design	Mr Henrik Rothe	30		10	Y	13/02/17	13/02/17	17/02/17	40	ICW	100				03/04/17	At the next available opportunity which may not be until the course runs the following year

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

Module 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							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[21] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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 Submission and/or exam date[25]	Assessment / Exam Retake date
10	N-ATF-ATM10	Air Transport Marketing	Dr Keith Mason	20		10	Y	16/03/17	16/03/17	18/03/17	40	ICW	100				15/05/17	At the next available opportunity which may not be until the course runs the following year
15	N-APM-APO10	Airport Operations	Mr Richard Moxon	30		10	Y	31/10/16	31/10/16	04/11/16	40	ICW	100				19/12/16	At the next available opportunity which may not be until the course runs the following year
16	N-AEX-ICPRO	In-Company Project	Dr Pere Suau-Sanchez	0		10	Y	TBA[26]	TBA	TBA	40	ICW	100				TBA	At the next available opportunity which may not be until the course runs the following year
17	N-AEX-AM	Aviation Marketing	Dr Keith Mason	10		5	Y	08/05/17	08/05/17	30/06/17	40	ICW	100				31/07/17	At the next available opportunity which

[26] Subject to the negotiation with the sponsoring organisation

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

Module 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							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[21] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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 Submission and/or exam date[25]	Assessment / Exam Retake date
																		may not be until the course runs the following year
18	N-AEX-ATEM	Air Transport in Emerging Markets	Dr Frankie O'Connell	10		5	Y	05/06/17	05/06/17	28/07/17	40	ICW	100				29/08/17	At the next available opportunity which may not be until the course runs the following year
19	N-AEX-BTM	The Business Travel Market	Dr Keith Mason	10		5	Y	22/05/17	22/05/17	14/07/17	40	ICW	100				14/08/17	At the next available opportunity which may not be until the course runs the following year
20	N-AEX-ATRR	Air Transport in Remote Regions	Dr Romano Pagliari	10		5	Y	15/05/17	15/05/17	07/07/17	40	ICW	100				07/08/17	At the next available opportunity which may not be until the course runs the following year
25	N-AEX-GP	Group Project	Dr Pere Suau-Sanchez	10		30	Y	03/07/17	03/07/17	14/07/17	50	GCW GPRES ICW	40 40 20				11/09/17 14/07/17 03/07/17	

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

Module 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								
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[21] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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 Submission and/or exam date[25]	Assessment / Exam Retake date
26	N-ATF-THES10	Individual Research Project	Dr Romano Pagliari	10		80	Y	15/07/17	15/07/17	May 2018	50	THESIS OR	80 20				June 2018	

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

Executive MSc in Airport Planning and Management (Singapore) – (Not currently running)

Module Number	Module code	Title	Module Leader	Contact hours[27]	Total hours delivered by Visiting Lecturers[28]	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[29] - 40% or 50%	Type of Assessment	Weighting within module30 (%) of Independent assessments	Weighting within module of multi-part assessments[31](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[32]	Assessment Submission and/or exam date[33]	Assessment / Exam Retake date
1	N-AEX-TALB	The Airline Business	Dr Keith Mason	20		10	Y	NOT CURRENTLY RUNNING			40 40	EX ICW	50 50					
2	N-AEX-TAPB	The Airport Business	Dr Romano Pagliari	20		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					
3	N-AEX-LC	Leading Change	Mr Graham Clark (SoM)	18		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					
4	N-AEX-PPD	Professional and Personal Development	Mr Graham Clark (SoM)	18		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					

[27] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[28] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[29] 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.
[30] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[31] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[32] 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.
[33] 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

Module Number	Module code	Title	Module Leader	Contact hours[27]	Total hours delivered by Visiting Lecturers[28]	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[29] - 40% or 50%	Type of Assessment	Weighting within module30 (%) of Independent assessments	Weighting within module of multi-part assessments[31](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[32]	Assessment Submission and/or exam date[33]	Assessment / Exam Retake date
5	N-AEX-ATEFM	Air Transport Economics and Financial Management	Dr Robert Mayer	25		10	Y	NOT CURRENTLY RUNNING			40	EX	100					
6	N-AEX-RM	Research Methods	Dr Nicola Volta	24		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					
21	N-AEX-ACR	Airport Commercial Revenue Workshop	Dr Romano Pagliari	20		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					
22	N-APM-ASP10	Airport Strategic Planning	Mr Richard Moxon	24		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					
9	N-AEX-CMBC	Crisis Management and Business Continuity	Mr Dave Barry	24		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					
23	N-APM-AEP10	Airport Environmental Planning	Dr Pere Suau-Sanchez	24		10	Y	NOT CURRENTLY RUNNING			40 40	ICW GPRES	75 25					
12	N-AFT-RPA10	Regulatory Policy and Air Law	Dr Keith Mason	25		10	Y	NOT CURRENTLY RUNNING			40	EX	100					
24	N-APM-ADE10	Airport Design	Mr Henrik Rothe	24		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					

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

Module Number	Module code	Title	Module Leader	Contact hours[27]	Total hours delivered by Visiting Lecturers[28]	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[29] - 40% or 50%	Type of Assessment	Weighting within module30 (%) of Independent assessments	Weighting within module of multi-part assessments[31](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[32]	Assessment Submission and/or exam date[33]	Assessment / Exam Retake date
10	N-ATF-ATM10	Air Transport Marketing	Dr Keith Mason	20		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					
15	N-APM-APO10	Airport Operations	Mr Richard Moxon	30		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					
16	N-AEX-ICPRO	In-Company Project	Dr Pere Suau-Sanchez	0		10	Y	NOT CURRENTLY RUNNING			40	ICW	100					
17	N-AEX-AM	Aviation Marketing	Dr Keith Mason	10		5	Y	NOT CURRENTLY RUNNING			40	ICW	100					
18	N-AEX-ATEM	Air Transport in Emerging Markets	Dr Frankie O'Connell	10		5	Y	NOT CURRENTLY RUNNING			40	ICW	100					
19	N-AEX-BTM	The Business Travel Market	Dr Keith Mason	10		5	Y	NOT CURRENTLY RUNNING			40	ICW	100					
12	N-AEX-ATRR	Air Transport in Remote Regions	Dr Romano Pagliari	10		5	Y	NOT CURRENTLY RUNNING			40	ICW	100					
25	N-AEX-GP	Group Project	Dr Pere Suau-Sanchez	10		30	Y	NOT CURRENTLY RUNNING			50	GCW GPRES ICW	40 40 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

Module Number	Module code	Title	Module Leader	Contact hours[27]	Total hours delivered by Visiting Lecturers[28]	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[29] - 40% or 50%	Type of Assessment	Weighting within module30 (%) of Independent assessments	Weighting within module of multi-part assessments[31](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[32]	Assessment Submission and/or exam date[33]	Assessment / Exam Retake date
26	N-ATF-THES10	Individual Research Project	Dr Romano Pagliari	10		80	Y	NOT CURRENTLY RUNNING			50	THESIS OR	80 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

Module Type for The Aviation Management Programme

Module number	Module Code	MSc & PgDip Exec Air Transport Management *(Singapore MSc only)*	MSc & PgDip Exec Airport Planning and Management *(Singapore MSc only)*	PgCert Aviation Management		Shared module?
1	N-AEX-TALB	C	C	C		Y
2	N-AEX-TAPB	C	C	C		Y
3	N-AEX-LC	C	C	C		Y
4	N-AEX-PPD	C	C	C		Y
5	N-AEX-ATEFM	C	C	C		Y
6	N-AEX-RM	C	C	C		Y
7	N-AEX-ABS	E				N
8	N-AEX-SFS	E				N
9	N-AEX-CMBC	E	E			Y
10	N-ATF-ATM10	E	E			Y
11	N-ATF-AFP10	E				Y
12	N-AFT-RPA10	E	E			Y
13	N-ATF-ATN10	E				Y
14	N-AW-ATEMO	E				Y
15	N-APM-APO10	E	E			Y
16	N-AEX-ICPRO	E	E			Y
17	N-AEX-AM	E	E			Y
18	N-AEX-ATEM	E	E			Y
19	N-AEX-BTM	E	E			Y
20	N-AEX-ATRR	E	E			Y
21	N-AEX-ACR		E			N
22	N-APM-ASP10		E			Y
23	N-APM-AEP10		E			Y
24	N-APM-ADE10		E			Y
25	N-AEX-GP	C	C			Y
26	N-AFT-THES10	C (MSc)	C (MSc)			Y

C - Compulsory; E – Elective

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
N-AEX-TALB	The Airline Business	Executive Air Transport Management	Executive Airport Planning and Management Business and Strategic Leadership[34]
N-AEX-TAPB	The Airport Business	Executive Air Transport Management	Executive Airport Planning and Management
N-AEX-LC	Leading Change	Executive Air Transport Management	Executive Airport Planning and Management
N-AEX-PPD	Professional and Personal Development	Executive Air Transport Management	Executive Airport Planning and Management
N-AEX-ATEFM	Air Transport Economics and Financial Management	Executive Air Transport Management	Executive Airport Planning and Management
N-AEX-RM	Research Methods	Executive Air Transport Management	Executive Airport Planning and Management
N-AEX-CMBC	Crisis Management and Business Continuity	Executive Air Transport Management	Executive Airport Planning and Management Safety and Accident Investigation (Air Transport)
N-ATF-ATM10	Air Transport Marketing	F-T Air Transport Management	Executive Air Transport Management Executive Airport Planning and Management
N-ATF-AFP10	Airline Fleet Planning	F-T Air Transport Management	Executive Air Transport Management
N-ATF-RPA10	Regulatory Policy and Air Law	F-T Air Transport Management	Executive Air Transport Management Executive Airport Planning

[34] Different assessment pattern hence different module with same syllabus

			and Management F-T Airport Planning and Management
N-ATF-ATN10	Air Transport and the Environment	F-T Air Transport Management	Executive Air Transport Management
N-AW-ATEMO	Air Transport Engineering – Maintenance Operations	Airworthiness	Executive Air Transport Management F-T Air Transport Management Military Aerospace and Airworthiness Safety and Human Factors in Aviation
N-APM-APO10	Airport Operations	F-T Airport Planning and Management	Executive Air Transport Management Executive Airport Planning and Management
N-AEX-ICPRO	In-company Project	Executive Air Transport Management	Executive Airport Planning and Management
N-AEX-AM	Aviation Marketing	Executive Air Transport Management	Executive Airport Planning and Management
N-AEX-ATEM	Air Transport in Emerging Markets	Executive Air Transport Management	Executive Airport Planning and Management
N-AEX-BTM	The Business Travel Market	Executive Air Transport Management	Executive Airport Planning and Management
N-AEX-ATRR	Air Transport in Remote Regions	Executive Air Transport Management	Executive Airport Planning and Management
N-APM-ASP10	Airport Strategic Planning	F-T Airport Planning and Management	Executive Airport Planning and Management
N-APM-AEP10	Airport Environmental Planning	F-T Airport Planning and Management	Executive Airport Planning and Management
N-APM-ADE10	Airport Design	F-T Airport Planning and Management	Executive Airport Planning and Management

N-AEX-GP	Group Project	Executive Air Transport Management	Executive Airport Planning and Management
N-AFT-THES10	Thesis	F-T Air Transport Management	Executive Air Transport Management Executive Airport Planning and Management F-T Airport Planning and Management

7. How are the ILOs assessed?

The course uses a range of assessment types. Overall, the programme has **three** distinct but interrelated elements: the taught modules, a group project, and an individual research project.

