Course Libraries 2017/18

Courses D – F

Course	Pages
Defence Acquisition Management	3 – 19
Defence and Security Marketing	20 – 29
Defence Cyber Masters Programme	30 – 45
Defence Leadership	46 – 60
Design of Rotating Machines	61 – 76
Design Strategy and Leadership	77 – 91
Digital Design and Strategic Communication	92 – 104
Energy from Waste	105 – 118
Energy Systems and Thermal Processes	119 – 138
Engineering and Management of Manufacturing Systems	139 – 155
Environmental Engineering	156 – 170
Environmental Management for Business	171 – 185
Environmental Water Management	186 – 199
Explosives Ordnance Engineering	200 – 214
Finance and Management	215 – 231

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: Defence Acquisition Management

Date of first publication/latest revision: 12 June 2017

---

1. What is the course?

Course information

Course Title	Defence Acquisition Management
Course code	MSDAMPTR, PDDAMPTR, PCDAMPTR, SPDAMPTR
Academic Year	Effective from September 2017
Valid entry routes	MSc/PgDip/PgCert
Additional Exit routes	PgDip/PgCert
Mode of delivery	Part-time
Location(s)[1] of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence acquisition
Centre	Centre for Defence Acquisition (CfDA)
Course Director	Matthew Summers
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	Yes
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

---

[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

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

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'.

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

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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

A. Postgraduate Certificate

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

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

B. Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Introductory Studies	0
Strategic Management and Introduction to Acquisition	10
Financing Acquisition	10
Programme and Project Management	10
Managing Acquisition Change	10
Supply Network Management in Defence and the Commercial Environment	10
Commercial Relationships in the Defence Environment	10
The International Dimension of Defence Acquisition	10
Cost Estimating and Planning	10
Efficient and Effective Through Life Support	10
Defence Capability Management	10
ELECTIVE MODULES:	**(20 credits)**

Select two modules from:
    Sustainability in Defence
    Knowledge in Defence
    Human Centric Systems Engineering
    Decision Analysis and Modelling Support
	
	10
	10
	10
	10

TOTAL:	120 credits

C. MSc

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

Description	Credits
COMPULSORY MODULES:	
Introductory Studies Strategic Management and Introduction to Acquisition	0 10

6

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

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

Pass Criteria

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> 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 <u>on the first attempt</u> for the significant majority of the taught assessments, noting that:
  - o 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);

---

[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%).

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

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

Course modules[5]

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[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[8] - 40% or 50%	Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Residential' Start Date	Residential' End Date		Type of Assessment	Weighting within module9 (%) of Independent assessments	module of multi-part assessments	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
1	R-DAM-IS	Introductory Studies		12	0	0	N	[08/01/18]	[08/01/18]	[09/01/18]	N/A	AO	N/A				[ ]	[N/A]
2	R-DAM-SMIA	Strategic Management and Introduction to Acquisition		30	0	10	N	[12/01/18]	[22/01/18]	[26/01/18]	40	ICW GCW	80 20				[05/03/18 26/01/18]	[Tba]

---

[5] Please see Senate Handbook for Setting Up a New Taught Course for guidance on completing this table
[6] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice
[7] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)
[8] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%. This will be at the Board of Examiners discretion.
[9] For **independent assessments** please record type and weighting of each separate piece of assessment individually.
[10] For **multi-part assessments** please record the overall weighting of module which should be 100%.
[11] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate). If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.
[12] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

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

Module Number	Module code	Title	Module Leader	Contact hours[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[8] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	Residential' Start Date	Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module9 (%) of Independent assessments	module of multi-part assessments	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
8	R-DAM-IDDA	The International Dimensions of Defence Acquisition		30	0	10	N	[18/12/17]	[22/01/18]	[26/01/18]	40	ICW	100				[05/03/18]	[Tba]
15 (E)	R-SEDC-DAMS	Decision Analysis and Modelling Support		30	0	10	Y	OccB17: 08/01/18 Occ A18: 03/09/18]	[12/02/18 08/10/18]	[16/02/18 12/10/18]	40 40	ICW ICW	100 100				OccB17: 26/03/18 Occ A18: 19/11/18]	12/10/18 Tba]
3	R-DAM-FA	Financing Acquisition		30	0	10	N	[23/02/18]	[05/03/18]	[09/03/18]	40	EX GPRES	70 30				[10/04/18 09/03/18]	[Tba]
13 (E)	R-DAM-MKIDA	Knowledge in Defence		30	0	10	N	[19/02/18]	[19/03/18]	[23/03/18]	40	ICW	100				[30/04/18]	[Tba]
14 (E)	R-SEDC-HCSE	Human Centric Systems Engineering		35	0	10	Y	OccB17: 12/02/18 Occ A18: 08/10/18]	[19/03/18 12/11/18	[23/03/18 16/11/18	40 40	ICW ICW	100 100				Occ B17: 02/05/18 Occ A18: 24/12/18]	16/11/18 Tba]
4	R-DAM-	Programme and Project		30	0	10	N	[14/05/18]	[18/06/18]	[22/06/18]	50			100	ICW GCW	80 20	[30/07/18 30/07/18]	[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

Defence Acquisition Management COURSE SPECIFICATION
QA&E USE ONLY: Version 3.0 August 2017   Course / SAS Version: [ ]

Module Number	Module code	Title	Module Leader	Contact hours[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[8] - 40% or 50%	Assessment					Submission dates	
								Module Start Date (eg Pre-course task)	Residential' Start Date	Residential' End Date		Independent Assessment		Multi-part Assessment				
												Type of Assessment	Weighting within module9 (%) of Independent assessments	module of multi-part assessments[10]	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
	PPM	Management																
9	R-DAM-CEF	Cost Estimating and Planning		30	0	10	N	09/04/18	14/05/18	18/05/18	40	ICW	100				25/06/18	Tba
5	R-DAM-MAC	Managing Acquisition Change		30	0	10	N	19/03/18	23/04/18	27/04/18	40	ICW	100				04/06/18	Tba
10	R-DAM-EETLS	Efficient and Effective Through Life Support		30	0	10	N	04/06/18	09/07/18	13/07/18	40	ICW	100				20/08/18	Tba
6	R-DAM-SNMCE	Supply Network Management in Defence and the Commercial Environment		30	0	10	N	07/08/17 06/08/18	11/09/17 10/09/18	15/09/17 14/09/18	40 40	ICW ICW	100 100				23/10/17 22/10/18	Tba Tba
11	R-DAM-DCM	Defence Capability Management		30	0	10	N	14/08/17 13/08/18	18/09/17 17/09/18	22/09/17 21/09/18	50 50	ICW ICW	100 100				30/10/17 29/10/18	Tba Tba

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

Module Number	Module code	Title	Module Leader	Contact hours[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[8] - 40% or 50%	Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	Residential' Start Date	Residential' End Date		Type of Assessment	Weighting within module[9] (%) of Independent assessments	module of multi-part assessments[10]	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
12 (E)	R-DAM-SD	Sustainability in Defence		30	0	10	N	[08/10/18]	[12/11/18]	[16/11/18]	40	ICW GPRES	80 20				[24/12/18 16/11/18]	[Tba]
7	R-DAM-CRDE	Commercial Relationships in the Defence Environment		30	0	10	N	[30/10/17 29/10/18]	[04/12/17 03/12/18]	[08/12/17 07/12/18]	40 40	ICW ICW	100 100				[15/01/18 14/01/19]	[Tba Tba]
16	R-DAM-RM	Research Methods		25	0	0	N	[06/11/17]	[11/12/17]	[15/12/17]	N/A	AO	N/A				[N/A]	[N/A]
17	R-DAM-DISS	Thesis		0	0	76 76 80 80	N N N N	[30/01/17 31/05/17 22/01/18 14/05/18]	[N/A N/A N/A N/A]	[N/A N/A N/A N/A]	50 50 50 50	THESIS THESIS THESIS THESIS	100 100 100 100				[20/04/18 13/08/18 22/04/19 20/08/19]	[N/A 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; AO - attendance only

Defence Acquisition Management COURSE SPECIFICATION
QA&E USE ONLY: Version 3.0 August 2017   Course / SAS Version: [ ]

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

This approach has been adopted because:

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

Assessment and ILO Mapping

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

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

14

MSc DAM

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

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

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10:

Defence Acquisition Management COURSE SPECIFICATION
QA&E USE ONLY: Version 3.0 August 2017   Course / SAS Version:[   ]

Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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: Postgraduate Certificate Defence and Security Marketing

Date of first publication/latest revision: August 2017

1. What is the course?

Course information

Course Title	Defence and Security Marketing
Course code	PCDMRPTR, SPDMRPTR
Academic Year	2017/18
Valid entry routes	PgCert
Additional exit routes	PgCert
Mode of delivery	Part-time
Location(s)[1] of Study	Shrivenham Site
School(s)	Defence and Security and School of Management
Theme	Defence and Security
Centre	Centre for Defence Management and Leadership
Course Director	Professor Ron Matthews
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University Entry Requirements
UK Qualifications Framework Level	QAA FHEQ Level 7
Benchmark Statement(s)	Business and Management

---

[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

Registration Period(s) available	24 Months: registration extends across two years to allow for flexibility in student study scheduling
Course Start Month(s)	January 2018

Institutions delivering the course

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

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

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

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

As this is a new course formal accreditation can only be sought towards the end of the first year of operation with a view to the first cohort of students receiving that accreditation. The University is seeking accreditation from the Chartered Institute of Marketing (CIM).

2. What are the aims of the course?

Cranfield University offers this course in order to:

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

This programme is intended for the following range of students:

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

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

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

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

Defence and Security Marketing COURSE SPECIFICATION
QA&E USE ONLY: Version 2.0 October 2017   Course / SAS Version[ ]

ILO 1. Evaluate the conceptual, contextual and policy-relevant backdrop to the field of defence and security marketing, including legal and political considerations, offset requirements and strategic trade and export controls

ILO 2. Examine defence and security marketing data, analyse and interpret country risks and trends, and critically evaluate real and potential business opportunities and threats, linked to appropriate offset strategies, to shape successful marketing campaigns

ILO 3. Apply the skills necessary to undertake successful identification of defence and security market prospects, produce an appropriate marketing plan and pursue the deal through effective negotiation to achieve acceptable contractual outcomes

ILO 4. Analyse the institutional constraints to defence and security trade from both national government legislation and supra-national organisations, such as the EU, UN, Wassenaar Arrangement and the Missile Technology Control Regime (MTCR).