The group project is assessed by a group oral presentation and a written report; individual contribution will be taken into account as well.

The individual research project is assessed by consideration of the written thesis submission and an oral presentation on the research findings.

Taught modules will include assessment by coursework and examination. Whilst we expect to focus on traditional assignments and exams for summative assessment of learning in year one, coursework assessment can also include:

- Online tests
- Oral presentations in class
- In-class quizzes/tests
- In-class or remote group work

We continue to consider our strategy in this regard for the optional modules in year two.
Module assignments are set to be challenging and to encourage the student to study the module topic areas in more depth. The objectives of the assignments are for the students to:

- Acquire the skill to efficiently search literature
- Acquire an in-depth knowledge of contemporary air transport management issues
- Apply skills and knowledge to solve specific problems
- Develop the capability to critically analyse data
- Compile succinct and informative reports to a high standard
- Formulate responses to specific questions against a time limit

This approach has been adopted in order to facilitate the completion of the course by part-time students, often from abroad, without the need to return only for examinations. However, two modules will be examined at Cranfield and it is our intention to combine this with a scheduled visit to attend other taught modules. For those continuing to MSc level, a thesis based on the individual research project has to be presented at the end of the registration period and must demonstrate competency in literature review, methodology, data analysis, conclusion forming and presentation. Students will also be asked to give a formal oral presentation on their research findings.

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.	ILO1	ILO2	ILO3	ILO4	ILO5	ILO6	ILO7	ILO8	ILO9
1	EX ICW	EX ICW			EX ICW	EX ICW	ICW	EX ICW	
2	ICW	ICW			ICW	ICW	ICW	ICW	
3				ICW	ICW		ICW	ICW	
4				ICW	ICW		ICW	ICW	
5	EX	EX			EX			EX	
6			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.	ILO10a	ILO11a	ILO12a	ILO 10b	ILO11b	ILO12b			
7	ICW GCW	ICW GCW							
8	ICW	ICW							
9	ICW	ICW							
10	ICW	ICW							
11	ICW	ICW							
12	EX								
13	ICW	ICW							
14	ICW	ICW							
15	ICW	ICW							
16	ICW IPRES	ICW IPRES							
17	ICW	ICW							
18	ICW	ICW							
19	ICW	ICW							
20	ICW	ICW							
21									
22									
23									
24									
25	GCW GPRES ICW	GCW GPRES ICW	GCW GPRES 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.	ILO13	ILO14	ILO15	ILO16	ILO17	ILO18	ILO19		
26	THESIS	THESIS	THESIS	THESIS	THESIS	THESIS	OR		

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

Students taking the Air Transport Management course will be equipped with the skills required to either enhance their present career or to allow them to pursue a new career path with airlines, airport authorities, civil aviation departments, air transport consultancies or aerospace companies.

Students taking the Airport Planning and Management course will be well prepared for employment or promotion in the field of airport planning and management. Such opportunities exist in airport authorities or planning consultancies worldwide. Opportunities are also possible within regulatory organisations both in the UK and worldwide as well as with various other suppliers that have business-to-business relationships with the airport sector such as IT companies, airlines and aircraft manufacturers.

Cranfield students are also well prepared to undertake research leading to the award of a 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: MSc in Explosives Ordnance and Engineering

Date of first publication/latest revision: 24/08/16

1. What is the course?

Course information

Course Title	Explosives Ordnance and Engineering
Course code	MSEOEFTR, MSEOEPTR, PDEOEFTR, PDEOEPTR, PCEOEFTR, PCEOEPTR
Academic Year	2016-17
Valid entry routes	MSc, PgDip, PgCert
Exit routes	MSc, PgDip, PgCert
Mode of delivery	Full-time and Part-time
Location of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Centre for Defence Chemistry
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Degree in science or science related subject or exceptionally with at least 10 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	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 and Diploma

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

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

***B.* 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:

- Defence Capability Centre (DCC): 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 DCC 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 program 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 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:	
Research Methodologies	5
Introduction to Explosives	5
Manufacture and Materials Properties of Explosives	10
Ammunition Systems 1 (Warheads)	10
Ammunition Systems 2 (Delivery Systems)	10
Ammunition Systems 3 (Target Effects)	10
ELECTIVE MODULES (select 10 credits):	
Gun Propellants	10
Transitions to Detonations	5
Testing and Evaluation of Explosives	5
Computer Modelling Tools in EOE	5
Design for Munitions Safety	5
Risk, Assessment for Explosives	5
Counter Improvised Explosives Devices (C-IED)	10
Forensic Investigation of Explosives and Explosive Devices	10
Rocket Motors and Propellants	10
Introduction to Pyrotechnics	5
Advanced Pyrotechnics	5

Explosives and the Environment Commercial Explosives	5 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:	
Research Methodologies Introduction to Explosives Future Developments: scanning the horizon in EOE Manufacture and Materials Properties of Explosives Ammunition Systems 1 (Warheads) Ammunition Systems 2 (Delivery Systems) Ammunition Systems 3 (Target Effects) Gun Propellants Transitions to Detonations Testing and Evaluation of Explosives Computer Modelling Tools in EOE Introduction to Pyrotechnics	5 5 15 10 10 10 10 10 5 5 5 5
ELECTIVE MODULES (select 25 credits):	
Design for Munitions Safety Risk, Assessment for Explosives Counter-Improvised Explosive Devices Capability Forensic Investigation of Explosives and Explosive Devices Rocket Motors and Propellants Advanced Pyrotechnics Explosives and the Environment Commercial Explosives	5 5 10 10 10 5 5 10
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:	
Research Methodologies Introduction to Explosives Future Developments: scanning the horizon in EOE Manufacture and Materials Properties of Explosives Ammunition Systems 1 (Warheads) Ammunition Systems 2 (Delivery Systems) Ammunition Systems 3 (Target Effects) Gun Propellants Transitions to Detonations Testing and Evaluation of Explosives Computer Modelling Tools in EOE Introduction to Pyrotechnics Project	5 5 15 10 10 10 10 10 5 5 5 5 80

ELECTIVE MODULES: (select 25 credits)	
Design for Munitions Safety	5
Risk, Assessment for Explosives	5
Counter-Improvised Explosive Devices Capability	10
Forensic Investigation of Explosives and Explosive Devices	10
Rocket Motors and Propellants	10
Advanced Pyrotechnics	5
Explosives and the Environment	5
Commercial Explosives	10
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);[1] [2]
- **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).

[1] 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).

[2] 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%).

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.

Part-time students register for the course in September and are required to attend the pre-requisite module Introduction to Explosives. Students that attend the Introduction to Explosives module in April will initially be registered as a short course for credit student and will be able to transfer their registration to a named award the following September. The maximum registration period for the Part-Time MSc programme is five years. PgCert and PgDip registrations should be over maximum periods of three and four years respectively.

The taught phase for each 10-credit module is completed within one week with the following week kept free of structured teaching to allow time for more independent learning and reflection for Full-time students. Most industrial visits, if appropriate, are also scheduled for the second week, Part-Time are students offered the opportunity to attend. 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).

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	Contact hours[1]	Total hours delivered by Visiting Lecturers[2]	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[3] - 40% or 50%	Type of Assessment	Weighting within module[4] (%) of independent assessments	Weighting within module of multi-pa assessments[5] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment	Assessment submission and/or examination date	Assessment/Exam Retake date
1	R-EOS-IS	Introductory Studies	57	0	0	N	05/09/16	05/09/16	16/09/16	N/A	AO	N/A				N/A	
2	R-EOS-RM1	Research Methodology	8	0	5	N	15/09/16	15/09/16	15/09/16	40	ICW	100				28/10/16	24/01/17
3	R-EOS-IE	Introduction to Explosives	27	0	5	N	19/09/16	19/09/16	23/09/16	50	EX	100				07/10/16	12/05/17
							24/04/17	24/04/17	28/04/17	50	EX	100				12/05/17	2017/18
4	R-EOS-FDSHE	Future Developments: scanning the Horizon	20	0	15	N	31/10/16	31/10/16	31/10/16	50	GPRES ICW OR	25 50 25				23/01/17 07/04/17 28/04/17	19/06/17 12/07/17

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

5	R-EOS-AS1	Ammunition Systems 1 (Warheads)	30	0	10	N	26/09/16	10/10/16	14/10/16	40	EX	100				12/12/16	21/03/17
6	R-EOS-MMPE	Manufacture and Materials Properties of Explosives	26	4	10	N	03/10/16	17/10/16	21/10/16	40	OR	100				16,17 & 18/11/16	10/02/17
7	R-EOS-CMT	Computer Modelling Tools in EOE	15	0	5	N	24/10/16	26/10/16	28/10/16	40	OR	100				28&29/11/16	17/02/17
8	R-EOS-AS2	Ammunition Systems 2 (Delivery Systems)	30	0	10	N	07/11/16	07/11/16	11/11/16	40	EX	100				15/12/16	09/03/17
9	R-EOS-AS3	Ammunition Systems 3 (Effects)	30	0	10	N	28/11/16	28/11/16	02/12/16	40	ICW	100				17/01/17	06/04/17
10	R-EOS-GPIBWT	Gun Propellants	27		10	N	02/01/17	09/01/17	13/01/17	40	EX ICW	75 25				23/03/17 09/02/17	01/06/17 20/04/17
11	R-EOS-TD	Transitions to Detonation	14	3	5	N	16/01/17	16/01/17	18/01/17	40	ICW	100				15/02/17	26/04/17
12	R-EOS-RAE	Risk, Assessment for Explosives	14	0	5	N	18/01/17	18/01/17	20/01/17	40	ICW	100				17/02/17	09/05/17
13	R-EOS-TEE	Testing and Evaluation of Explosives	20	3	5	N	06/02/17	06/02/17	08/02/17	40	ICW	100				10/03/17	19/05/17
14	R-FP-FIEED	Forensic Investigation of Explosives and Explosive Devices	30		10	Y	06/02/17	20/02/17	24/02/17	40	ICW	100				24/03/17	31/05/17
15	R-EOS-RMP	Rocket Motors and Propellants	28	4-6	10	N	23/01/17	20/02/17	24/02/17	40	EX	100				03/04/2017	05/06/2017
16	R-EOS-IP	Introduction to Pyrotechnics	13		5	N	20/02/17	27/02/17	01/03/17	40	EX	100				24/04/17	03/07/17

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

17	R-EOS-AP	Advanced Pyrotechnics	13		5	N	01/03/17	01/03/17	03/03/17	40	ICW	100				28/04/17	07/07/17
18	R-EOS-EE	Explosives and the Environment	16		5	N	06/03/17	06/03/17	08/03/17	40	ICW	100				05/04/17	14/06/17
19	R-EOS-CE	Commercial Explosives	30		10	N	06/03/17	06/03/17	10/03/17	40	EX	100				07/04/17	20/06/17
20	R-EOS-DMS	Design for Munitions Safety	15		5	N	13/03/17	13/03/17	15/03/17	40	ICW	100				05/04/17	13/07/17
21	R-FP-CEDC	Counter-Improvised Explosive Devices Capability	25		10	N	13/03/17	27/03/17	31/03/17	50	IPRES	100				28/04/17	23/06/17
22	R-EOE-DISS	Project	40		80	N	N/A	13/04/17	28/07/17	50	THESIS ORAL	75 25				28/07/17 13/07/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
R-FP-FIEED	Forensic Investigation of Explosives and Explosive Devices (E)	Forensic Programme	Explosives Ordnance Engineering
R-FP-CEDC	Counter Improvised Explosive Devices Capability	Forensic Programme	Explosives Ordnance Engineering
R-EOS-RMP	Rocket Motors and Propellants	Explosive Ordnance Engineering	Weapon & Vehicle Systems

7. How are the ILOs assessed?

The course uses a range of assessment types. Students can expect to have (25%) written examinations, (75%) assessment by submitted work. Presentation/viva are also used as mechanisms for assessment, the relative proportion of marks allocated to these methods of assessment will depend upon the chosen route (option). Explanations of some of the more unusual forms of assessment are provided below:

Short notice briefing: two days given to research a particular theme and write a report (free format)

- Witness statement: prepare a document that conforms to the exacting standards and style required for this discipline,
- Qualitative risk assessment: prepare a document based upon a particular activity that conforms to the Cranfield University model of risk analysis and assessment,
- Literature review: explore and discuss a fully referenced critical analysis of open source literature pertaining to a particular theme in explosives ordnance engineering,
- Peer review and short-notice prioritisation (detailed above).

These approaches have been used to 'simulate' activities likely to be expected of students in their future careers. With academic guidance and critique, students will be better equipped to deliver high quality work in future scenarios.

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
2	CW	CW	CW	CW		CW	
3					EX		
5	EX	EX			EX	EX	
6	OR	OR			OR	OR	
8	EX	EX			EX	EX	
9	CW	CW	CW	CW	CW	CW	
10	EX	EX	EX	EX	EX		
11	CW	CW	CW	CW	CW	CW	
13	CW	CW	CW		CW	CW	
12	CW	CW	CW	CW	CW	CW	
14	ICW	ICW	ICW	ICW	ICW	ICW	
15	EX	EX	EX		EX		
16			EX			EX	
17	EX	EX		EX	EX		
18	CW			CW	CW	CW	
19	EX			EX		EX	
20	CW		CW	CW		CW	
21	IPRES	IPRES	IPRES	IPRES	IPRES	IPRES	IPRES

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 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7
4	OR	OR	OR	OR	OR	OR	OR
7	OR	OR	OR	OR	OR	OR	
10	EX	EX	EX	EX	EX		
11	CW	CW	CW	CW	CW	CW	
13	CW	CW	CW		CW	CW	
16			EX			EX	
12	CW	CW	CW	CW	CW	CW	
14	ICW	ICW	ICW	ICW	ICW	ICW	

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7
15	EX	EX	EX		EX		
17	EX	EX		EX	EX		
18	CW			CW	CW	CW	
19	EX			EX		EX	
20	CW		CW	CW		CW	
21	IPRES	IPRES	IPRES	IPRES	IPRES	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 8	ILO 9	ILO 10	ILO 11
22	THESIS	THESIS	THESIS	THESIS

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known

as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. <u>What opportunities are graduates likely to have on completing the course?</u>

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.

COURSE TITLE: MSc in Finance and Management

Date of first publication/latest revision: August 2016

1. What is the course?

Course information

Course Title	MSc in Finance and Management
Course code	MSFNMFTC, PDFNMFTC, PCFNMFTC
Academic Year	2016/17
Valid entry routes	MSc
Additional exit routes	PgDip and PgCert
Mode of delivery	Full-time
Location of Study	Cranfield Campus
School(s)	School of Management
Theme	Leadership and Management
Centre	Policy, Sustainability and Performance
Course Director	Dr Andrea Moro and Dr Yacine Belghitar
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
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
Course Start Month(s)	September

Institutions delivering the course

This course will primarily be delivered by Finance and Accounting group in School of Management. The course shares 80 credits on the core modules and 15 credits via three electives with the existing MSc Investment Management programme but provides a specialist pathway, with 20 credits of specialism in the core modules and potentially additional 20 credits via five electives different from those offered on current MSc in Investment Management programme.

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

Teaching/instruction from external academic, industry and other guest speakers
Individual thesis or company based project.

To develop the above /company based projects our intention is to outsource this function to a specialist company and to support this with an administrator to manage the relationship between the university and the students.

Cranfield University is 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 demonstrate:

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 demonstrate:

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. Undertake a company based project to apply the knowledge gained in the MSc with an aim to offer recommendations for real world problem faced by the company.

4. <u>How is the course taught?</u>

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. This will be supplemented by online module case packs. 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
- Simulated games
- Modelling and programming
- Research-based thesis or a company based project

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.
- Visits to markets e.g. London Stock Exchange, investment bank dealing room, Bloomberg information provider to capital markets.
- 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 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:	
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 from 11-18	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	100 80
ELECTIVE MODULES:	
4 modules from 11-18	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);[1] [2]

[1] 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).

- **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?

The course is offered on a full-time basis only. Full-time students register for the course in September and are expected to complete the course within 12 calendar months.

The core modules will be taught in a series of 10x2 hour lectures in the first two terms. The elective modules will be taught in 6x2 and 1x3 hours lectures in the third term. The individual company based project / thesis is undertaken during terms 3 and 4.

[2] 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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
		TERM 1																
1	M-F/COF	Corporate Finance	Prof Huainan Zhao	20		10	Y		03/10/16	16/12/16	40	EX	100				14/12/16	TBC
2	M-F/SAF	Statistical Analysis in Finance	Dr Yacine Belghitar	20		10	Y		03/10/16	16/12/16	40 40	GCW EX	40 60				02/12/16 15/12/16	TBC
3	M-F/ACC	Accounting	Dr Matthias Nnadi	20	6	10	Y		03/10/16	16/12/16	40 40	EX EX	25 75				04/11/16 12/12/16	TBC

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
4	M-F/ECO	Economics for Financial Markets	Dr Constantinos Alexiou	20		10	Y		03/10/16	16/12/16	40	EX	100				13/12/16	TBC
5	M-F/ORG	Organisational Management	Dr Deidre Anderson	20		10	Y		03/10/16	16/12/16	40	ICW	100				07/12/16	TBC
		TERM 2																
6	M-F-STR	Strategic Management	Dr Richard Schoenberg	20		10	N		09/01/17	24/03/17	40	EX	100				w/c 20/03/17	TBC
7	M-F/ICF	International Corporate Finance	Prof Sunil Poshakwale	20		10	N		09/01/17	24/03/17	40 40	GPRAC EX	25 75				15&16/02/17 23/03/17	TBC
8	M-F/VFM	Valuation and Financial Modelling	Dr Vineet Agarwal	20		10	Y		09/01/17	24/03/17	40 40	GCW EX	50 50				13/03/17 22/03/17	TBC
9	M-F/FMRE	Financial Markets, Regulation and Ethics	Paul Richards/ Steve Wallace	20	14 / 6	10	Y		09/01/17	24/03/17	40 40	ICW ICW	67 33				10/03/17 17/03/17	TBC
10	M-F/RMF	Research Methods in Finance	Dr Vineet Agarwal	20		10	Y		09/01/17	24/03/17	40 40	GPRES ICW	30 70				08/03/17 15/03/17	TBC
		TERM 3 (Electives – choose any 4)																
11	M-F/CRS	Corporate Restructuring	Dr Yacine Belghitar	15		5	N		10/04/17	23/06/17	40	ICW	100				14/06/17	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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
12	M-F/ACF	Advanced Corporate Finance	Dr Abdulkadir Mohamed	15		5	N		10/04/17	23/06/17	40	EX	100				31/05/17	TBC
13	M-F/IFF	Infrastructure Finance	TBC	15		5	N		10/04/17	23/06/17	40	EX	100				31/05/17	TBC
14	M-F/ENF	Entrepreneurial Finance	Dr Andrea Moro	15		5	N		10/04/17	23/06/17	40	ICW	100				21/06/17	TBC
15	M-F/SMA	Strategic Management Accounting and Control	Prof Michael Bourne	15		5	N		10/04/17	23/06/17	40	ICW	100				23/06/17	TBC
16	M-F/MAD	Mergers and Acquisitions	Prof Huainan Zhao	15		5	Y		10/04/17	23/06/17	40	ICW	100				16/06/17	TBC
17	M-F/FEC	Applied Financial Econometrics	Dr Yacine Belghitar, Dr Peter Yallup	15		5	Y		10/04/17	23/06/17	40	ICW	100				12/06/17	TBC
18	M-F/PEQ	Private Equity	Dr Abdulkadir Mohamed	15		5	Y		10/04/17	23/06/17	40	ICW	100				19/06/17	TBC
		TERM 4																
	M-F/THS	Thesis	Various Supervisors	50		80	Y		26/06/17	08/09/17		THESIS	100				05/09/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share 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
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/FEC	Applied Financial Econometrics	Finance and Management	Investment Management
M-F/PEQ	Private Equity	Finance and Management	Investment Management
M-F/THS	Thesis	Finance and Management	Investment Management

7. 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.

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
	Postgraduate Certificate							Postgraduate Diploma								MSc				
1	✓		✓	✓		✓	✓													
2	✓		✓		✓	✓	✓													
3	✓	✓	✓	✓		✓	✓													
4	✓		✓				✓													
5	✓		✓				✓													
6	✓		✓						✓				✓		✓					
7	✓				✓				✓	✓	✓			✓	✓					
8					✓		✓	✓	✓	✓	✓		✓	✓	✓					
9	✓	✓	✓	✓		✓	✓		✓		✓				✓					

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
10								✓	✓	✓		✓		✓	✓					
11								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
12									✓	✓	✓	✓			✓	✓		✓	✓	
13									✓	✓	✓	✓				✓		✓	✓	
14								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
15									✓	✓	✓	✓			✓	✓		✓	✓	
16								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
17									✓	✓	✓	✓	✓			✓	✓	✓	✓	
18								✓	✓		✓	✓	✓	✓	✓	✓		✓	✓	
19																	✓			✓

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

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

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.

COURSE TITLE: MSc in Flight Test and Flight Dynamics

Date of first publication/latest revision: October 2016

1. What is the course?

Course information

Course Title	MSc in Flight Test and Flight Dynamics
Course code	MSFFDPTC, PDFFDPTC , PCFFDPTC
Academic Year	2016/17
Valid entry routes	MSc, PgCert
Additional exit routes	PgDip
Mode of delivery	Part-time
Location of Study	Cranfield University and MoD Boscombe Down
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Aerospace
Centre	Centre for Aeronautics
Course Director	Dr Alastair Cooke
Awarding Body	Cranfield University
Teaching Institution	Cranfield University and Empire Test Pilots' School
Admissions body	Cranfield University and Empire Test Pilots' School
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	Not Applicable
Registration Period(s) available	Part-time MSc - up to three years, Part-time PgCert – two years
Course Start Month(s)	August

Institutions delivering the course
This course is delivered by The School of Aerospace, Transport and Manufacturing, Aerospace Theme, Centre for Aeronautics where the research interests include:

- Flight dynamics
- Aircraft stability
- Control and handling qualities
- Flight control system design

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

- Teaching and assessment is also provided by the Empire Test Pilots' School (ETPS), MoD Boscombe Down

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 enable test pilot and flight test engineer 'graduates' to gain a more rigorous understanding of the concepts and theories underpinning flight test and experimental flight dynamics.

The Postgraduate Certificate (PgCert) entry route is provided for students who wish to access only the parts of the course delivered at ETPS.

The Postgraduate Diploma (PgDip) exit route is provided for students who wish to access only parts of the course delivered at ETPS and Cranfield University.