ILO 5. Apply the research and methodological skills acquired to source and analyse the evidence to prove or refute arguments on which policy positions and corporate decision-making are based

4. How is the course taught?

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

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

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

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

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

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

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

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

Pass Criteria

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> 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 <u>on the first attempt</u> for the significant majority of the taught assessments, noting that:
    o 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);
    o 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);
    o 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>

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

Students will be required to attend an opening five-day residential school (to include the CDS induction day and Modules 1 and 2) followed by three three-day and one four day residential

---

[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%).

schools held between January and September each year. All schools will be located at the CDS Shrivenham Campus. The period October - December will be dedicated to the Independent Study Project.

Course modules

The following modules outline all parts of the programme leading to the PgCert.

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							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	R-DMR-IS	Introductory Studies		7	N/A	0	N	[N/A]	[12/01/18]	[12/01/18]	N/A	AO	N/A			[]	[N/A]	N/A
2	R-DMR-LEPDSF	Legal, Ethical and Political Defence & Security Frameworks		21	2	10	N	[2/01/18]	[8/01/18]	[11/1/18]	40	ICW	100			[ ]	[05/3/18]	4/06/18

---

[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; MULTI – Multi-part Assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	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
												Independent Assessment		Multi-part Assessment			Submission dates	
		(incl. CDS induction day)																
3	R-DMR-DSM	Defence & Security Marketing		21	4	10	N	[5/03/18]	[12/3/18]	[14/3/18]	40	ICW	100			[]	[08/5/18]	06/08/18
4	R-DMR-N	Negotiations		21	0	10	N	[08/5/18]	[14/5/18]	[16/5/18]	40	ICW	100			[ ]	[09/7/18]	08/10/18
5	R-DMR-DSO	Defence & Security Offset		21	0	10	N	[09/7/18]	[16/7/18]	[18/7/18]	40	ICW	100			[ ]	[10/9/18]	10/12/18
6	R-DMR-STCC	Strategic Trade Controls and Compliance		21	0	10	N	[03/9/18]	[10/9/18]	[12/9/18]	40	ICW	100			[]	[05/11/18]	04/02/19
7	R-DMR-ISP	Independent Study Project		07 (plus 13 individual supervision)	0	10	N	[10/9/18]	[13/9/18]	[13/9/18]	40	ICW	100			[]	[07/01/19]	n/a

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

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module

7. How are the ILOs assessed?

The following assessment types are utilised:

1. Individual written assignments, on an applied relevant topic, will all have a targeted length of 2,500 words. 2. In-class group presentations. 3. There will also be an Independent Study Project conducted as a mini consultancy project within the student's company, or, if self-funded, a library-based project. The submitted report will be 4,000 words in length.

This approach has been adopted because:

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

Assessment and ILO Mapping

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.

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

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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

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

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

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:	14 September 2017

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	2017/18
Valid entry routes	MSc, PgDip, PgCert Cyber Defence and Information Assurance (CDIA) MSc, PgDip, PgCert Cyberspace Operations (CSOps)
Additional Exit routes	PgDip Cyber Defence and Information Assurance PgCert Cyber Defence and Information Assurance PgDip Cyberspace Operations PgCert Cyberspace Operations
Mode of delivery	Part-time Flexible learning
Location(s)[1] of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Centre for Electronic Warfare, Information and Cyber
Course Director	Dr Ruth Massie
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	Yes
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.

---

[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

	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 the Cyberwarfare in Intelligence and Military Operations module.
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)	October

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)

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) entry 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:

2

CDIA

- 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. Independently and confidently be able to apply appropriate theories, tools and/or techniques to a cyber-related situation, or situations, as appropriate to the student's named award

ILO 20. Critically evaluate the published literature and synthesise the identified concepts

ILO 21. Judge appropriate research approaches for conducting research and draw justifiable inferences from the data and analysis generated and present a self-critical discussion of the results with conclusions

ILO 22. Display practical ability in self-directed research to produce a high quality thesis.

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

The course is taught through a mixture of 10 and 20 credit modules. Students can progress through the modules in any order they wish having completed the Foundations: Management of Cyber module. A small number of modules contain pre-requisites that must be completed before the student is able to progress.

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

Modules are delivered in a variety of formats based on the subject content requirements. The ten-credit modules fall into four basic categories:
- 13 week modules; 2.5-3 day compulsory residential with three online activites (these may be before and/or after the residential), assignment due in in week 13 (FMC, CATO, ST, THD, CNPC and RMM)
- 7 week modules, type A; three weeks' pre-work, one week compulsory residential, three weeks self-study, assignment due in in week 7 (DLDS and IM)
- 7 week module, type B; one week residentials, six weeks self-study, assignment due in in week 7 (CSTP)
- Online only; 13 week online only module (UR)

The two 20 credit modules are structured as:
- CIMO: three weeks online exercises, one week compulsory residential, 6 weeks online exercises, assignment due in in week 13
- ACCP: six weeks of online work, supervision as required, assignment due in in week 20

The dissertation is an 80 credit module for which the students will have 12 months to complete once they have submitted their dissertation proposal. Proposals will be accepted on the last working day of September, January, March and July.

In addition, there is a 12 month zero credit Study Skills module that must be completed to be eligible for any of the awards. This has five hours of in class contact time and a further five hours of online work with a further 20 hours of independent learning.

Please note, modules will only be run subject to there being a minimum of six students selecting the module.

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.

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. <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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

A. Postgraduate Certificate in 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:	
Foundations: Management of Cyber	10
The Human Dimension	10
Critical Networks and Process Control	10
Study Skills	0
ELECTIVE MODULES: Chose 30 credits from the following modules	
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Data Led Decision Support	10
Incident Management	10
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:	
Foundations: Management of Cyber	10
Cyberwarfare in Intelligence and Military Operations	20
Study Skills	0
ELECTIVE MODULES: Chose 30 credits from the following modules	
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Data Led Decision Support	10
Incident Management	10
TOTAL:	**60**

C. Postgraduate Diploma in Cyber Defence and Information Assurance
The accumulation of 120 credits through the assessment of taught modules as detailed below:

Description	Credits
COMPULSORY MODULES:	

Foundations: Management of Cyber	10
The Human Dimension	10
Critical Networks and Process Control	10
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Data Led Decision Support	10
Incident Management	10
Cyber Systems Thinking and Practice	10
Research Methods	10
Applied Cyber Concepts Project	20
Study Skills	0
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:	
Foundations: Management of Cyber	10
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Cyberwarfare in Intelligence and Military Operations	20
Data Led Decision Support	10
Incident Management	10
Cyber Systems Thinking and Practice	10
Research Methods	10
Study Skills	0
ELECTIVE MODULES: Chose 20 credits from the following modules	
The Human Dimension	10
Critical Networks and Process Control	10
Applied Cyber Concepts Project	20
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:	
Foundations: Management of Cyber	10
The Human Dimension	10
Critical Networks and Process Control	10

Description	Credits
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Data Led Decision Support	10
Incident Management	10
Cyber Systems Thinking and Practice	10
Research Methods	10
Applied Cyber Concepts Project	20
Study Skills	0
Dissertation	80
ELECTIVE MODULES:	
N/a	
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:	
Foundations: Management of Cyber	10
Understanding Risk	10
Cyber Attack – Threats and Opportunities	10
Social Technologies	10
Cyberwarfare in Intelligence and Military Operations	20
Data Led Decision Support	10
Incident Management	10
Cyber Systems Thinking and Practice	10
Research Methods	10
Study Skills	0
Dissertation	80
ELECTIVE MODULES: Chose 20 credits from the following modules	
The Human Dimension	10
Critical Networks and Process Control	10
Applied Cyber Concepts Project	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 <u>not</u> 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 <u>on the first attempt</u> for the significant majority of the taught assessments, noting that:
  o 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);
  o 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);
  o 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>

This course is only offered on a part-time basis and delivered in a flexible learning style. Students are required to begin with the Foundations: Management of Cyber module but then are free to undertake the modules as fits their own requirements; noting the pre-requisites applied to some modules. Students are expected to study for no more than 20 credits at any one time, except modules in parallel with the ACCP. On average students are expected to study 40 to 60 credits per academic year. The quickest time for completion of the whole Masters is 3 years; the pattern to complete this is:
- Year One, Autumn; FMC and UR and start of SS
- Year One, Spring; CATO and ST and SS
- Year One, Summer; CDIA: CNPC and HD or CSOps: CIMO and completion of SS
- Year Two, Autumn; CSTP and RM
- Year Two, Spring; DLDS and IM and start of ACCP
- Year Two, Summer; complete ACCP
- Year Three; Dissertation (July proposal submission point)

---

[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				Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Module Taught Phase End Date		Independent Assessment		Multi-part Assessment			Submission dates	
													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	R-DEFCY-SS	Study Skill	[]	10	0	0	N	[02/10/17]	[N/a]	[N/a]	[25/09/18]	N/a	AO	100%				[N/a]	[N/a]
2	R-DEFCY-FMC	Foundations: Management of Cyber	[]	36	0	10	N	[02/10/17]	[02/10/17	[06/10/17	[03/12/17]	40	ICW	100%				[02/01/18	[Oct 18-Jan19]
3	R-DEFCY-UR	Understanding Risk	[]	36	0	10	N	[A 09/10/17]	[N/a]	[N/a]	[10/12/17]	40	ICW	100%				[02/01/18	[Oct 18-Jan19]

---

[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	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Module Taught Phase 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	R-DEFCY-CA	Cyber Attack – Threats and Opportunities	[]	36	0	10	N	[08/01/18]	[29/01/18]	[31/01/18]	[11/03/18]	40	ICW	100%				[03/04/18]	[Jan-April 19]
5	R-DEFCY-ST	Social Technologies	[]	36	0	10	N	[15/01/18]	[31/01/18]	[02/02/18]	[18/03/18]	40	ICW	100%				[10/04/18]	[Jan-Apr 19]
6	R-SISD-DLDS	Data Led Decision Support	[]	30	0	10	Y	[26/03/18]	[16/04/18]	[20/04/18]	[20/04/18]	40	GCW ICW	25% 75%				[20/04/18 14/05/18]	[Mar – May 19]
7	R-DEFCY-IM	Incident Management	[]	35	0	10	N	[A 06/11/17]	[27/11/17]	[01/12/17]	[01/12/17]	40			100	GPRAC ICW	30% 70%	[01/12/17 02/01/18]	[Feb-Apr 18]
								[B 19/02/18]	[12/03/18]	[16/03/18]	[16/03/18]	40			100	GPRAC ICW	30% 70%	[16/03/18 10/04/18]	[Nov – Dec 18]
8	R-DEFCY-CN	Critical Networks and Process Control	[]	36	0	10	N	[30/04/18]	[16/04/18]	[18/05/18]	[01/07/18]	50	ICW	100%				[24/07/18]	[Apr-July 19]
9	R-DEFCY-HD	The Human Dimension	[]	36	0	10	N	[23/04/18]	[14/05/18]	[16/05/18]	[24/06/18]	50	ICW	100%				[17/07/18]	[Apr-Jul 19]
10	R-DEFCY-CIMO	Cyberwarfare in Intelligence and Military Operations	[]	72	0	20	N	[23/04/18]	[14/05/18]	[18/05/18]	[01/07/18]	50	ICW	100%				[24/07/18]	[Apr-July 19]