This programme is intended only for test pilot and flight test engineer students studying with ETPS. Consequently it is closed to all other applicants.

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. Create a simplified mathematical model of an aircraft suitable for flight dynamics analysis.
ILO 2. Undertake analyses of performance, stability and control flight test results.
ILO 3. Identify the principles that constrain design solutions to specification non-compliance.
ILO 4. Plan and execute flight test programmes to obtain the data necessary to construct an aerodynamic model of an aircraft.
ILO 5. Design, plan, execute and report on flight test programmes undertaken to evaluate aircraft and installed system compliance with flying qualities requirements
ILO 6. Identify and evaluate flight control system architectures.

B. Postgraduate Diploma

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

ILO 7. Create a computational mathematical model of an aircraft suitable for flight dynamics analysis.
ILO 8. Undertake critical analyses of performance, stability and control flight test results.
ILO 9. Identify and evaluate flight control system architectures.
ILO 10. Interpret contemporary handling qualities criteria in the context of the flight test environment.
ILO 11. Design flight test programmes to obtain the data necessary to construct an aerodynamic model of an aircraft.
ILO 12. Design and analyse flight control system architectures.
ILO 13. Propose technically robust solutions to handling qualities specification non-compliance

C. MSc

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

ILO 14. Identify the underlying principles that constrain design solutions to specification non-compliance.
ILO 15. Define and justify a research project by reference to, and critical assessment of, the scientific, technical and/or commercial literature. Plan, manage and report the results in a clear manner.
ILO 16. Analyse the work, relate it to the work of others and be self-critical. Communicate the work, the results and its analysis in a technically sound and well presented document.

4. <u>How is the course taught?</u>

The course is taught in two phases: the first takes place at ETPS, MoD Boscombe Down and the second at Cranfield University.

The teaching and learning at ETPS takes place within the appropriate (FW or RW) class A course defined in QinetiQ/AEG/ETPS/GRADUATE COUSE SYLLABI/1.0. These courses equip individuals to operate as test pilots or flight test engineers within the international military and/or civilian flight test community. For the purposes of defining this course the teaching at ETPS has been considered as a series of themes from which elements have been identified and ‘mapped’ across to equivalent modules in the MSc in Aerospace Dynamics delivered entirely by Cranfield University, see Section 6.

The teaching and assessment of major elements of the Graduate Course Syllabus is achieved by the following process:

- Academic instruction delivered by Flight Dynamics tutors (who are awarded RTS status by the University). This instruction is designed to ensure sound knowledge of the theory.

- A ‘Phase Brief’ delivered by either a test pilot, or flight test engineer (FTE), tutor that concentrates on the practical aspects of planning, conducting and reporting on an aspect of testing.
- An ‘Exercise Brief’ that covers the details of the exercise that constitutes the assessment for the topic.
- A tutorial session designed to foster discussion of the topic in small groups or on an individual basis.
- A demonstration flight during which the practical aspects of test conduct are rehearsed. The performance of the student is assessed and used to gauge understanding of the subject.
- Solo or mutual exercise flight(s).
- A reporting ‘action’ in the form an oral debrief, presentation, committee meeting or written report.
- Grading as described in QinetiQ/ETPS/STUHANDBOOK
- Formal debrief in which the reporting ‘activity’ is discussed in detail with the assessing tutor.

Although the aeronautics theme permeates much of what is taught at ETPS its assessment is not readily identifiable for mapping purposes. Equally the academic rigour with which this topic is applied within the reporting actions listed above is not sufficient for an M-level qualification. Consequently assessment is made by means of an examination entitled the ‘Fundamentals of Aeronautics’ that falls outside the Graduate course assessment scheme.

The flight dynamics theme within the Graduate course has a direct parallel with the Flight Dynamics Principles module taught in the Aerospace Dynamics MSc, see Section 6. As such it is assessed by means of a similar assignment to that used at Cranfield and is subject to the same ‘approval’ process as assessments generated for the Aerospace Dynamics MSc. This assignment falls outside the Graduate course assessment scheme.

As control engineering is not covered to sufficient depth it is presented at the conclusion of the Graduate course prior to students transferring to Cranfield University. This module, which has an equivalent on the MSc in Aerospace Dynamics, is delivered in the more traditional manner by means of lectures and assessed using an examination and an assignment. Both of which are subject to the same approval’ process as assessments generated for the Aerospace Dynamics MSc.

The balance of the taught element of the MSc course is delivered at Cranfield University on a full time basis by means of modules offered from within the MSc in Aerospace Dynamics. Depending on the module selected teaching and learning is achieved by means of lectures and laboratory exercises whilst the assessment is made using an examination or an assignment.

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

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:	
Module A - Fundamentals of Aeronautics and Flight Test Modules 1 and 2	30 30
ELECTIVE MODULES:	
None	
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 A - Fundamentals of Aeronautics and Flight Test Modules 1 to 4	30 60
ELECTIVE MODULES:	
Three from modules 5 to 8	30
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:	
Module A - Fundamentals of Aeronautics and Flight Test Modules 1 to 4 Module 9 - Individual Research Project	30 60 80
ELECTIVE MODULES:	
Three from modules 5 to 8	30
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);[1] [2]
- **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?

Typically students will register for the course in August and gain accreditation for the learning that is encompassed by the module entitled `Fundamentals of Aeronautics and Flight test'. They are then expected to complete the PgCert course modules at ETPS by December. Students on the PgDip or MSc exit routes will then attend the Control Engineering module at ETPS in early January before transferring to Cranfield University to complete the taught element. All modules that are available for this course and delivered at Cranfield form part of the existing provision for the MSc in Aerospace Dynamics.

The taught element of the course will therefore be completed by the end of the second teaching period at Cranfield, typically by May. For those studying for the MSc the remaining time, until end of July of the following year, is set aside for completion of the individual research project on a part-time basis.

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[1] 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).

[2] 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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
A	N-FD-FOA	Fundamentals of Aeronautics and Flight Test	Dave Lee (ETPS)	60		30	N					Accredited Prior Certificated Learning. This module must be completed successfully prior to registration with Cranfield University as part of the entry requirements.							
1	N-FD-FDP	Flight Dynamics Principles for Flight Test	Dave Lee (ETPS)	26		10	N		01/08/15	31/10/15	40	ICW	100				31/10/15	At the next available opportunity which may not be until the course runs the following year	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
2	N-FD-PFT	Preview Flight Testing	Dave Lee (ETPS)	30		20	N		01/11/15	31/12/15	50			100 MULTI	GPROJ OR	60 40	31/12/15	At the next available opportunity which may not be until the course runs the following year
3	N-FD-CEM	Control Engineering	Dr Alastair Cooke (CU)	50		15	N		04/01/16	08/01/16	40 40			100 MULTI	EX ICW	67 33	22/01/16	At the next available opportunity which may not be until the course runs the following year
4	N-ASD-FQFC	Flying Qualities and Flight Control	Dr Alastair Cooke (CU)	40		15	Y		25/01/16	29/02/16	40	ICW	100				22/04/16	At the next available opportunity which may not be until the course runs the following year
5	N-ASD-AMS	Air-Vehicle Modelling and Simulation	Dr James Whidborne (CU) / Dr Mudassir Lone (CU)	28		10	Y		11/01/16	15/01/16	40	ICW	100				26/02/16	At the next available opportunity which may not be until the course runs the following year

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
6	N-ASD-MVCAA	Multivariable Control Systems for Aerospace Applications	Dr James Whidborne (CU)	30		10	Y		18/01/16	05/02/16	40	EX	100				22/04/16	At the next available opportunity which may not be until the course runs the following year
7	N-ASE-GPS	Aerospace Navigation and Sensors	Dr Stephen Hobbs (CU)	26		10	Y		22/02/16	04/03/16	40 40			100 MULTI	EX ICW	50 50	22/04/16 29/04/16	At the next available opportunity which may not be until the course runs the following year
8	N-ASD-FASD	Fundamentals of Aircraft System Identification	Dr Mudassir Lone (CU)	20		10	Y		29/02/16	04/03/16	40	EX	100				06/05/16	At the next available opportunity which may not be until the course runs the following year
9	N-FD-IRP	Individual Research Project	Dr Alastair Cooke (CU)	10		80	N		01/04/16	31/07/17		THESIS	100				31/07/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
N-ASD-FQFC	Flying Qualities and Flight Control	Aerospace Dynamics	Aerospace Dynamics
N-ASD-AMS	Air-Vehicle Modelling and Simulation	Aerospace Dynamics	Aerospace Dynamics Autonomous Vehicle Dynamics and Control
N-ASD-MVCAA	Multivariable Control Systems for Aerospace Applications	Aerospace Dynamics	Aerospace Dynamics Astronautics and Space Engineering
N-ASE-GPS	Aerospace Navigation and Sensors	Astronautics and Space Engineering	Aerospace Dynamics Astronautics and Space Engineering
N-ASD-FASD	Fundamentals of Aircraft System Identification	Aerospace Dynamics	Aerospace Dynamics

7. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types. All exit routes require students to submit two flight test reports and the Preview report which have been assessed and graded as part of the Graduate course. In addition students studying for the PgCert can expect to have one written examination and one piece of assessment by submitted work (assignment). For those on the PgDip or the MSc exit route a further one to three written examinations and two to three assignments are required depending on the electives chosen.

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.)

For Example:

Award ILOs / ***Module No.***	***ILO 1.***	***ILO 2.***	***ILO 3.***	***ILO 4.***	***ILO 5.***	***ILO 6.***	***ILO 7.***	***ILO 8.***	
98	*ICW*				*EX*	*EX*	*ICW*		
99	*ICW1*		*ICW1*	*ICW2*					

A. Postgraduate Certificate

Award ILOs / Module No.									

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.									

C. MSc

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

Award ILOs / Module No.									

<u>CROSS-MODULAR ASSESSMENT</u> (including any assessment which rests outside an individual module)

Title	Modules Covered	Assessment	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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

enter text here

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: MSc in Flow Assurance for Oil and Gas Production

Date of first publication/latest revision: 05/09/16

1. What is the course?

Course information

Course Title	Flow Assurance for Oil and Gas Production
Course code	MSFLAFTC, MSFLAPTC,
Academic Year	2016/17
Valid entry routes	MSc
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Energy & Power
Centre	Centre for Oil and Gas Engineering
Course Director	Dr Yi Cao, Dr Liyun Lao
Awarding Body	Cranfield University
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. F
Course Start Month(s)	October

Institutions delivering the course

This course is delivered by the Centre for Oil and Gas Engineering where the research interests include:

- Multiphase flow technology
- Oil and gas production
- CO_2 capture and CO_2 transport
- Process and Energy Systems Design, Simulation and Optimisation
- Process Instrumentation and Flow Measurement
- Process Control
- Conventional and renewable energy
- Environmental Protection

Teaching and assessment is also provided by School of 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 has not yet been accredited formally by any external body. The Group's MSc in Process Systems Engineering and Energy Systems and Thermal Processes are accredited by Institute of Mechanical Engineers (IMechE) and Energy Institute (EI). It is intended that, in addition to IMechE and EI, accreditation from Society of Petroleum Engineers (SPE) will be sought at the earliest possible time.

2. <u>What are the aims of the course?</u>

Cranfield University offers this course in order to provide engineering and applied science graduates with advanced theory and practice of the technical and managerial aspects on Flow Assurance to ensure safe, efficient and economical oil and gas production with minimal environmental impact. Postgraduate Diploma (PgDip) and Postgraduate Certificate (PgCert) exit routes are provided for students who wish to access only parts of the course provided. PgDip and PgCert can also be fall back routes for MSc candidates.