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

Defence Cyber Masters Programme COURSE SPECIFICATION – Cohort 5
QA&E USE ONLY: Version 4.2 September 2017   Course / SAS Version: [ ]

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Module Taught Phase 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
11	R-DEFCY-CSTP	Cyber Systems Thinking and Practice	[ ]	35	0	10	N	[A 04/09/17]	[11/09/17]	[15/09/17]	[11/09/17]	40			100%	GPRES ICW	30% 70%	11/09/17 31/10/17	[Mar-May 18]
								[B 12/03/18]	[19/03/18]	[23/03/18]	[23/08/18]	40			100%	GPRES ICW	30% 70%	21/03/18 08/05/18	[Sep-Oct 18]
12	R-DEFCY-RM	Research Methods	[ ]	36	0	10	N	[A 04/12/17]	[12/12/17]	[14/12/17]	[11/02/18]	40	ICW	100%				[05/03/18]	[Jun - Sep 18]
								[B 18/06/18]	[25/06/18]	[27/06/18]	[26/08/18]	40	ICW	100%				[19/09/17]	[Dec 18 - Mar 19]
13	R-DEFCY-ACCP	Applied Cyber Concepts Project	[ ]	18	0	20	N	[05/03/18]	[N/a]	[N/a]	[15/04/18]	50	ICW	100%				[17/07/18]	[Mar – July 19]
14	R-DEFCY-DISS	Dissertation	[ ]	24	0	80	N	[A 29/09/17]	[N/a]	[N/a]	[N/a]	50	Thesis	100%				[28/09/18]	[Examiners Discretion
								[B 31/01/18]	[N/a]	[N/a]	[N/a]	50	Thesis	100%				[31/01/19]	
								[C 30/03/18]	[N/a]	[N/a]	[N/a]	50	Thesis	100%				[29/03/19]	
								[D 31/07/19]	[N/a]	[N/a]	[N/a]	50	Thesis	100%				[31/07/19]	]

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:
The Course uses a range of assessment types. Depending on the number and type of modules taken students can expect assessment by submitted work and elements of assessment by presentation or viva. Some of this assessed work will be completed in groups. For each module students will be invited to undertake one or more pieces of coursework which collectively will form a portfolio of work to be assessed. This approach has been adopted in order to present students with a variety of realistic problems that need to be solved using a variety of approaches which provide opportunities to demonstrate their ability to apply skills and knowledge developed on the course, many of which relate to situations that might be found in the workplace. To obtain an MSc, students must complete a dissertation, demonstrating their ability to apply the skills and knowledge gained on the course to a real world problem.

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

Assessment and ILO Mapping

A. Postgraduate Certificate

Award ILOs / Module	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10
						CDIA Only		CSOps Only		
SSM										
FMC	ICW			ICW						
UR		ICW								
CATO		ICW	ICW							
ST			ICW		ICW					
DLSD	ICW									
IM	ICW		ICW		ICW					
CNPC						ICW				
THD							ICW			
CIMO								ICW	ICW	ICW

13

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	ILO16	ILO 17 (CSOps Only)	ILO 18 (CDIA only
DLDS		ICW GCW						
IM					ICW GPRAC			
CIMO							ICW	
CSTP	ICW	ICW	ICW		ICW GPRES			
RMM	ICW	ICW	ICW	ICW	ICW	ICW		
ACCP			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	ILO 22
DISS	ICW	ICW	ICW	ICW

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality

Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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

The course aims to ensure that graduates are better prepared to tackle the current and emerging demands of 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.

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:	11/09/2017

1. What is the course?

Course information

Course Title	Defence Leadership
Course code	MSDLSPTR – PDDLSPTR – PCDLSPTR - SPDLSPTR
Academic Year	2017/18
Valid entry routes	PgCert, PgDip, MSc
Additional exit routes	PgCert, PgDip,
Mode of delivery	Part-time
Location(s)[1] of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Leadership and Management
Centre	Centre for Leadership and Management
Course Director	Dr Bryan Watters
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	Yes
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)	5 Years, MSc, 4 Years PG Dip, 3 Years PG Cert

---

[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

available	
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 Institute of Leadership and Management, the cost of which will be borne by Cranfield University. This membership lasts for 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 Diploma in Leadership and Management and become eligible to apply for ILM membership at the level of Fellow. Students exiting on completing the Postgraduate Certificate would be eligible for ILM Level 7 Award in Leadership and Management.

2. What are the aims of the course?

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

3

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

4. How is the course taught?

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

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

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

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

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

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

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

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 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

---

[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%).

award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);

  o 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);

  o 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[5]

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[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[8] - 40% or 50%	Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Type of Assessment	Weighting within module9 (%) of Independent assessments	Weighting within module of multi-part assessments[10] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
1	R-DL-IS	Introduction Introductory Studies & Critical thinking		20		10	N	[07/01/18]	[07/01/18]	[09/01/18]	50	ICW	100				[26/02/18]	Next Assessment Opportunity
2	R-DL-LSCM	Leadership Studies - Classical & Modern		20	2	10	N	[10/01/18]	[10/01/18]	[12/01/18]	50	ICW	100				[09/04/18]	Next Assessment Opportunity

---

[5] Please see Senate Handbook for Setting Up a New Taught Course for guidance on completing this table

[6] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

[7] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

[8] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%. This will be at the Board of Examiners discretion.

[9] For **independent assessments** please record type and weighting of each separate piece of assessment individually.

[10] For **multi-part assessments** please record the overall weighting of module which should be 100%.

[11] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate). If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.

[12] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

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

Module Number	Module code	Title	Module Leader	Contact hours[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[8] - 40% or 50%	Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Type of Assessment	Weighting within module9 (%) of Independent assessments	Weighting within module of multi-part assessments[10] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
3	R-DL-SMD	Strategic Management in Defence		20	2	10	N	[13/05/18]	[13/05/18]	[15/05/18]	50	ICW	100				[02/07/18]	[Next Assessment Opportunity]
4	R-DL-PL Occ B	The Psychology of Leadership		20	0	10	N	[16/05/18]	[16/05/18]	[18/05/18]	50	ICW	100				[13/08/18]	[Next Assessment Opportunity]
5	R-DL-DSOB	Defence Sector & Organisational Behaviour		20	0	10	N	[21/10/18]	[21/10/18]	[23/10/18]	50	ICW	100				[10/12/18]	[Next Assessment Opportunity]
6	R-DL-PPM	Programme & Project Management		20	0	10	N	[24/10/18]	[24/10/18]	[26/10/18]	50	ICW	100				[21/01/19]	[Next Assessment Opportunity]
7	R-DL-LCI	Leading Change and Innovation		20	2	10	N	[04/02/18]	[04/02/18]	[06/02/18]	40	ICW	100				[26/03/18]	[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	Module Leader	Contact hours[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[8] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module9 (%) of Independent assessments	Weighting within module of multi-part assessments[10](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
8	R-DL-NSRC	National Security: Resilience and Crisis		20	4	10	N	[07/02/18]	[07/02/18]	[09/02/18]	40	ICW	100				[08/05/18]	Next Assessment Opportunity
9	R-DL-GSCC	Global Security: Culture and Complexity		20	1	10	N	[20/05/18]	[20/05/18]	[22/05/18]	40	ICW	100				[09/07/18]	Next Assessment Opportunity
10	R-DL-GSEC	Global Security: Emerging Challenges		20	0	10	N	[23/05/18]	[23/05/18]	[25/05/18]	40	ICW	100				[20/08/18]	Next Assessment Opportunity
11	R-DL-LDD	Leadership Development in Defence		20	12	10	N	[18/11/18]	[18/11/18]	[20/11/18]	40	ICW	100				[14/01/19]	Next Assessment Opportunity
12	R-DL-CDLS	Contemporary Defence Leadership Studies		20	6	10	N	[21/11/18]	[21/11/18]	[23/11/18]	40	ICW	100				[25/02/19]	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

10

Module Number	Module code	Title	Module Leader	Contact hours[6]	Total hours delivered by Visiting Lecturers[7]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[8] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module9 (%) of Independent assessments	Weighting within module of multi-part assessments[10] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[11]	Assessment Submission and/or exam date[12]	Assessment / Exam Retake date
13	R-DL-RM	Research Methods		20	0	10	N	[21/01/18]	[21/01/18]	[26/01/18]	50	ICW	100				[09/02/18]	[]
14	R-DL-DISS	Dissertation		30	0	70	N	[26/01/18]	[N/A]	[N/A]	50	THESIS	100				[30/01/19]	[]

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

Defence Leadership COURSE SPECIFICATION
QA&E USE ONLY: Version 4.2 October 2017   Course / SAS Version:

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
N/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

12

B. Postgraduate Diploma in Defence Leadership

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

Module No. \ Award ILOs	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:

Module No. \ Award ILOs	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.

13

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

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

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the 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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to

14

ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

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

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: MSc in Design of Rotating Machines

Date of first publication/latest revision: 09/03/17

---

1. **What is the course?**

   Course information

Course Title	Design of Rotating Machines
Course code	MSDRMFTC, MSDRMPTC, PDDRMFTC, PDDRMPTC, PCDRMFTC, PCDRMPTC
Academic Year	2017/18
Valid entry routes	MSc
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Energy & Power
Centre	Centre for Power Engineering
Programme Director Course Director	Dr Gill Drew Dr Joao Amaral Teixeira
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
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

---

[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

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 accredited by the Institution of Mechanical Engineers (IMechE) until 2019 and is currently going through the accreditation procedure for the Royal Aeronautical Society *(*RAeS)*.

2. What are the aims of the course?

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

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

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

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

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

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

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

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

This programme is intended for the following range of students:

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

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

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

PgCert in Design of Rotating Machines

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

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

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

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

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

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

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

PgDip in Design of Rotating Machines

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

ILO 5.　Apply effectively mechanical transmission techniques and theories in support of the selection, design and evaluation of a range of technically significant gearing equipment.

ILO 6.　Apply and critically evaluate key technical management principles, including project management, people management, technology marketing, product development and finance.

ILO 7.　 Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

MSc in Design of Rotating Machines

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

ILO 8.　Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought

ILO 9.　To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences

4.　How is the course taught?

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

4

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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

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

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

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

Description	Credits
COMPULSORY MODULES:	
N-DRM-BD Bearing Design	10
N-DRM-GD Gear Design	10
N-DRM-RD Rotor Dynamics	10
G-MTI Management for Technology	10
N-AME-SI Structural Integrity	10
N-DRM-RESS Rotating Equipment Systems and Selection	10
N-DRM-VDM Vibration and Diagnostics of Rotating Machines	10
N-AME-ESA Engineering Stress Analysis: Theory and Simulations	10
N-DRM-SARMC Stress Analysis of Rotating Machines	0
Group Project (Compulsory for full time students)*	40
ELECTIVE MODULES:	
*Dissertation in place of group project (for part time students)	40
TOTAL:	**120**

C. MSc

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

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

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

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

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

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

---

[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			Minimum Mark[7] - 40% or 50%	Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates		
												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-ENE-INWK Occ A	Induction	G Drew	24		0	Y		02/10/17	06/10/17	N/A	AO	N/A				N/A		
2	N-DRM-BD	Bearing Design	A Addali	40		10	N		16/10/17	27/10/17	40	EX	100				w/c 11/12/17	10-14/09/18	
3	N-DRM-	Rotating Equipment	J Amaral Teixeira	35		10	N		09/10/17	13/10/17	40	ICW	100				FR	July 18	

[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

Design of Rotating Machines COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version:

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
	RESS	Systems and Selection															11/11/17 PT 25/11/17	
4	N-DRM-GD	Gear Design	J Amaral Teixeira	30		10	N		30/10/17	03/11/17	40	ICW	100				FT 25/11/17 PT 9/12/17	July 18
5	N-DRM-SARMC	Stress Analysis of Rotating Machine Components	A Addali	30		0	N		15/01/18	19/01/18	N/A	AO	N/A					
6	N-DRM-RD	Rotor Dynamics	J Amaral Teixeira	50		10	N		13/11/17 & 04/12/17	17/11/17 & 08/12/17	40	EX	100				W/C 1/1/18	10-14/09/18 July 18
7	N-AME-ESA	Engineering Stress Analysis: Theory and Simulations	A Mehmanparast	32		10	Y		27/11/17	01/12/17	40	ICW	100				FT 2/1/18 PT 13/1/18	July 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	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
8	N-DRM-VDM	Vibration and Diagnostics of Rotating Machines	A Addali	40		10	N		22/01/18	26/01/18	40	EX	100				W/C 19/12/18	10-14/09/18
9	N-AME-SI	Structural Integrity	A Mehmanparast	38.5		10	Y		05/02/18	09/02/18 7	40	EX	100				W/C 19/2/18	10-14/09/18
10	G-MTI Occ A	Management for Technology	S Carver	50		10	Y		26/02/18	02/03/18	40 40	EX GCW	50 50				EX w/c 19/3/18 GCW FT 10/3/18 GCW PT 24/3/18	EX 10-14/09/18 GCW July 18
11	I-ENE-GRPP Occ A	Group Project	G Drew	20		40	Y		05/03/18	04/05/18	50	GPROJ ICW	80 20				01/05/18 11/05/18	
12	I-ENE-DISS Occ A	Dissertation (Part-Time option only)	G Drew	10		40	Y		02/10/17	29/09/18	50	IPROJ IPRES	80 20				28/09/18 28/09/18	

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

10

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			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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
13	I-ENE-THESIS Occ A	Energy Individual Research Project	G Drew	20		80	Y		07/05/18	07/09/18	50	OR THESIS	10 90				03/09/18 03/09/18	

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

11

Design of Rotating Machines COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version:

Please list all modules that are used by 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 • 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 • Safety Accident & Investigation • Design of Rotating Machines • REMS EngD
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 • REMS EngD
G-MTI	Management for Technology	School of Management	• Advanced Mechanical Engineering • REMS EngD • Design of Rotating

			Machines
			• Food Chain Systems
			• Offshore and Ocean Technology with Pipeline Engineering
			• Offshore Materials and Engineering
			• Offshore and Renewable Energy
			• Offshore Risk Management
			• Offshore and Ocean Technology with Subsea Engineering
			• Renewable Energy Engineering
			• Renewable Energy Technology
			• Flow Assurance for Oil and Gas Production
			• Energy Systems and Thermal Processes
			• Process Systems Engineering
			• Energy from Waste
			• Geothermal Engineering
			• Advanced Chemical Engineering

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.

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. PgCert

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

B. PgDip

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

Award ILOs / Module No.	ILO 7.	ILO 8.	ILO 9
4	ICW		
10		EX GCW	
11		GPROJ ICW	GPROJ ICW
12		IPROJ IPRES	IPROJ IPRES

C. MSc

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

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

14

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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:	12/4/17

1. What is the course?

Course information

Course Title	Design Strategy and Leadership
Course code	PCDSLFTC, PCDSLPTC, PDDSLFTC, PDDSLPTC, MNDSLFTC, MNDSLPTC
Academic Year	2017/18
Valid entry routes	MDes,PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield Campus
School(s)	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
Is this an AP Contract course?[2]	No
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

---

[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

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 accredited by the Chartered Society of Designers until 2022.

1. What are the aims of the course?

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

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   Apply state of the art design, strategy and leadership practices, techniques and tools

ILO2.   Critically evaluate leadership methodologies used to solve complex problems

ILO3   Demonstrate planning and application of innovative techniques to propose strategic business models for industrial competitive advantage

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

C. MDes in Design Strategy and Leadership

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

ILO 08   Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 09   To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

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

- Course delivery will be the responsibility of SWEE. 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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

A.   Postgraduate Certificate

4

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

Description	Credits
COMPULSORY MODULES:	
Induction Week	0
ELECTIVE MODULES:	
Any 6 of the following modules:	
Personal Leadership and Development	10
Consumer Trends	10
Managing Innovation and New Product Development	10
Creative Enterprise and Entrepreneurship	10
Design and Brand Management	10
Whole System Design	10
Strategic Management and Leadership	10
Project Management Introduction	10
TOTAL:	**60**

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

Description	Credits
COMPULSORY MODULES:	
Induction Week	0
Personal Leadership and Development	10
Consumer Trends	10
Managing Innovation and New Product Development	10
Creative Enterprise and Entrepreneurship	10
Design and Brand Management	10
Whole System Design	10
Strategic Management and Leadership	10
Project Management Introduction	10
Group Project (Full-time students)	40
ELECTIVE MODULES:	
Part Time Students:	
Group Project	40
OR	
Dissertation	40
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

5

COMPULSORY MODULES:	
Induction Week	0
Personal Leadership and Development	10
Consumer Trends	10
Managing Innovation and New Product Development	10
Creative Enterprise and Entrepreneurship	10
Design and Brand Management	10
Whole System Design	10
Strategic Management and Leadership	10
Project Management Introduction	10
Group Project (Full-time students)	40
Individual Thesis Project	80
ELECTIVE MODULES:	
Part Time Students: Group Project OR	40
Dissertation	40
TOTAL:	**200**

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

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[3][4]
- **For Taught Assessments,** the minimum mark for each individual taught assessment on the first attempt for the significant majority of the taught assessments, noting that:
  - if you fail to attain the minimum mark for **up to 30 learning credits**, you will be permitted to re-take all of those assessments (except for circumstances where a resit award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);

---

[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%).

6

- 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 <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>

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

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) between years one and two.
- 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.

7

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[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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-DES-INWK	Induction	M Moreno	30		0	Y		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	I-DSL-A1010	Personal Leadership & Development	A Encinas-Oropesa	35		10	N		09/10/17	13/10/17	40	ICW	100				FT 21/10/17 PT 04/11/17	June 18
3	I-DSL-A1021	Consumer Trends	F Charnley	30		10	Y		23/10/17	27/10/17	40		100	100	GPRES GPRES	25 75	FT 11/11/17	June 18

---

[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

Design Strategy and Leadership COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017

Course / SAS Version:1.0

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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
																	PT 25/11/17	
4	I-ICI-A1020	Managing Innovation & New Product Development	C Savory	35		10	Y		30/10/17	03/11/17	40	GCW	100				FT 25/11/17 PT 09/12/17	June 18
5	I-ICI-A1009	Creative Enterprise & Entrepreneurship	M Van Der Kamp	30		10	Y		13/11/17	17/11/17	40			100	ICW GCW GPRES ICW	10 50 30 10	FT 09/12/17 PT 02/01/18	June 18
6	I-DFS-A1521	Design & Brand Management	M Collins	40		10	Y		27/11/17	01/12/17	40	ICW	100				FT 02/01/18 PT 13/01/18	June 18
7	I-DFS-A1028	Whole System Design	F Charnley	27		10	Y		11/12/17	15/12/17	40	ICW	100				FT 08/01/18 PT 20/01/18	June 18
8	I-DSL-A1011	Strategic Management and Leadership	P Reinmoeller	30		10	N		08/01/18	12/01/18	40	ICW	100				FT 20/01/18 PT 03/02/18	June 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 | Module Leader | Contact hours[5] | Total hours delivered by Visiting Lecturers[6] | Credits | Is the module shared? Y/N | Calendar | | | Minimum Mark[7] - 40% or 50% | Independent Assessment | | Multi-part Assessment | | | Submission dates | |
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		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
9	M-M/PMI	Project Management Introduction	J Algar	20		10	Y		29/01/18	02/02/18	40 40	EX	40	60	GCW GPRAC GPRES	10 30 20	W/B 19/02/18	July 18
10	I-DES-GRPP	Group Project For Full-Time Students	Supervisors	16		40	Y		19/02/18	07/05/18	50	GPR OJ ICW	80 20				01/05/18 07/05/18	
11	I-DES-DISS	Dissertation For Part-time Students	Supervisors	10		40	N		02/10/17	28/09/18	50	IPRO J IPRE S	80 20				28/09/18	
12	I-DES-THESIS	Individual Research Project	Supervisors	20		80	N		07/05/18	07/09/18	50	THES IS OR	90 10				03/09/18	Sept 19

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-DSL-A1021	Consumer Trends	Design Strategy and Leadership	Innovation & Creativity in Industry Digital Design and Strategic Communication
I-ICI-A1009	Creative Enterprise & Entrepreneurship	Innovation & Creativity in Industry/ SOM programme- Bettany Centre for Entrepreneurship	Design Strategy & Leadership Digital Design and Strategic Communication
I-DFS-A1521	Design and Brand Management	Design Strategy and Leadership	Innovation & Creativity in Industry Digital Design and Strategic Communication
I-ICI-A1020	Managing Innovation and New Product Development	Innovation & Creativity in Industry/ SOM programme- Centre for Innovative Products and Services	Design Strategy & Leadership Digital Design and Strategic Communication Global Product Development and Management Manufacturing Technology and Management
M-M-PMI	Project Management Introduction	SOM MBA	Design Strategy & Leadership Innovation & Creativity in Industry Digital Design and Strategic Communication Logistics and Supply Chain Management Procurement and Supply Chain Management
I-DFS-A1028	Whole System Design	Design Strategy and Leadership	Cost Engineering Digital Design and Strategic Communication Innovation and Creativity in Industry Sustainable Manufacturing Systems EngD

7. How are the ILOs assessed?

11

The following assessment types are utilised:

The taught modules are assessed by in-module assessment (predominantly coursework, focussing on the application of design thinking and learning through practice). The group project is assessed by means of a written group report, a reflective exercise, individual contribution and an oral presentation. The research project is assessed by a thesis and an oral examination.