This programme is intended for the following range of students:

- Graduates with engineering or related science degrees keen to pursue a career in oil and gas industry by specialising in Flow Assurance.
- Graduates currently in employment keen to extend their qualifications or to pursue a career change.
- 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. <u>What should students expect to achieve in completing the course?</u>

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

MSc in Flow Assurance for Oil and Gas Production

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

ILO 1. Understand systematically the current theory and practice oil and gas production and transport with particular emphasis on Flow Assurance

ILO 2. Critically evaluate the technical, and economic issues involved in the design and operation of oil and gas production and transport systems

ILO 3. Apply effectively the knowledge gained to the design and control of oil and gas production and transport systems

ILO 4. Make effective use of a range of software employed for modelling, optimisation and control of oil and gas transportation systems

ILO 5. Demonstrate an ability to undertake independent learning, especially via the effective use of information retrieval systems

ILO 6. Demonstrate a professional approach to problem solving

ILO 7. Communicate effectively in writing

ILO 8. Operate effectively in a team

ILO 9. Gain an in-depth understanding of the technical, economic and environmental issues involved in the design and operation of oil and gas production and transport systems

ILO 10. Demonstrate a knowledge of some key technical management principles, including project management, people management, technology marketing, development and finance

ILO 11. Use of the techniques appropriate for the management of oil and gas production and transport systems

ILO 12. Integrate knowledge, understanding and skills from the taught modules in a real-life situation.

ILO 13. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

ILO 13. Develop a professional ability to undertake a critical appraisal of technical and/or commercial literature

ILO 14. Evaluate critically current research in selected topics in the area of oil and gas production and flow assurance

ILO 15. Demonstrate an ability to manage research studies, and plan and execute projects in the area of oil and gas production technology and flow assurance

ILO 16 Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions

ILO 17 To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation

4. How is the course taught?

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

- A dedicated electronic Blackboard site
- One-day training workshop on MATLAB
- 1-day transient multiphase simulator, OLGA, training course for students
- 0.5-day training on PipeSim steady state two phase flow analysis software
- Hands on laboratory exercise
- Arrangement of attendance of relevant modules offered by other MSc programmes
- Industrial visits and seminars

The taught programme is generally delivered from October to March. Each module is generally delivered over one week (with the exception of Management for Technology).

The Group Project is delivered between November and February. Each group will typically include 4-6 students and an academic supervisor will be assigned to each group. Formal project review meetings will be held on a bi- weekly basis at which each student will be required to provide a brief presentation on the work performed to date. The academic supervisor will participate in these project review meetings to record attendance, assess the individual oral presentations and level of contribution to the project and to provide guidance as appropriate. Students taking the group project are required to participate in at least 80% of these review meetings. Additionally, it is expected that students will meet and work on the project outside of the formal meetings. A (student) project co-ordinator will be nominated to ensure that these meetings are used to good effect and appropriate minutes are taken and findings reported to the academic supervisor. Students will be required to attend in person the initial and final project review meetings. Students are required to keep a journal throughout as documentary evidence of his/her contribution to the Group Project

Part time students will take an additional elective taught module in place of the Group project

The Individual Research Project is typically delivered between April and September. Each student is allocated a supervisor, who will guide and assess the student work. During the Individual research project period, the supervisor and the student should meet every two weeks to review progress made and agree future actions.

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:	

PSE23, PSE24	20
ELECTIVE MODULES:	
4 modules from (PSE03, PSE26, PSE11, PSE05, PSE10, PSE12, PSE13, PSE17)	40
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:	
PSE23, PSE24, PSE02, PSE03, PSE05, PSE12, PSE11 Group Project - Full Time Dissertation in place of Group Project (Part time)	70 40 40
ELECTIVE MODULES:	
1 module from PSE26, PSE10, PSE13, PSE17	10
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:	
PSE23, PSE24, , PSE02, PSE03, PSE05, PSE12, PSE11 Group Project - Full Time Dissertation in place of group project (part time students) Individual Research Project	70 40 40 80
ELECTIVE MODULES:	
1 module from PSE26,PSE10, PSE13, PSE17	10
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);[1] [2]
- **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/October and are expected to complete the course within 12 calendar months.

This course is also offered on a part-time basis. Part-time students register for the course in September/October and are expected to complete the course within 3 years. Part-time students would attend the required modules of the taught component according to the schedule agreed with the course tutor. Individual research projects are commonly undertaken in collaboration with the candidate's place of work.

Each taught module is taught over one week, with the second week largely free of structured teaching to allow time for more independent learning and reflection.

[1] 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).

[2] 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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-ENE-INWK	Induction	G Drew	24		0	N		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	N-PSE-PPO	PSE11 Process Plant Operation	G Kopanos	30		10	Y		10/10/16	14/10/16	40	EX	100				W/C 12/12/16	
4	N-AME-RR	PSE03 Risk & Reliability Engineering	. A Kolios	30		10	Y		07/11/16	11/11/16	40	EX	100				WC 02/01/17	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
3	N-PSE-FSD	PSE05 Pumps and Pumping Systems	J Amaral Teixeira	30		10	Y		24/10/16	28/10/16	40	ICW	100				FT 05/11/16 PT 12/11/16	
6	N-FLA-MPF	PSE23 Multiphase Flows	L Lao	30		10	N		28/11/16	02/12/16	40	EX	100				WC 02/01/17	
7	N-PSE-CETIP	PSE17 Computational Fluid Dynamics for Industrial Processes	P Verdin	30		10	Y		05/12/16	09/12/16	40	ICW	100				FT 21/01/17 PT 28/01/17	
8	N-FLA-PTC	PSE24 Production Technology & Chemistry	L Lao	30		10	N		09/01/17	13/01/17	40	ICW	100				FT 21/01/17 PT 28/01/17	
5	N-PSE-ACS	PSE12 Advanced Control Systems	Y Cao	30		10	Y		14/11/16	18/11/16	40	ICW	100				FT 26/11/16 PT 03/12/16	
9	N-PSE-PSD	PSE13 Process Design and Simulation	G Kopanos	41		10	Y		23/01/17	27/01/17	40	GCW	100				FT 04/03/17 PT 11/03/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers [4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
10	N-AME-SI	PSE 26 Structural Integrity	A Mehmanparast	38.5		10	Y		30/01/17	03/02/17	40	EX	100				W/C 20/02/17	
12	G-MTI	PSE02 Management for Technology	S Carver	45		10	Y		13/02/17	17/02/17	40	EX GCW	50 50				20/03/17 25/03/17	
11	N-PSE-PMS	PSE10 Process Measurement Systems	L Lao	30		10	Y		06/02/17	10/02/17	40	ICW	100				FT 18/03/17 PT 25/03/17	
13	I-ENE-GRPP	PSE25 Group Project	Supervisor	16		40	Y		27/02/17	05/05/17	50 50	GPROJ ICW	80 20				02/05/17 06/05/17	
14	I-ENE-DISS	Dissertation for part time students	Supervisor	10		40	Y		03/10/16	30/09/17	50	IPROJ	100				30/09/17	
15	I-ENE-THESIS	Energy Individual Research Project	Supervisor	20		80	Y		08/05/17	08/09/17	50	THESIS OR	90 10				04/09/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
G-MT	PSE02 Management for Technology	School of Management	• Materials for Energy Systems • Advanced Mechanical Engineering • Biofuels Process Engineering • Design of Rotating Machines • Energy Supply for Low Carbon Futures Gas Energy • Ocean and Offshore Technology with Offshore Materials Engineering, • Ocean and Offshore Technology With Pipeline Engineering, • Ocean and Offshore Technology With Offshore Renewable Energy • Ocean and Offshore Technology With Risk Management • Ocean and Offshore Technology With Subsea Engineering • Renewable Energy Engineering • Renewable Energy Technology • Carbon Capture and Storage • Energy Systems and Thermal Processes • Process Systems Engineering • Energy from Waste • Flow Assurance for Oil & Gas Production
N-AME-RR	PSE 03 Risk and Reliability Engineering	Advanced Mechanical Engineering	• Process Systems Engineering • Renewable Energy Engineering • Carbon Capture and Storage • Flow Assurance for Oil & Gas Production
N-PSE-FSD	PSE05 Pumps and Pumping Systems	Process Systems Engineering	• Flow Assurance for Oil & Gas Production

N-PSE-PMS	PSE10 Process Measurement Systems	Process Systems Engineering	• Atmospheric Emissions Technology • Carbon Capture and Storage • Energy Systems and Thermal Processes • Flow Assurance for Oil & Gas Production •
N-PSE-PPO	PSE11 Process Plant Operations	Process Systems Engineering	• Process Systems Engineering • Biofuels Process Engineering • Carbon Capture and Storage • Flow Assurance for Oil & Gas Production • Cost Engineering
N-PSE-ACS	PSE 12 Advanced Control Systems	Process Systems Engineering	• Advanced Mechanical Engineering • Biofuels Process Engineering • Carbon Capture and Storage, • Energy Systems and Thermal Processes • Flow Assurance for Oil & Gas Production
N-PSE-CETIP	PSE 17 Computational Fluid Dynamics for Industrial Processes	Process Systems Engineering	• Energy Systems and Thermal Processes • Carbon Capture and Storage • Flow Assurance for Oil & Gas Production
N-AME-SI	PSE 26 Structural Integrity	Advanced Mechanical Engineering	• Materials for Energy Systems • Design of Rotating Machines • Ocean and Offshore Technology With Offshore Materials Engineering • Ocean and Offshore Technology With Pipeline Engineering • Ocean and Offshore Technology With Offshore Renewable Energy, • Ocean and Offshore Technology with Risk Management • Ocean and Offshore Technology with Subsea

			Engineering • Renewable Energy Engineering • Safety and Accident Investigation Flow Assurance for Oil & Gas Production
N-PSE-PSD	Process Design and Simulation	Process Systems Engineering	• Biofuels Process Engineering • Carbon Capture and Storage • Flow Assurance for Oil & Gas Production

7. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types. Students can expect to have 6-8 written examinations, 7 pieces of assessment by submitted work and 4 elements of assessment by presentation or viva.

This approach has been adopted to:

- 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

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

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. <u>What opportunities are graduates likely to have on completing the course?</u>

Graduates from the course will be equipped with the academic skills and requirements to successfully pursue a career in the energy (oil and gas) company, consultants and operators, technology provider, research organisations or 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.

COURSE TITLE: MSc in Food Chain Systems

Date of first publication/latest revision: 26/07/16

1. What is the course?

Course information

Course Title	Food Chain Systems
Course code	MSFOSFTC, MSFOSPTC, PDFOSFTC, PDFOSPTC, PCFOSFTC, PCFOSPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	MSc, PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Cranfield Soil and Agrifood Institute
Course Director	Dr Angel Medina Vaya
Awarding Body	Cranfield University
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)	October

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.

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

This course belongs to the Food Chain Systems 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 health and environmental sector employers to provide professional experience and development opportunities for students. Thesis sponsors and supporters include: Coca Cola Enterprises, Giles Foods, Discovery Foods, 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 not accredited by any external bodies.

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 Chain Systems

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

ILO 1. Evaluate and compare the utilization 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 utilization 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 and diversity to identify strengths and weaknesses by synthetizing existing knowledge and proposing potential improvements to increase final product quality and safety.