This approach has been adopted because:

This assessment approach adopted is in accordance with the SWEE standard assessment model.

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
I-DSL-A1010	ICW	ICW	ICW			
I-DFS-A1021			GPRES		GPRES	GPRES
I-ICI-A1020	GCW	GCW		GCW		
I-ICI-A1009				GCW ICW GPRES	GCW ICW GPRES	GCW ICW GPRES
I-DFS-A1521		ICW		ICW		ICW
I-DSL-A1028	ICW	ICW	ICW			
I-DSL-A1011	ICW		ICW		ICW	
M-M/PMI	GCW GPRAC GPRES				EX	GCW GPRAC GPRES

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.	ILO7
I-DES-GRPP	GPROJ ICW
I-DES-DISS	IPROJ IPRES

12

C. MSc

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

Award ILOs Module No.	ILO8	ILO9
I-DES-THESIS	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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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

The C4D centre is funded by HEFCE 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.

15

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: Digital Design and Strategic Communication

Date of first publication/latest revision: 11/04/17

1. What is the course?

Course information

Course Title	Digital Design and Strategic Communication
Course code	MNDDSFTC, MNDDSPTC, PCDDSFTC, PCDDSPTC, PDDDSFTC, PDDDSPTC
Academic Year	2017/18
Valid entry routes	MDes,PgDip,PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time and Part-time
Location(s)[1] of Study	Cranfield Campus
School(s)	School of Water, Energy and Environment (SWEE)
Theme	Water
Centre	C4D
Course Director	Dr Mariale Moreno
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
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)	TBC
Registration Period(s)	Full-time (1-year) & Part-time (3-years)

---

[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

available	
Course Start Month(s)	Full time- Oct 2017, Part time- Anytime

Institutions delivering the course

This course is delivered by School of Water Energy and Environment, Water Theme, Centre for Creative Competitive Design (C4D) where the research interests include:
Digital Design, Strategic Communication, Circular Economy, Strategic Creativity and Breakthrough Innovation

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

The Course is proposed to run in C4D/SWEE but is linked to SATM/SoM module lecturers

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course will be accredited by the Chartered Society of Designers in the future once the course has run for one full year.

2. What are the aims of the course?

The aim of the Digital Design and Strategic Communications M-level course is to provide students with the experience to develop and use a wide knowledge-base of digital design management tools and mobile information platforms. The course will also prepare students with the knowledge to make confident business and leadership decisions to propose exciting product and service system solutions. 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:

Students with a career route towards product, service systems, management and leadership, innovation and digital communications

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.   Critically assess and select tools for data capture and interpretation.
ILO 2.   Apply design thinking to the generation of compelling data visualisations
ILO 3.   Evaluate the effectiveness of visual and human-centered design approaches to influence business decisions

B. Postgraduate Diploma

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

ILO 4.   Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem

diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. **Masters of Design**

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

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

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

4. How is the course taught?

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

Learning modes of delivery will include: lectures, observations, consumer feedback data collection exercises, industry visits, critique, peer to peer discussion and debate, team and independent studies

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

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

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

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

Description	Credits
COMPULSORY MODULES:	
Induction Week	0
ELECTIVE MODULES:	
Any 6 modules from: User Experience Design and Communication Consumer Trends Managing Innovation and New Product Development Creative Enterprise and Entrepreneurship Design and Brand Management Whole System Design Managing and Visualising Data Project Management Introduction	10 10 10 10 10 10 10 10
TOTAL:	60

3

B.   Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Induction Week	0
User Experience Design and Communication	10
Consumer Trends	10
Managing Innovation and New Product Development	10
Creative Enterprise and Entrepreneurship	10
Design and Brand Management	10
Whole System Design	10
Managing and Visualising Data	10
Project Management Introduction	10
Group Design Project (full time students)	40
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	40 40
TOTAL:	120

C.   MDes

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

Description	Credits
COMPULSORY MODULES:	
Induction Week	0
User Experience Design and Communication	10
Consumer Trends	10
Managing Innovation and New Product Development	10
Creative Enterprise and Entrepreneurship	10
Design and Brand Management	10
Whole System Design	10
Managing and Visualising Data	10
Project Management Introduction	10
Group Design Project or Dissertation (for part-time students)	40
Individual Research Project	80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	40 40
TOTAL:	200

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

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> 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 <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 **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 <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>

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 year and are expected to complete the course within 3 years.

---

[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 MDes. 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						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-DES-INWK	Induction Week	Dr Mariale Moreno	30	0	0	Y		02/10/17	06/10/17	N/A	AO	100				N/A	N/A
2	I-DSC-EDD	User Experience Design and Communication	Dr Mariale Moreno	60	12	10	N		09/10/17	13/10/17	40			100	IPRAC ICW IPROJ	50 25 25	FT 21/10/17 PT 04/11/17	June 18
3	I-DSL-A1021	Consumer Trends	Dr Fiona Charnley	30		10	Y		23/10/17	27/10/17	40			100	GPRES GPRES	25 75	FT 11/11/17 PT 25/11/17	June 18

---

[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.

Digital Design and Strategic Communication COURSE SPECIFICATION
QA&E USE ONLY: Version 3.1 September 2017

Course / SAS Version:1.0

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
												Independent Assessment		Multi-part Assessment			Submission dates	
4	I-ICI-A1020	Managing Innovation & New Product Development	Dr Clive Savory	35		10	Y		30/10/17	03/11/17	40	GCW	100				FT 25/11/17 PT 09/12/17	June 18
5	I-ICI-A1009	Creative Enterprise & Entrepreneurship	Dr Oksana Koryak	30		10	Y		13/11/17	17/11/17	40			100	ICW ICW GPRES GCW	10 10 30 50	FT 09/12/17 PT 02/01/18	June 18
6	I-DFS-A1521	Design & Brand Management	Dr Leon Williams	40	10	10	Y		27/11/17	01/12/17	40	ICW	100				FT 02/01/18 PT 13/01/18	June 18
7	I-DFS-A1028	Whole System Design	Dr Fiona Charnley	27		10	Y		11/12/17	15/12/17	40	ICW	100				FT 08/01/18 PT 20/01/18	June 18
8	I-DSC-MVD	Managing and Visualising Data	Dr Mariale Moreno	54	12	10	N		08/01/18	12/01/18	40			100	IPRES IPROJ	50 50	FT 20/01/18 PT 03/02/18	June 18
9	M-M/PMI	Project Management Introduction	Mr John Algar	20		10	Y		29/01/18	02/02/18	40 40	EX	40	60	GCW GPRAC GPRES	10 30 20	W/B 19/02/18	July 18
10	I-DES-GRPP	Group Design Project (for Full-time Students)	Dr Matt Collins	16	N/A	40	Y		19/02/18	07/05/18	50	GPROJ ICW	80 20				01/05/18 07/05/18	
11	I-DES-DISS	Dissertation (for Part-time	Dr Mariale Moreno	10	N/A	40	Y		02/10/17	28/09/18	50	IPROJ IPRES	80 20				28/09/18	

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	Calendar 'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment Type of Assessment	Weighting within module[8] (%) of Independent assessments	Multi-part Assessment Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Submission dates Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
		Students)																
12	I-DES-THESIS	Individual Research Project	Dr Mariale Moreno	20	N/A	80	Y		07/05/18	07/09/18	50	THESIS OR	90 10				03/09/18	Sept 19

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-DSL-A1021	Consumer Trends	Design Strategy and Leadership	Digital Design and Strategic Communication Innovation and Creativity in Industry
I-ICI-A1009	Creative Enterprise and Entrepreneurship	Innovation and Creativity in Industry/ SOM programme- Bettany Centre for Entrepreneurship	Digital Design and Strategic Communication Design Strategy and Leadership
I-DFS-A1521	Design and Brand Management	Design Strategy and Leadership	Digital Design and Strategic Communication Innovation and Creativity in Industry
I-ICI-A1020	Managing Innovation and New Product Development	Innovation and Creativity in Industry/ SOM programme- Centre for Innovative Products and Services	Digital Design and Strategic Communication Design Strategy and Leadership Global Product Development and Management Manufacturing Technology and Management
M-M-PMI	Project Management Introduction	SOM MBA	Digital Design and Strategic Communication Design Strategy and Leadership Procurement and Supply Chain Management Logistics and Supply Chain Management Innovation and Creativity in Industry
I-DFS-A1028	Whole System Design	Design Strategy and Leadership	Sustainable Manufacturing Systems EngD Digital Design and Strategic Communication Innovation and Creativity in Industry Cost Engineering

7. How are the ILOs assessed?

The following assessment types are utilised:

The taught modules are assessed by in-module assessment (predominantly coursework, focussing on the application of design thinking and learning through practice). The group project is assessed by means of a written group report, a reflective exercise, individual contribution and an oral presentation. The research project is assessed by a thesis and an oral examination.

This approach has been adopted because:

This assessment approach adopted is in accordance with the SWEE standard assessment model.

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
I-DES-INWK	-	-	-
TBC (UEDC)	IPRAC ICW IPROJ		
I-DSL-A1021	GPRES GPRES	-	-
I-ICI-A1020	GCW	-	GCW
I-ICI-A1009	-	GCW ICW ICW GPRES	-
I-DFS-A1521	ICW	ICW	ICW
I-DFS-A1028	-	ICW	-
TBC (MVD)	-	-	IPRES IPROJ
M-M/PMI	-	GCW EX GPRAC GPRES	GCW EX GPRAC GPRES

B. Postgraduate Diploma

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

Digital Design and Strategic Communication COURSE SPECIFICATION
QA&E USE ONLY: Version 3.1 September 2017   Course / SAS Version:1.0

Award ILOs \ Module No.	ILO4
I-DES-GRPP	GPROJ ICW
I-DES-DISS	IPROJ IPRES

C. Masters of Design

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

Award ILOs \ Module No.	ILO5	ILO6
I-DES-THESIS	THESIS OR	THESIS OR

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

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

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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

Graduates from this course would be suitable for role opportunities, such as: Senior creative UX designer, digital data analyst, senior digital marketing, manager of digital insights, digital project manager, digital communication, corporate brand and communications, brand strategist, graphic designer.