B. Postgraduate Diploma in Food Chain Systems

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
ILO 5. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate findings in a professional manner in written, oral and visual forms

C. MSc in Food Chain Systems

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, and evaluate findings and draw appropriate conclusions.

ILO 7. To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

4. <u>How is the course taught?</u>

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 work. The definition of the dissertation topic will be determined in consultation with the FCS 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 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:	
Any 6 taught modules from 2-9	60
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 Modules 2-9 Group project	0 80 40
ELECTIVE MODULES:	
Dissertation in place of Group Project (Part time)	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 Modules 2-9 Group project Individual thesis project	0 80 40 80
ELECTIVE MODULES:	
Dissertation in place of Group Project (Part time)	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);[1] [2]
- **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);

[1] 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).

[2] 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 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.

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-AGF-INWK	Induction module	A Medina Vaya	33		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-AGF-PBFQ	Plant –Based Food Quality	A Thompson	25		10	N		10/10/16	14/10/16	40			MULTI 100	ICW IPRES	70 30	ICW - FT - 22/10/16 ICW - PT - 29/10/16 IPRES - FT/PT - 14/10/16	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers [4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
3	I-FCS-A1003	Mathematical Foundations	C Walton	25		10	N		24/10/16	28/10/16	40	ICW	100				FT - 05/11/16 PT - 12/11/16	
4	I-LAM-A1138	Soil Plant Environment Science	J Hannam	34		10	Y		07/11/16	11/11/16	40	ICW	100				FT - 19/11/16 PT - 26/11/16	
5	I-FCS-A1005	Food Diagnostics	C Walton	25		10	N		21/11/16	25/11/16	40	ICW	100				FT - 03/12/16 PT - 10/12/16	
6	I-AGF-FBM	Food Mycology	A Medina-Vaya	28		10	N		05/12/16	09/12/16	40			100	GCW ICW	80 20	GCW - FT/PT- 17/12/16 ICW - FT - 17/12/2016 ICW - PT - 03/01/2017	
7	I-FCS-A1007	Postharvest Technology	S Kourmpetli	30		10	N		09/01/17	13/01/17	40			100	ICW IPRES	70 30	ICW - FT - 21/01/17 ICW - PT - 28/01/2017 IPRES	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers [4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
																	FT/PT - 13/01/2017	
8	I-FFS-FCR	Food Chain Resilience	D Julien	25		10	Y		23/01/17	27/01/17	40			100	GCW GPRES	30 70	GPRES FT/PT - 27/01/2017 GCW - FT/PT 04/02/2017	
9	I-FCS-A1008	Food Microbiology & HACCP	N Magan	30		10	N		06/02/17	10/02/17	40	ICW	100				FT - 18/02/2017 PT - 25/02/2017	
10	I-AGF-GRPP	Group Project	AMedina Vaya	16		40	N		20/02/17	05/05/17	50	GPROJ ICW	80 20				GPROJ - 02/05/2017 IPROJ - 06/05/2017	
11	I-AGF-DISS	Dissertation in place of group project for part time students	A Medina Vaya	10		40	N		03/10/16	08/09/17	50	IPROJ	100				30/09/17	
12	I-AGF-THESIS	Individual Thesis Project	Individually assigned	20		80	N		08/05/17	08/09/17	50	THESIS	90 10				04/09/17	

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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers [4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
												OR						

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-LAM-A1138	Soil Plant Environment Science	Land Reclamation and Restoration	Future Food Sustainability
TBC	Food Chain Resilience	Future Food Sustainability	Food Chain Systems

7. 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 SEEA.

Complete the grid below by inserting in the boxes which assessments from the modules directly **CROSS-MODULAR ASSESSMENT** (including any assessment which rests outside an individual module)

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. <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.

COURSE TITLE: MSc in Forensic Programme

Date of first publication/latest revision: July 2016

L. What is the course?

Course information

Course Title	Forensic Programme
Course code	**MSc, PgDip Forensic Archaeology and Anthropology** (MSFAAFTR– PDFAAFTR – MSFAAPTR – PDFAAPTR) **MSc, PgDip Forensic Ballistics** (MSFBLFTR – PDFBLFTR– MSFBLPTR – PDFBLPTR) **MSc, PgDip Forensic Engineering and Science** (MSFESFTR– PDFESFTR – MSFESPTR – PDFESPTR) **MSc, PgDip Forensic Explosives and Explosion Investigations** (MSFEIFTR, PDFEIFTR, MSFEIPTR, PDFEIPTR) **MSc, PgDip, PgCert Forensic Investigation** (MSFOIFTR – PDFOIFTR – MSFOIPTR – PDFOIPTR – PCFOIFTR – PCFOIPTR) **MSc, PgDip, PgCert** Digital Forensics (MSDFOFTR , PDDFOFTR, PCDFOFTR – MSDFOPTR, PDDFOPTR, PCDFOPTR) SPFPPPTR
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Cranfield Forensic Institute
Awarding Body	Cranfield University
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)
Benchmark	N/A

Statement(s)	
Registration Period(s) available	Part-time: 2 years (PgDip and PgCert) or 3 years (MSc) Full-time: MSc 13 months, PgDip and PgCert 1 year.
Course Start Month(s)	September

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 computing, information technology security and legal issues, forensic engineering, forensic biomechanics and osteomics.

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

- Mass Spec Analytical - research project titles and placements.
- Harvard Museum - research project titles and placements.
- Hawkins and Associates - member of the Industrial Advisory Panel.
- The Metropolitan Police Force - research project titles.
- Inforce - teaching staff and a module leader, research project titles. Sponsorship of course prize.
- Micropathology Ltd – teaching staff, research and access to experimental facilities.

Teaching and assessment for some parts of the course is provided by other Schools of the University, including the School of Aerospace, Transport and Manufacturing; Cranfield Defence and Security, however, remains fully responsible for the quality of delivery of the course.

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited formally by the Forensic Science Society until 5 April 2022 with the exception of the Digital Forensics component.

M. <u>What are the aims of the course?</u>

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, forensic engineers or digital forensic professionals.

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 relevant first degrees
- other graduates working in relevant professional fields of study, including forensic science, information technology, forensic engineering and law
- practitioners in forensic computing, information technology or forensic science.

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

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 a critical awareness of current practice in forensic science

ILO 2. demonstrate critical assessment and originality of thought through the examination of a wide range of different types of evidence using at first hand many of the analytical techniques within the armoury of the modern forensic scientist, engineer or digital forensic professional

ILO 3. critically assess data through the application of appropriate statistical tests and reasoning

ILO 4. demonstrate a critical awareness of the importance of traceability of evidence

ILO 5. communicate effectively through the written word and orally by means of expert witness reports and the presentation of evidence in court

ILO 6. demonstrate a wide range of transferable skills through the regular use of computer based literature searches, critical use of the Internet and the use of desktop publishing techniques to construct reports.

B. Postgraduate Diploma

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

ILO 7. acquire and assimilate knowledge from a wide range of adjacent disciplines in archaeology, anthropology, engineering, computer science and the physical sciences that impact on forensics.

C. MSc

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

ILO 8. understand and employ the scientific principles behind current analytical techniques and procedures to critically evaluate new ones and solve problems encountered

ILO 9. independently plan and execute a detailed research project and present results at meetings

ILO 10. 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 the area, categorising good and bad practice, and defending their opinions
- a clear explanation of experimental/analytical procedures and the presentation of results by appropriate means

- self-critical discussion 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?

Our education philosophy is led by the basic principles of:

- 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
- access to a dedicated computer student lab where they will be able to undertake digital forensic examinations and experimentation
- access to various digital forensic tools including the leading examination software access to external experts who are considered to be at the top of their field and are currently practising in digital forensics
- 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 many 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. When there is no requirement for an oral presentation then a piece of laboratory practical work will be written up as a report for the police or the court, rather than as a traditional student laboratory report. 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.

In addition to the teaching methods outlined, students will be supported in their learning and personal development by:

- Good staff student relations. Staff are enthusiastic and helpful and the students respond accordingly. The Course Director or Programme Director is usually available to address any immediate issues of concern that a student or students may have in connection with the course.
- All students are provided with a personal tutor who is available to support the student and advise on academic issues and provide pastoral care.
- Named subject matter experts who oversee each theme 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 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 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, 17-23, 26, 27, 28, 39	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 (25)	50 40 80
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 7, 8, 10, 17-23, 26, 27, 28, 39	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 2-5 Modules 9-12	50 40
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 6, 7, 8,13, 15, 18-23, 26, 27, 28, 37, 38, 39	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 2-5 Modules 9-12 Research project (25)	50 40 80
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 6, 7, 8, 13, 15, 18-23, 26, 27, 28, 37, 38. 39	0 30
TOTAL:	**200**

E. Postgraduate Diploma in Forensic Engineering Science

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

Description	Credits
COMPULSORY MODULES:	
Modules 2-5 Modules 7, 9, 37, 38	50 40
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 6, 8, 10, 11, 12, 13, 15, 18-24, 26, 27, 28, 39	0 30
TOTAL:	**120**

H. MSc in Forensic Engineering Science

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 7, 9, 37, 38 Research project (25)	50 40 80
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 6, 8, 10, 11, 12, 13, 15, 18-24, 26, 27, 28, 39	0 30
TOTAL:	**200**

F. PgDip 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 2-5 Modules 6, 7, 26, 27	50 40
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 8, 9, 10, 11, 13, 15, 18-23, 28, 37, 38, 39	0 30
TOTAL:	**120**

G. 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 2-5 Modules 6, 7, 26, 27 Research project (25)	50 40 80
ELECTIVE MODULES:	
Module 1 3 modules selected from any of the following: 8, 9, 10, 11, 13, 15, 18-23, 28, 37, 38, 39	0 30
TOTAL:	**200**

H. 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 2-5, or 6-23, 26, 27, 28, 37- 39	0 30
TOTAL:	60

I. 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: 6-23, 26, 27, 28, 37 - 39	0 70
TOTAL:	**120**

J. 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 (25)	50 80
ELECTIVE MODULES:	
Module 1 7 modules selected from any of the following: 6-23, 26, 27, 28, 37-39	0 70
TOTAL:	**200**

K. Postgraduate Certificate in Digital Forensics

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

Description	Credits
COMPULSORY MODULES:	
Module 29	20
ELECTIVE MODULES:	
Module 1 4 modules chosen from Modules 27, 28 & 30 to 35	0 40
TOTAL:	**60**

L. Postgraduate Diploma in Digital Forensics

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

Description	Credits
COMPULSORY MODULES:	
Module 29 Modules 2, 3, 5 & 30	20 40
ELECTIVE MODULES:	
Module 1 Up to 60 credits selected from any of the following modules: 28, 31- 35 To include no more than 10 credits from modules: 8, 21 and 27	0 60 (10 credits per module)
TOTAL:	**120**

M. MSc in Digital Forensics

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:	
Module 29 Modules 2, 3, 5 & 30 Research Project (36)	20 40 80
ELECTIVE MODULES:	
Module 1 Up to 60 credits selected from any of the following modules: 28, 31- 35 (To include no more than 10 credits from modules) 8, 21 and 27	0 60
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);[1] [2]
- **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 48 weeks.

Part-time students register for the course in September and are expected to complete the MSc within 3 years, the PgDip within 2 years and the PgCert within 2 years.

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[1] 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).

[2] 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%).

With the exception of Forensic Computing Foundations which has a two week residential most modules are taught over one week with sufficient time allocated to complete the coursework assignment(s). For Digital Forensic modules where examinations form part of the assessment pattern, the examinations will be completed within the residential week; the coursework will be completed after the residential module. The examination for Reasoning for Forensic Science and coursework for Investigation and Evidence Collection are 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.

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	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	R-FP-IS	Introductory Studies	70	0	0	N	06/09/16	06/09/16	09/09/16	N/A	AO					N/A	N/A
2	R-FP-IEC	Investigation and Evidence Collection	34	0	10	Y	12/09/16	12/09/16	16/09/16	40	ICW	100				14/10/16 FT 11/11/16 PT	28/11/16 28/12/16

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

[5] 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.

[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.

[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.

[8] 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.

[9] 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	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
3	R-FP-RFS	Reasoning for Forensic Science	25	0	10	N	26/09/16	26/09/16	30/09/16	40	EX	100				20/12/16	03/02/17
4	R-FP-AT	Analytical Techniques	50	0	20	Y	10/10/16	10/10/16	21/10/16	40	ICW	100				18/11/16 FT 16/12/16 PT	31/01/17 19/02/17
5	R-FP-CS	Courtroom Skills	25	0	10	N	12/09/16	06/03/17	10/03/17	40 40	OR ICW	60 40				09&10/03/17 06/02/17 FT&PT	TBC TBC
6	R-FP-FIEED	Forensic Investigation of Explosives and Explosive Devices	30	0	10	Y	20/02/17	20/02/17	24/02/17	40	ICW	100				24/03/17 FT 25/04/17 PT	08/05/17 05/06/17
7	R-FP-FEI	Fires, Explosions and their Investigation	28	0	10	Y	14/11/16	14/11/16	18/11/16	40	ICW	100				09/12/16 FT 11/01/17 PT	02/01/17 27/02/17
8	R-FP-TE	Trace Evidence	26	0	10	N	21/11/16	21/11/16	25/11/16	40	ICW	100				06/01/17 FT 03/02/17 PT	08/02/17 15/03/17

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Module Number	Module code	Title	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
9	R-FP-MEP	Materials Engineering and Processing	32	0	10	N	28/11/16	28/11/16	02/12/16	40	ICW	100				13/01/17 FT 10/02/17 PT	13/02/17 13/03/17
10	R-FP-IFIFB	Introduction to Firearms Investigations and Forensic Ballistics	32	0	10	N	07/11/16	07/11/16	11/11/16	40	ICW	100				09/12/16 FT 11/01/17 PT	23/01/17 20/02/17
11	R-FP-FI	Firearms Investigations	32	0	10	N	12/12/16	12/12/16	16/12/16	40	ICW	100				20/01/17 FT 17/02/17 PT	27/02/17 27/03/17
12	R-FP-FBI	Forensic Ballistics Investigations	32	0	10	N	13/02/17	13/02/17	17/02/17	40	ICW	100				17/03/17 FT 18/04/17 PT	02/05/17 30/05/17
13	R-FP-FARBR	Forensic Archaeology: Recovering Buried Remains	28	0	10	N	30/10/16	30/10/16	04/11/16	40	GPRES	100				04/11/16	19/01/17
14	R-FP-FAMGE	Forensic Archaeology: Mass	56	0	10	N	27/03/17	27/03/17	02/04/17	40 40	|PRAC ICW	50 50				02/04/17 02/05/17 FT 31/05/17 PT	14/06/17 12/07/17

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	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
							Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
											Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
		Grave Excavation															
15	R-FP-FFAO	Fundamentals of Forensic Anthropology: Osteology	27	0	10	N	28/11/16	28/11/16	02/12/16	40	ICW	100				06/01/17 FT 03/02/17 PT	13/02/17 13/03/17
16	R-FP-FFAI	Further Forensic Anthropology: Identification	28	0	10	N	23/01/17	23/01/17	27/01/17	40	EX	100				03/05/17	17/06/17
17	R-FP-PAE	Practical Archaeological Excavation	50	0	10	N	TBC	TBC	TBC	40	IPRAC ICW	40 60				TBC TBC	TBC
18	R-FP-FCI	Forensic Craniofacial Identification	28	0	10	N	**Not running in 2016/17**			40 40	IPRAC EX	50 50					
19	R-FP-MFI	Mass Fatality Incidents	28	0	10	Y	09/01/17	09/01/17	13/01/17	40 40	ICW ICW	50 50				10/02/17 FT 09/03/17 PT 10/03/17 FT 06/04/17 PT	16/06/17 FT & PT

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	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
20	R-FP-EFS	Environmental Forensic Science	28	0	10	N	**Not running in 2016/17**			40 40	ICW ICW	50 50					
21	R-FP-FF	Fakes and Forgeries	28	0	10	N	16/01/17	16/01/17	19/01/17	40	ICW	100				16/02/17 FT 16/03/17 PT	02/04/17 30/04/17
22	R-FP-RIFS	Radiographic Investigations in Forensic Science	25	0	10	N	30/01/17	30/01/17	03/02/17	40			MULTI	ICW ICW	40 60	03/03/17 FT 31/03/17 PT 03/03/17 FT 31/03/17 PT	07/04/17 15/05/17
23	R-FP-DNAT	DNA and Toxicology	28	0	10	N	**Not running in** 2016/17			40			MULTI	ICW ICW	40 60		
24	N-HFS-AAI	Aircraft Accident Investigation and Response	30	0	10	Y	03/04/17	03/04/17	07/04/17	40	ICW	100				05/05/17 FT 05/06/17 PT	At the next available opportunity which may not be until the course runs the following

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	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
																	year
25	R-FP-DISS	Research Project	50	0	80	N	03/04/17	03/04/17	28/07/17	50			100	EXEC THESIS ORAL	20 60 20	28/07/17	TBC
26	R-FP-HF	Hazardous Forensics	28	0	10	N	13/03/17	13/03/17	17/03/17	40 40	ICW ICW	50 50				13/04/16 FT 11/05/16 PT	30/05/16 26/06/16
27	R-FP-FEAI	Forensic Exploitation & Intelligence	28	0	10	N	05/12/16	05/12/16	09/12/16	40 40	ICW ICW	50 50				11/01/17 FT 08/02/17 PT	20/02/17 20/03/17
28	F-FCO-FP	Digital Crime and Investigation	28	0	10	N	03/10/16	03/10/16	07/10/16	40	ICW	100				04/11/16 FT 02/12/16 PT	19/12/16 16/01/17
29	R-FCO-FCF	Forensic Computing Foundations	60	0	20	N	17/10/16	17/10/16	28/10/16	40 40 40 40	EX EX ICW ICW	15 25 30 30				27/10/16 28/10/16 25/11/16 FT 03/01/17 PT 25/11/16 FT 03/01/17 PT	11/12/16 12/12/16 09/01/17 06/02/17 09/01/17 FT 06/02/17 PT

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	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	Credits	Is the module shared? Y/N	Calendar			Assessment							
							Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[5] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
											Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments[7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
30	R-FCO-FI1	Internet Forensics	35	0	10	N	14/11/16	14/11/16	18/11/16	40 40	EX ICW	40 60				18/11/16 16/12/16 FT 18/01/17 PT	04/04/17 30/01/17 27/02/17
31	R-FCO-FN1	Network Forensics	35	0	10	N	12/12/16	12/12/16	16/12/16	40 40	EX ICW	40 60				16/12/16 20/01/17 FT 17/02/17 PT	05/04/17 28/04/17 26/05/17
32	R-FCO-SPFC1	Programmin g for Digital Forensics	35	0	10	N	09/01/17	13/01/17	13/01/17	40	ICW	100				10/02/17 FT 10/03/17 PT	26/05/17 23/06/17
33	R-FCO-MOX	Mac OS X Forensics	32	0	10	N	27/02/17	27/02/17	03/03/17	40 40	EX ICW	40 60				03/03/17 03/04/17 FT 02/05/17 PT	07/04/17 26/05/17 23/06/17
34	R-FCO-AFC1	Advanced Forensic Computing	35	0	10	N	27/03/17	27/03/17	31/03/17	40	ICW	100				02/05/17 FT 31/05/17 PT	26/05/17 23/06/17
35	R-FCO-FCUL1	Digital Forensics Using Open Source Tools	50	0	10	N	06/02/17	06/02/17	10/02/17	40 40	EX ICW	40 60				10/02/17 10/03/17 FT 07/04/17 PT	06/04/17 26/05/17 23/06/17
36	R-FCO-DISS	Project	16	0	80	N	03/04/17	03/04/17	28/07/17	50	THESIS	100				28/07/17	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	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
37	R-FP-AFIA	Approach to Failure Investigation and Analysis	27	0	10	N	27/02/17	27/02/17	03/03/17	40	ICW	100				31/03/17 FT 03/05/17 PT	15/05/17 10/07/17
38	R-FP-FAC	Failure Analysis of Components	30	0	10	Y	23/01/17	23/01/17	27/01/17	40	ICW	100				24/02/17 FT 24/03/17 PT	11/05/17 30/06/17
39	R-FP-CEDC	Counter-Improvised Explosive Devised Capability	28	0	10	Y	10/10/16 (Occ B) 13/03/17 (Occ A)	24/10/16 27/03/17	28/10/16 31/03/17	50 50	IPRES IPRES	100 100				25/11/16FT 09/01/17PT 28/04/17FT 25/04/17PT	09/01/17 TBC 23/06/17 23/06/17

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

Module	MSc Theme	Forensic Archaeology and Anthropology	Forensic Ballistics	Forensic Engineering and Science	Forensic Investigation	Forensic Explosives and Explosion Investigation	Digital Forensics		Marketed as short course	Joint with another MSc
1	IS	E	E	E	E	E	E			
2	IEC	C	C	C	C	C	C		YES	YES
3	RFS	C	C	C	C	C	C		YES	
4	AT*	C	C	C	C	C			YES	YES
5	CS	C	C	C	C	C	C		NO	
6	FIEED		E	E	E	RS			YES	YES
7	FEI	E	E	RS	E	RS	E		YES	YES
8	TE	E	E	E	E	E	E		YES	
9	MEP		RS	RS	E	E			YES	
10	IFIFB	E	RS	E	E	E			YES	
11	FI**		RS	E	E	E			YES	
12	FBI**		RS	E	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				YES	
18	FCI	E	E	E	E	E			YES	
19	MFI	E	E	E	E	E			YES	YES
20	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 Engineering and Science	Forensic Investigation	Forensic Explosives and Explosion Investigation	Forensic Computing		Marketed as short course	Joint with another MSc
21	FAF	E	E	E	E	E	E		YES	
22	RIFS	E	E	E	E	E			YES	
23	DNAT	E	E	E	E	E			YES	
24	AAIR			E						YES
25	DISS - FP	C	C	C	C	C				
26	HF	E	E	E	E	RS			YES	
27	FEAI	E	E	E	E	RS	E		YES	
28	DCI	E	E	E	E	E	E		YES	
29	FCF						RS		YES	
30	FI1						RS		YES	
31	FN1						E		YES	
32	PDF						E		YES	
33	MOX						E		YES	
34	AFC1						E		YES	
35	FCUOST						E		YES	
36	DISS - FC						RS			
37	AFIA**		E	RS	E	E			YES	
38	FAC**		E	RS	E	E			YES	YES
39	CEDC	E	E	E	E	E			YES	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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
R-FP-IEC	Investigation & Evidence Collection	MSc Forensic Programme	MSc Safety & Accident Investigation
R-FP-AT	Analytical Techniques	MSc Forensic Programme	MSc Safety & Accident Investigation
R-FP-FIEED	Forensic Investigation of Explosives and Explosive Devices	MSc Forensic Programme	MSc Explosive Ordnance Engineering
R-FP-FEI	Fires, Explosions and their Investigation	MSc Forensic Programme	MSc Explosive Ordnance Engineering
R-FP-MFI	Mass Fatality Incidents	MSc Forensic Programme	MSc Safety & Accident Investigation
N-HFS-AAI	Aircraft Accident Investigation and Response	MSc Safety & Human Factors in Aviation	MSc Safety & Accident Investigation MSc Military Aerospace and Airworthiness
R-FP-FAC	Failure Analysis of Components	MSc Forensic Programme	MSc Air Transport Management
R-FP-CEDC	Counter-Improvised Explosive Device Capability	MSc Forensic Programme	MSc Explosive Ordnance Engineering

7. 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 information systems 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.