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:	09/03/17

1. What is the course?

Course information

Course Title	Energy from Waste
Course code	MSEFWFTC, MSEFWPTC, PDEFWFTC, PDEFWPTC, PCEFWFTC, PCEFWPTC
Academic Year	2017/18
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy & Environment
Theme	Energy & Power
Centre	Centre for Bioenergy and Resource Management
Programme Director **Course Director**	Dr Gill Drew Dr Stuart Wagland
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Candidates must possess, or be expected to achieve, a 1st or 2nd class UK Honours degree in a relevant engineering or science-based discipline, or the international equivalent of these UK qualifications. Other relevant qualifications together with industrial experience may be considered.

---

[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

	If you are an international student you will need to provide evidence that you have achieved a satisfactory test result in an English qualification. The minimum standard expected from a number of accepted courses are as follows: IELTS - 6.5, TOEFL – 92, Pearson PTE Academic – 65, Cambridge English Scale – 180, Cambridge English: Advanced – C, Cambridge English: Proficiency - C
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc, PgDip and PgCert - one year Part-time MSc, PgDip and PgCert - up to three years
Course Start Month(s)	October

Institutions delivering the course

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

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

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

2. What are the aims of the course?

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

This programme is intended for the following range of students:

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

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

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

A. Postgraduate Certificate in Energy from Waste

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

ILO 1.   Demonstrate a systematic understanding of the main principles, terminology and key issues related to the management of urban and complementary wastes

ILO 2.   Critically evaluate the main options available in recovering energy from waste including mechanical methods of processing wastes to recover recyclable material and/or produce waste-derived fuels

ILO 3.   Develop a comprehensive understanding of the methods of characterising waste as a fuel and evaluate the renewable energy potential of waste-derived fuels

ILO 4.   Apply knowledge of the waste sector, policies and properties of waste materials to assess the operational challenges of EfW systems including the management of emissions and residues

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

ILO 6.   Critically evaluate and discuss the role of waste as a source of energy as part of an overall energy mix. Compare EfW with alternative sustainable/renewable energy technologies

ILO 7.   Effectively communicate work via oral and written presentations and reports.

B. Postgraduate Diploma in Energy from Waste

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

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

C. MSc in Energy from Waste

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

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

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

4. How is the course taught?

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

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

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

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

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

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

4

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

C.   MSc

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

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

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

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> 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 <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 **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 <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).

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.

---

[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 code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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-ENE-INWK	Induction	G Drew	24		0	Y		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	I-ERM-A2005	Environmental Risks: Hazard, Assessment and Management	S Jude	24.5		10	Y		09/10/17	13/10/17	40	ICW	100					July
3	I-WRM-CRM	Circular Waste Management:	R Villa	52		20	Y		23/10/17& 06/11/17	27/10/17& 10/11/17	40			100	ICW ICW	50 50		July

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

Energy from Waste COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 September 2017

Course / SAS Version:1.0

#	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	Calendar 'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment Type of Assessment	Weighting within module8 (%) of Independent assessments	Multi-part Assessment Weighting within module of multi-part assessments [9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Submission dates Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
		Recycle, Recover and Dispose																
4	N-BPE-EFB	Energy from Biomass and Waste: Thermochemical Processes	B Fernandez Fidalgo	30		10	Y		20/11/17	24/11/17	40	EX	100					10-14/09/18
5	I-EFW-EWO	Energy from Waste Operations	S Wagland	30		10	N		08/01/18	12/01/18	40	ICW	100					July
6	I-MES-A2031	Renewable Energy Technologies: Design case studies	S Wagland	22		10	Y		05/02/18	09/02/18	40			100	GPRES ICW	25 75		July
7	TBC	Pilot Plant Operations	S Wagland	40		10	Y		12/02/18	16/02/18	40	GCW ICW	50 50					July
8	G-MTI	Management for Technology	S Carver	50		10	Y		26/02/18	02/03/18	40	EX GCW	50 50					10-14/09/17 July
9	I-ENE-GRPP	Group Project	Supervisor	16		40	Y		05/03/18	04/05/18	50 50	GPROJ ICW	80 20				07/05/18 10/05/18	

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 code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[7] - 40% or 50%	Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		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-ENE-DISS	Dissertation (PT)	Supervisor	10		40	Y		02/10/17	29/09/18	50	IPROJ IPRES	80 20				29/09/18	
11	I-ENE-THESIS	Individual thesis project	Supervisor	20		80	Y		07/05/18	07/09/18	50 50	THESIS OR	90 10				03/09/18	

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 used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-ERM-A2005	Environmental Risks and Hazards	Environmental Engineering	• Environmental Engineering • Energy from Waste • REMS EngD
I-WRM-CRM	Circular Waste Management: Recycle, Recover and Dispose	Environmental Engineering	• Energy from Waste
N-BPE-EFB	Energy from Biomass: Thermochemical Processes	Advanced Chemical Engineering	• Energy from Waste • Renewable Energy Technology
	Pilot Plant Operations	Advanced Chemical Engineering	• Energy from Waste
I-MES-A2031	Renewable Energy Technologies: Design case studies	Energy from Waste	• Renewable Energy Technology
G-MTI	Management for Technology	School of Management	• Advanced Mechanical Engineering • REMS EngD • Design of Rotating Machines • Food Chain Systems • Offshore and Ocean Technology with Pipeline Engineering • Offshore Materials and Engineering • Offshore and Renewable Energy • Offshore Risk Management • Offshore and Ocean Technology with Subsea Engineering • Renewable Energy Engineering • Renewable Energy Technology • Flow Assurance for Oil and Gas Production • Energy Systems and Thermal Processes • Process Systems Engineering

				• Energy from Waste • Geothermal Engineering • Advanced Chemical Engineering

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.

Assessment and ILO Mapping

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

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

A. Postgraduate Certificate

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

B. Postgraduate Diploma

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

Award ILOs / Module No.	8

11

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

C. MSc

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

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

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

As part of the regular monitoring procedures for established collaborative partnerships, in addition to the Annual Reflective Review there is an Annual Operating Statement and a 5 year

review known as a Focused Review which looks at each partnership in depth. Occasional site inspection visits are also made.

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 Systems and Thermal Processes

Date of first publication/latest revision:	05/05/17

1. What is the course?

Course information

Course Title	Energy Systems and Thermal Processes
Course code	MSESPFTC, MSESPPTC, PDESPFTC, PDESPPTC, PCESPFTC, PCESPPTC (UK) MSECOFTC, MSESOPTC (Muscat)
Academic Year	2017/18
Valid entry routes	MSc, PgDip PgCert Muscat - MSc
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-Time, Part-Time
Location(s)[1] of Study	Cranfield and Muscat
School(s)	School of Water, Energy and Environment
Theme	Energy & Power
Centre	Centre for Oil and Gas Engineering
Course Director	Dr Ilai Sher
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark	Not Applicable

---

[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

1

Energy Systems and Thermal Processes COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017   Course / SAS Version:1.1

Statement(s)	
Registration Period(s) available	1 year Full-Time, 3 years Part-time
Course Start Month(s)	October at Cranfield September in Muscat

Institutions delivering the course

This course is delivered by the School of Water, Energy and Environment, Energy 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

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)

The MSc at Cranfield is currently accredited by the Institution of Mechanical Engineers (IMechE) until 2019.

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

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

A. Postgraduate Certificate in Energy Systems and Thermal Processes

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

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

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

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

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

B. Postgraduate Diploma in Energy Systems and Thermal Processes

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

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

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

C. MSc in Energy Systems and Thermal Processes

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

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

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

4. How is the course taught?

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

- A dedicated electronic 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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

A.   Postgraduate Certificate (PgCert)

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
ELECTIVE MODULES:	
A minimum of 4 modules from: Heat Transfer Industrial Heating Systems Power Generation Systems Thermal Systems Operation and Design Renewable Energy Technologies: Systems Management for Technology	10 10 10 10 10 10

Description	Credits
A maximum of 2 modules from: Computational Fluid Dynamics for Industrial Processes Advanced Control Systems Process Measurement Systems Advanced Optimisation of Process and Energy Systems Energy Production, Emissions Control, Carbon Capture and Transport	10 10 10 10 10
TOTAL:	**60**

B.   Postgraduate Diploma (PgDip)

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

Description	Credits
COMPULSORY MODULES:	
Induction 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
ELECTIVE MODULES:	

2 modules from:
   Computational Fluid Dynamics for Industrial Processes
   Advanced Control Systems
   Energy Production Emissions Control Carbon Capture and Transport Process Measurement Systems
   Advanced Optimisation of Process and Energy Systems
 	
Part Time Students:
Group Project
OR
Dissertation
	20 (10 credits for each module)
	
	40
	
	40

TOTAL:	**120**

C.   MSc (at Cranfield)

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

Description	Credits
COMPULSORY MODULES:	

Description	Credits
Induction	0
Heat Transfer	10
Industrial Heating Systems	10
Power Generation Systems	10
Thermal Systems Operation and Design	10
Renewable Energy Technologies: Systems	10
Management for Technology	10
Group Project	40
Individual research project	80
ELECTIVE MODULES:	

2 modules from:
    Computational Fluid Dynamics for Industrial Processes
    Advanced Control Systems
    Energy Production Emissions Control Carbon Capture and
    Transport Process Measurement Systems
    Advanced Optimisation of Process and Energy Systems
	20 (10 credits for each module)

Part Time Students: Group Project OR Dissertation	40 40
TOTAL:	200

D MSc (in Muscat)

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

Description	Credits
COMPULSORY MODULES	
Induction	0
Heat Transfer	10
Power Generation Systems	10
Computational Fluid Dynamics for Industrial Processes	10
Industrial Heating Systems	10
Thermal Systems Operation and Design	10
Process Measurement Systems	10
Management for Technology	10
Renewable Energy Technologies: Systems	10
Group project (Compulsory for full time students)	40
Thesis	80
ELECTIVE MODULES	
Part Time Students: Group Project OR Dissertation	40 40
TOTAL	**200**

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

Pass Criteria

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> 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 <u>on the first attempt</u> for the significant majority of the taught assessments, noting that:
  - o 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);
  - o 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);
  - o 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>

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

This course is also offered on a part-time basis. Students would instead attend the required modules of the taught component according to the schedule agreed with the course director. 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.

---

[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 in Cranfield.** Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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-ENE-INWK Occ A	Induction	G Drew	24		0	Y		02/10/17	06/10/17		AO					N/A	
2	N-PSE-HT Occ A	PSE15 Heat Transfer	I Sher	30		10	Y		16/10/17	20/10/17	40	EX	100				11-15/12/17	10-14/09/18
4	N-PSE-IHS	PSE18 Industrial Heating Systems	I Sher	30		10	N		30/10/17	03/11/17	40			100	EX EX	50 50	3-5/1/18	10-14/09/18

---

[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			Minimum Mark[7] - 40% or 50%	Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		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
	Occ A																	
3	N-PSE-PGRES Occ A	PSE16 Power Generation Systems	G Di Lorenzo	30		10	Y		08/01/18	12/01/18	40	ICW	100				FT 27/1/18 PT 10/2/18	July 18
6	N-PSE-TSOD Occ A	PSE19 Thermal Systems Operation and Design	I Sher	30		10	Y		20/11/17	24/11/17	40			100	EX EX	50 50	2-5/1/18	10-14/09/18
7	N-PSE-CETIP Occ A	PSE17 Computational Fluid Dynamics for Industrial Processes	P Verdin	30		10	Y		04/12/17	08/12/17	40	ICW	100				FT 20/1/18 PT 3/2/18	July 18
5	N-PSE-ACS Occ A	PSE12 Advanced Control Systems	Y Cao	30		10	Y		06/11/17	10/11/17	40	ICW	100				FT 2/12/17 PT 16/12/17	July 18
8	I-MES-	PSE20	G Di Lorenzo	21		10	Y		29/01/18	02/02/18	40	ICW	100				FT 24/2/18	July 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

Energy Systems and Thermal Processes COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017

Course / SAS Version:1.1

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 Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment Type of Assessment	Weighting within module8 (%) of Independent assessments	Multi-part Assessment Weighting within module of multi-part assessments[9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Submission dates Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
	RETS Occ A	Renewable Energy Technologies: Systems															PT 10/3/18	
11	G-MTI Occ A	PSE02 Management for Technology	S Carver	50		10	Y		26/02/18	02/03/18	40 40	EX GCW	50 50				EX 19-23/3/18 FT 10/3/18 PT 24/3/18	10-14/09/18 July 18
10	N-PSE-PMS Occ A	PSE10 Process Measurement Systems	L Lao	30		10	Y		12/02/18	16/02/18	40	ICW	100				FT 24/2/18 PT 10/3/18	July 18
12	I-ENE-GRPP Occ A	Group Project	G Drew	16		40			05/03/18	04/05/18	50 50	GPROJ ICW	80 20				01/05/18 11/05/18	
13	I-ENE-DISS Occ A	Dissertation for part time students	G Drew	10		40			02/10/17	29/09/18	50	IPROJ IPRES	80 20				28/09/18	

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

Energy Systems and Thermal Processes COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017

Course / SAS Version:1.1

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
14	I-ENE-THESIS Occ A	Energy Individual Research Project (IRP)	G Drew	20		80			07/05/18	07/09/18	50 50	OR THESIS	10 90				03/09/18 03/09/18	
15	N-PSE-AOPES Occ A	Advanced Optimisation of Process and Energy Systems	Dr Giorgos Kopanos	30		10			05/02/18	09/02/18	40	ICW	100				FT 24/2/18 PT 10/3/18	July 18
16	I-MES-A2033 Occ A	Energy Production, Emissions Control, Carbon Capture and Transport	K. Patchigolla	30		10			15/01/18	19/01/18	40			100	ICW IPRES	50 50	ICW: FT 27/1/18 PT 10/2/18 IPRES: 19/1/18	July 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

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

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[14] - 40% or 50%	Assessment					Submission dates	
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment				
												Type of Assessment	Weighting within module[15] (%) of Independent assessments	Weighting within module of multi-part assessments[16] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
1	I-ENE-INWK Occ B	Induction	G Drew	24		0	Y		10/09/17	10/09/17		AO					N/A	
2	N-PSE-HT Occ B	PSE15 Heat Transfer	I Sher	30		10	Y		22/10/17	26/10/17	40	EX	100				11-14/12/17	10-14/09/18
4	N-PSE-IHS	PSE18 Industrial Heating	I Sher	30		10	n		03/12/17	07/12/17	40			100	EX EX	50 50	2-4/1/18	10-14/09/18

[12] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

[13] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

[14] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%. This will be at the Board of Examiners discretion.

[15] For **independent assessments** please record type and weighting of each separate piece of assessment individually.

[16] For **multi-part assessments** please record the overall weighting of module which should be 100%.

[17] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate). If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.

[18] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

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

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[14] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Type of Assessment	Weighting within module[15] (%) of Independent assessments	Weighting within module of multi-part assessments[16] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
	Occ B	Systems																
3	N-PSE-PGRES Occ B	PSE16 Power Generation Systems	G Di Lorenzo	30		10	Y		05/11/17	09/11/17	40	ICW	100				FT 16/11/17 PT 30/11/17	July 18
6	N-PSE-TSOD Occ B	PSE19 Thermal Systems Operation and Design	I Sher	30		10	Y		07/01/18	11/01/18	40			100	EX EX	50 50	20-23/2/18	10-14/09/18
7	N-PSE-CETIP Occ B	PSE17 Computational Fluid Dynamics for Industrial Processes	P Verdin	30		10	Y		19/11/17	23/11/17	40	ICW	100				FT 30/11/17 PT 14/12/17	July 18
8	I-MES-RETS Occ B	PSE20 Renewable Energy Technologies: Systems	G Di Lorenzo	21		10	Y		11/02/18	15/02/18	40	ICW	100				FT 22/02/18 PT 08/03/18	July 18
11	G-MTI Occ C	PSE02 Management for	S Carver	50		10	Y		04/02/18	08/02/18	40	EX	50				EX 20-	10-14/09/18

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

Energy Systems and Thermal Processes COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017

Course / SAS Version:1.1

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent assessments	Weighting within module of multi-part assessments[16] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
		Technology									40	GCW	50				23/3/18 GCW FT 15/02/18 PT 01/03/18	July
10	N-PSE-PMS Occ B	PSE10 Process Measurement Systems	L Lao	30		10	Y		21/01/18	25/01/18	40	ICW	100				FT 01/02/18 PT 15/02/18	July
12	I-ENE-GRPP Occ B	Group Project	G Drew	16		40			05/03/18	04/05/18	50 50	GPROJ ICW	80 20				01/05/18 11/05/18	
13	I-ENE-DISS Occ B	Dissertation for part time students	G Drew	10		40			02/10/17	29/09/18	50	IPROJ IPRES	80 20				28/09/18 28/09/18	
14	I-ENE-THESIS Occ B	Energy Individual Research Project (IRP)	G Drew	20		80			07/05/18	07/09/18	50 50	OR THESIS	10 90				03/09/18 03/09/18	

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

14

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
N-PSE-ACS	Advanced Control Systems	Process Systems Engineering	• Advanced Mechanical Engineering • Advanced Chemical Engineering • Flow Assurance for Oil and Gas Production • Energy Systems and Thermal Processes • Process Systems Engineering (Muscat) • Advanced Chemical Engineering General Route. • Renewable Energy Marine Structures EngD
N-PSE-CETIP	Computational Fluid Dynamics for Industrial Processes	Process Systems Engineering	• Flow Assurance for Oil and Gas Production • Energy Systems and Thermal Processes
N-PSE-PMS	Process Measurement Systems	Process Systems Engineering	• Flow Assurance for Oil and Gas Production • Process Systems Engineering (Muscat) • Atmospheric Emissions TechnologyEnergy Systems and Thermal Processes
N-PSE-TSOD	Thermal Systems Operation and Design	Process Systems Engineering	• Energy Systems and Thermal Processes • Advanced Chemical Engineering General Route
I-MES-RETS	Renewable Energy Technologies: Systems	Energy Systems and Thermal Processes	• Renewable Energy Technology
I-MES-A2033	Energy Production, Emissions Control, Carbon Capture and Transport	Energy Systems and Thermal Processes	• Renewable Energy Technology • Atmospheric Emission Technology • Cleantech Entrepreneurship
N-PSE-PGRES	Power Generation Systems	Energy Systems and Thermal Processes	• Advanced Mechanical Engineering • Advanced Chemical

			• Engineering General Route
			• Geothermal Engineering
N-PSE-AOPES	Advanced Optimisation of Process and Energy Systems	Process Systems Engineering	• Energy Systems and Thermal Processes
N-PSE-HT	Heat Transfer	Energy Systems and Thermal Processes	• Geothermal Engineering
G-MTI	Management for Technology	School of Management	• Advanced Mechanical Engineering • REMS EngD • Design of Rotating Machines • Food Chain Systems • Offshore and Ocean Technology with Pipeline Engineering • Offshore Materials and Engineering • Offshore and Renewable Energy • Offshore Risk Management • Offshore and Ocean Technology with Subsea Engineering • Renewable Energy Engineering • Renewable Energy Technology • Flow Assurance for Oil and Gas Production • Energy Systems and Thermal Processes • Process Systems Engineering • Energy from Waste • Geothermal Engineering • Advanced Chemical Engineering

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

16

- Help the students to improve their technical writing and oral presentation skills

Assessment and ILO Mapping

A. Postgraduate Certificate in Energy Systems and Thermal Processes

Award ILOs / Module No.	1	2	3	4
2	EX	EX	EX	
3	ICW	ICW	ICW	
4	EX	EX	EX	
5	ICW	ICW	ICW	
6	EX	EX	EX	EX
7	ICW	ICW	ICW	ICW
8	ICW	ICW	ICW	
10	ICW	ICW	ICW	ICW
15	ICW	ICW	ICW	ICW
16	ICW	ICW	ICW	

B. Postgraduate Diploma in Energy Systems and Thermal Processes

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

Award ILOs / Module No.	1	2	3	4	5	6
11					EX GCW	
12					GPROJ ICW	GPROJ ICW
13					IPROJ IPRES	IPROJ IPRES

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

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

Award ILOs / Module No.	7	8
14	THESIS OR	THESIS OR

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

Award ILOs / Module No.	1	2	3	4	5	6	7	8
2	EX	EX	EX					
3	ICW	ICW	ICW					
4	EX	EX	EX					
6	EX	EX	EX	EX				
7	ICW	ICW	ICW	ICW				
8	ICW	ICW	ICW					
10	ICW	ICW	ICW	ICW				
11					EX GCW			
12					GPROJ ICW	GPROJ ICW		
13					IPROJ IPRES	IPROJ IPRES		
14							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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to

ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

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

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	2017/18
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	Not Applicable
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield University
School(s)	School of Aerospace, Transport and Manufacturing
Theme	Manufacturing
Centre	Sustainable Manufacturing Systems Centre
Course Director	Professor Charalampos (Harris) Makatsoris
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	enter here
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)	Full-time MSc - one year, Part-time MSc - up to three years, Full-time

---

[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

1

Engineering and Management of Manufacturing Systems COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version: 1

available	PgDip - one year, Part-time PgDip - two years, Full-time PgCert - one year, Part-time PgCert - two years
Course Start Month(s)	Full-time: October and March. Part-time: throughout the year

Institutions delivering the course

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

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

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

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

2. What are the aims of the course?

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

Cranfield University offers this course in order to:

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

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

This programme is intended for the following range of students:

- Those wishing to work nationally or internationally with manufacturing companies that need to address manufacturing systems problems.
- Those wishing to work in manufacturing and operations management consultancy.
- Those wishing to work in the public/government sector on industry competitiveness and productivity issues.