(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.***
1						
2	ICW	ICW		ICW		
3		EX	EX			
4	ICW	ICW	ICW			
5	ICW OR	ICW			ICW OR	ICW
6	ICW	ICW		ICW	ICW	
7		ICW		ICW		
8	ICW	ICW	ICW	ICW		
9		ICW				ICW
10	ICW	ICW	PRAC		ICW	ICW
11	ICW	ICW	PRAC	ICW	ICW	ICW
12	ICW	ICW	ICW			ICW
13	GPRES	GPRES				
14	ICW					ICW
15	PRAC					

16	PRAC					
17	ICW					PRAC
18	Not running					
19	ICW1 ICW2	ICW		ICW2	ICW1	ICW1 ICW2
20	Not Running					
21	ICW		ICW		ICW	
22	ICW					
23	Not running					
24	ICW					ICW
26		ICW1			ICW1	
27			ICW1		ICW2	ICW2
28	ICW			ICW	ICW	
29	EX ICW	EX ICW		EX ICW	ICW	ICW
30	EX ICW	EX ICW				ICW
31	EX ICW	EX ICW	ICW			ICW
32	ICW	ICW				ICW
33	EX ICW	EX ICW	ICW	ICW		ICW
34	ICW	ICW	ICW	ICW	ICW	ICW
35	EX ICW	EX ICW	ICW	ICW		ICW
37	ICW		ICW			ICW
38			ICW			ICW
39	IPRES	IPRES	IPRES	IPRES	IPRES	IPRES

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 1.***	***ILO 2.***	***ILO 3.***	***ILO 4.***	***ILO 5.***	***ILO 6.***	***ILO 7.***
1							
2	ICW	ICW		ICW			
3		EX	EX				
4	ICW	ICW	ICW				
5	ICW	ICW			ICW	ICW	
6	ICW	ICW		ICW	ICW		EX
7		ICW		ICW			ICW
8	ICW	ICW	ICW	ICW			
9		ICW				ICW	

10	ICW	ICW	PRAC		ICW	ICW	
11	ICW	ICW	PRAC	ICW	ICW	ICW	
12	ICW	ICW	ICW			ICW	ICW
13	GPRES	GPRES					GPRES
14	ICW					ICW	PRAC
15	PRAC						PRAC
16	PRAC						PRAC
17	ICW					PRAC	
18	Not running						
19	ICW1 ICW2			ICW2	ICW1	ICW1 ICW2	ICW1 ICW2
20	Not running						
21	ICW		ICW		ICW		
22	ICW						ICW
23	Not running						
24	ICW					ICW	ICW
26		ICW1			ICW1		ICW2
27			ICW1		ICW2	ICW2	ICW1
28	ICW			ICW	ICW		
29	EX ICW	EX ICW		EX ICW	ICW	ICW	
30	EX ICW	EX ICW				ICW	
31	EX ICW	EX ICW	ICW			ICW	
32	ICW	ICW				ICW	
33	EX ICW	EX ICW	ICW	ICW		ICW	
34	ICW	ICW	ICW	ICW	ICW	ICW	
35	EX ICW	EX ICW	ICW	ICW		ICW	
37	ICW		ICW			ICW	
38			ICW			ICW	
39	IPRES	IPRES	IPRES	IPRES	IPRES	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 1.*	*ILO 2.*	*ILO 10.*

25	ORAL	EXEC	THESIS
36	IPROJ	IPROJ	IPROJ

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For 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 course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

9. 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, and the science base to archaeology and anthropology.

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: MSc Future Food Sustainability

Date of first publication/latest revision: 15/02/16 – 06/09/16

1. What is the course?

Course information

Course Title	Future Food Sustainability
Course code	MSFFSFTC, MSFFSPTC, PDFFSFTC, PDFFSPTC, PCFFSFTC, PCFFSPTC
Academic Year	2016/17
Valid entry routes	MSc, PgDip, PgCert
Additonal exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location 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
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: throughout the year

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 Cranfield Institute for Resilient Futures, 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, food chain logistics, water usage and management,

Cranfield University interacts with several institutions with the aim of improving the employability of its students. This course will benefit from the feedback obtained through the Environment and Agrifood Industrial Advisory Panel composed by companies throughout the entire food chain .

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

Accreditation is currently being sought by the Institute of Food Science and Technology (IFST), which has recently (January 2015) announced that it is now accrediting suitable Undergraduate and Masters courses.

2. <u>What are the aims of the course?</u>

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

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. Assess how sustainability options based on technological developments can be utilised for financial and economic decision making

ILO 4. Develop systematic and analytical skills in informatics based on the use of scientific data derived from crop development, and water and soil usage

ILO 5. Integrate technological and social science information and show how they can be utilised to predict future impacts and influence effective policy 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. Demonstrate effectiveness in numeracy, IT, communication, time management, report writing, group working and presentation

B. Postgraduate Diploma in Future Food Sustainability

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

ILO 8. Demonstrate high-functioning team-working skills

ILO 9. Appraise the challenges faced in the area of food sustainability and formulate appropriate problem solving skills to address these

ILO 10. Integrate knowledge, understanding and skills from the taught modules in a real-life situation.

ILO 11. Effectively work in a small project team to identify project objectives and select appropriate methodologies to address problems faced by industrial clients; collaborating with other team members to communicate 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 12. Design a successful independent research project relevant to appropriate public and/or private sector organisations, and in relation to food sustainability

ILO 13. Actively participate, by engaging critically and confidently, in the discourse on the wider issues of global food supply both now and in the future

ILO 14 Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, and evaluate findings and draw appropriate conclusions.

ILO 15 To communicate their findings successfully via a thesis, written in an approved School style and in an oral presentation.

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. Seven taught modules are assessed by assignments, and one is assessed by an exam. 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, 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 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 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:	

Module 2 Module 3 Module 4 Module 6 Module 7 Module 9	10 10 10 10 10 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 Modules 2-9 Group project or part time equivalent	0 80 40
ELECTIVE MODULES:	
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 Modules 2-9 Group project or part time equivalent Individual thesis project	0 80 40 80
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);[1] [2]
- **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

[1] 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).

[2] 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%).

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[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module[6] (%) of Independent assessments	Weighting within module of multi-part assessments[7] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
1	I-AGF-INWK	Induction Module	A Medina Vaya	33		0	Y		03/10/16	07/10/16	N/A	AO	N/A				N/A	
2	I-FFS-AI	Agricultural Informatics	R Corstanje	40		10	N		10/10/16	14/10/16	40	ICW	100				FT 26/10/16 PT 5/11/16	
3	I-EPP-A1004	Environmental Advocacy and Discourse	A Graves	25		10	Y		31/10/16	04/11/16	40	ICW	100				FT 07/01/17 PT 14/01/17	

[3] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[4] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[5] 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.
[6] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[7] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[8] 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.
[9] 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

Module Number	Module code	Title	Module Leader	Contact hours[3]	Total hours delivered by Visiting Lecturers[4]	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[5] - 40% or 50%	Type of Assessment	Weighting within module6 (%) of Independent assessments	Weighting within module of multi-part assessments [7](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[8]	Assessment Submission and/or exam date[9]	Assessment / Exam Retake date
4	I-LAM-A1138	Soil Plant Environment Science	J Hannam	34		10	Y		07/11/16	11/11/16	40	ICW	100				FT - 19/11/16 PT - 26/11/16	
5	I-EMB-FEA	Financial and Economic Appraisal	P Burgess	25		10	Y		21/11/16	25/11/16	40	ICW	100				FT 3/12/16 PT 10/12/16	
6	I-EPP-A1005	Environmental Horizon Scanning and Futures Research	F Lickorish	30		10	Y		05/12/16	09/12/16	40	ICW	100				FT 17/12/16 PT 3/1/17	
7	I-FFS-PBT	Plant-based Technologies	A Thompson	20		10	N		09/01/17	13/01/17	40	ICW	100				FT 21/1/17 PT 28/1/17	
8	I-FFS-FCR	Food Chain Resilience	D Julien	25		10	N		23/01/17	27/01/17	40			100	GCW GPRES	30 70	GPRES FT/PT - 27/01/2017 GCW - FT/PT 04/02/2017	
9	I-FFS-WSS	Water and Sustainable Agrifood Systems	T Hess	30		10	N		06/02/17	10/02/17	40	ICW	100				FT 18/2/17 PT 25/2/17	

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10	I-AGF-GRPP	Group Project	Individually assigned	16		40	N		20/02/17	05/05/17	50	GPROJ ICW	80 20				02/05/17 06/05/17	
11	I-AGF-DISS	Dissertation in place of group project for part time students	A Medina Vaya	10		40	N		03/10/16	08/09/17	50	IPROJ	100				30/09/17	
12	I-AGF-THESIS	Individual Thesis Project	Individually assigned	20		80	N		08/05/17	08/09/17	50	THESIS OR	90 10				04/09/17	

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

Please list all modules that are shared with another existing course.

Module code	**Module title**	**Course that owns the module**	**Course(s)/programme(s) that share the module**
I-EPP-A1005	Environmental Horizon Scanning and Futures Research	Environment and Public Policy	Future Food Sustainability
I-LAM-A1138	Soil Plant Environment Science	Land Reclamation and Restoration	Future Food Sustainability Food Chain Systems
I-EMB-FEA	Financial and Economic Appraisal for Environmental Management	Environmental Management for Business	Environment and Public Policy, Environmental Management for Business, Economics of Natural Resource and Environmental Management, Future Food Sustainability
I-EPP-A1004	Environmental Advocacy and Discourse	Environmental and Public Policy	Future Food Sustainability
TBC	Food Chain Resilience	Future Food Sustainability	Food Chain Systems

7. 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), and formal examination of one module. 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.

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

Title	**Modules Covered**	**Assessment**	
		Type	Weight (%)

8. 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 acts as advisor to the Panel. Proposals are reviewed in line with the Quality Assurance Agency for Higher Education (QAA) Quality Code, in particular Chapter B1 (Programme Design and Approval) and in the case of partnership arrangements in accordance with Chapter B10 (Managing Higher Education with Others). 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. For collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year review known as a Focussed Review which looks at each course in depth. In addition occasional site inspection visits are made.

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the guidance provided by the QAA particularly in Chapter B7 (External Examining) which emphasises that 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.

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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.

9. <u>What opportunities are graduates likely to have on completing the course?</u>

This course is part of the Agriculture and Food teaching Programme within CSAFI and, as such, is teamed with the MSc course in Food Chain Systems. 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:

- Coca Cola Enterprises
- Giles Foods
- Whitworth's Ltd
- Discovery Foods

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