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

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

A. **Postgraduate Certificate**

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

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

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

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

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

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

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

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

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

B. **Postgraduate Diploma**

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

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

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

C. **MSc**

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

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

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

4. How is the course taught?

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

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

4

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	80
Group Project for full-time students (10a) or Dissertation for part-time students (10b)	40
ELECTIVE MODULES:	
None	
RECOMMENDED MODULE:	

Engineering and Management of Manufacturing Systems COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version: 1

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	80
Group Project for full-time students (10a) or Dissertation for part-time students (10b)	40
Individual Research Project (11)	80
ELECTIVE MODULES:	
None	
RECOMMENDED MODULE:	
Induction	0
TOTAL:	200

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

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

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

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

---

[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%).

6

award capped at 50% would be insufficient to achieve an overall average mark of ≥50% across the taught assessments);

   o 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);
   o 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>

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[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
									Calendar			Independent Assessment		Multi-part Assessment			Submission dates	
1	I-MAN-INWK	Induction	Dr Konstantinos Salonitis	23		0	Y		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	I-MNU-A1034	Operations Management	Prof Charalampos (Harris) Makatsoris	32		10	Y		9/10/17	13/10/17	40	EX	100				wc 16/11/17	September 2018

---

[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	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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
3	I-MNU-A1031	Enterprise Systems	Dr Essam Shehab	32		10	Y		16/10/17	20/10/17	40	EX	100				wc 27/11/16	September 2018
4	I-MNU-A1029	Operations Analysis	Dr Konstantinos Salonitis	32	8	10	Y		30/10/17	03/11/17	40	EX	100				wc 11/12/17	September 2018
5	I-MNU-A1018	General Management	Dr Yuchun Xu	32		10	Y		13/11/17	17/11/17	40	EX	100				Wc 02/01/18	September 2018
6	I-MNU-A1027	Manufacturing Systems Engineering	Prof Charalampos (Harris) Makatsoris	32		10	Y		20/11/17	24/11/17	40	ICW	100				08/01/18	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	N		04/12/17	08/12/17	40	ICW	100				15/01/18	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		15/01/18	19/01/18	40	ICW	100				05/02/18	Re-assessment date to be set by agreement of Course Director

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	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
																		and Module Leader as/when required
9	I-MNU-A1019	Manufacturing Strategy	Dr Patrick McLaughlin	35		10	Y		22/01/18	26/01/18	40			100 MULTI	GPRES GCW ICW	30 50 20	2/02/18	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required
10a	I-MAT-GRPP	Group Project for Full Time Students	Dr David Ayre	20		40	Y		18/06/18	26/10/18	50			80 MULTI 20 MULTI	GPRES GPROJ ICW observed behaviour	16 64 10 10	w/c 26/10/18	
10b	I-MAT-DISS	Dissertation for Part Time Students	Dr Konstantinos Salonitis	20		40	Y		01/02/18	31/08/18	50	ICW	100				03/09/18	
11	I-MNU-THESIS	Individual Research Project	Dr Yuchun Xu	20		80	Y		30/04/18	07/09/18	50	THESIS OR	90 10				03/09/18	

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

March Intake

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent assessments	Weighting within module of multi-part assessments[16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
												Independent Assessment		**Multi-part Assessment**			**Submission dates**	
1	I-MAN-INWK	Induction	Dr Konstantinos Salonitis	22		0	Y		05/03/18	09/03/18	N/A	AO	N/A				N/A	
2	I-MNU-A1034	Operations Management	Prof Charalampos (Harris) Makatsoris	32		10	Y		12/03/18	16/03/18	40	EX	100				TBC (Mar 2018)	November 2017
3	I-MNU-A1031	Enterprise Systems	Dr Essam Shehab	32		10	Y		19/03/18	23/03/18	40	EX	100				TBC (April 2018)	December 2017

[12] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

[13] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

[14] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%. This will be at the Board of Examiners discretion.

[15] For **independent assessments** please record type and weighting of each separate piece of assessment individually.

[16] For **multi-part assessments** please record the overall weighting of module which should be 100%.

[17] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate). If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.

[18] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

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

Engineering and Management of Manufacturing Systems COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version: 1

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module15 (%) of Independent assessments	Weighting within module of multi-part assessments[16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
									Calendar				Independent Assessment	Multi-part Assessment			Submission dates	
4	I-MNU-A1029	Operations Analysis	Dr Konstantinos Salonitis	32	8	10	Y		09/04/18	13/04/18	40	EX	100				TBC (April 2018)	December 2017
5	I-MNU-A1018	General Management	Dr Yuchun Xu	32		10	Y		16/04/18	20/04/18	40	EX	100				TBC (May 2018)	January 2018
6	I-MNU-A1027	Manufacturing Systems Engineering	Prof Charalampos (Harris) Makatsoris	32		10	Y		30/04/18	04/05/18	40	ICW	100				01/06/18	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	N		14/05/18	18/05/18	40	ICW	100				27/07/18	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		21/05/18	25/05/18	40	ICW	100				27/07/18	Re-assessment date to be set by agreement of Course Director and Module

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

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers [13]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module15 (%) of Independent assessments	Weighting within module of multi-part assessments[16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
																		Leader as/when required.
9	I-MNU-A1019	Manufacturing Strategy	Dr Patrick McLaughlin	35		10	Y		04/06/18	08/06/18	40			100 MULTI	GPRES GCW ICW	30 50 20	15/06/18	Re-assessment date to be set by agreement of Course Director and Module Leader as/when required.
10a	I-MAT-GRPP	Group Project for Full Time Students	Dr David Ayre	20		40	Y		18/06/18	26/10/18	50			80 MULTI 20 MULTI	GPRES GPROJ ICW observed behaviour	16 64 10 10	w/c 26/10/18	
10b	I-MAT-DISS	Dissertation for Part Time Students	Dr Konstantinos Salonitis	20		40	Y		18/06/18	29/03/19	50	ICW	100				w/c 25/03/1	
11	I-MNU-THESIS	Individual Research Project	Dr Yuchun Xu	20		80	Y		29/10/18	29/03/19	50	THESIS OR	90 10				w/c 25/03/19	

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

Engineering and Management of Manufacturing Systems COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version: 1

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-MAN-INWK	Induction	Engineering and Management of Manufacturing Systems	Management and Information Systems, Knowledge Management for Innovation (not currently running), Aerospace Manufacturing, Global Product Development and Management, Cyber-Secure Manufacturing
I-MNU-A1034	Operations Management	Engineering and Management of Manufacturing Systems	Manufacturing Technology and Management, Global Product Development and Management, Management and Information Systems, Aerospace Manufacturing, Cyber-Secure Manufacturing
I-MNU-A1031	Enterprise Systems	Management and Information Systems	Management and Information Systems, Knowledge Management for Innovation (not currently running)
I-MNU-A1029	Operations Analysis	Engineering and Management of Manufacturing Systems	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, Knowledge Management for Innovation (not currently running)
I-MNU-A1027	Manufacturing Systems Engineering	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing, Cyber-Secure Manufacturing
I-MNU-A1038	Supply Chain Management	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing
I-MNU-A1019	Manufacturing Strategy	Engineering and Management of Manufacturing Systems	Aerospace Manufacturing
I-MAT-DISS	Dissertation for Part Time Students	Manufacturing Technology and Materials Programme	Advanced Materials, Aerospace Materials, Applied Nanotechnology, Manufacturing Technology and Management, Aerospace Manufacturing, Global Product Development and Management, Knowledge Management for Innovation (not

			currently running, Management and Information Systems, Cyber-Secure Manufacturing, Welding Engineering
I-MAT-GRPP	Group Project for Full Time Students	Manufacturing Technology and Materials Programme	Advanced Materials, Aerospace Materials, Applied Nanotechnology, Manufacturing Technology and Management, Management and Information Systems, Knowledge Management for Innovation (not currently running), Aerospace Manufacturing, Global Product Development and Management, Cyber-Secure Manufacturing, Welding Engineering
I-MNU-THESIS	Individual Research Project	Aerospace Manufacturing	Management and Information Systems, Knowledge Management for Innovation (not currently running) Global Product Development and Management, Cyber-Secure Manufacturing, Advanced Materials, Aerospace Materials, Applied Nanotechnology, Manufacturing Technology and Management, Welding Engineering

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							

15

Module No. \ Award ILOs	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.	ILO 7.	ILO.8
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		
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:

Module No. \ Award ILOs	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:

Module No. \ Award ILOs	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. **What opportunities are graduates likely to have on completing the course?**

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.

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 – July 2017

1. What is the course?

Course information

Course Title	Environmental Engineering
Course code	MSEENFTC, MSEENPTC, PDEENFTC, PDEENPTC, PCEENFTC, PCEENPTC
Academic Year	2017/18
Valid entry routes	MSc, PgDip, PgCert
Additional Exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield Campus
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Institute for Resilient Futures
Course Director	Dr Mark Pawlett
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
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)

---

[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 (October preferred, other times on case by case basis)

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

Cranfield University actively seeks sponsorship and support for individual thesis projects from water and resource sector employers to provide professional experience and development opportunities for students. Thesis sponsors and supporters include: Waste Resources Action Programme (WRAP), Viridor, Chartered Institution of Waste Management (CIWM), Environment Agency, Department for Environment, Food and Rural Affairs (Defra), Severn Trent Water, Anglian Water, Golder Associates, RSK, Arup, Mott MacDonald.

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 and the Institution of Agricultural Engineers (IAgrE) until 2021.

2. What are the aims of the course?

Cranfield University offers these courses in order to:

Cover the application of scientific and engineering principles for the protection and improvement of environmental quality alongside protecting and enhancing quality of human life at both local 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.   Describe the key processes operating in the natural environment and the general biological, physical and engineering principles that underpin relevant aspects of ecosystem function and natural environmental management.

ILO 2.   Critically evaluate the principal sources, risk and environmental impact of waste and pollution generation along with the importance of pollution control and the principles of sustainable energy and materials use.

ILO 3.   Critically evaluate sustainable environmental engineering concepts and principles in order to design practical environmental management solutions, taking into account social, environmental, technical, regulatory (including health and safety) and commercial constraints to a range of industrial and commercial contexts.

B. Postgraduate Diploma in Environmental Engineering

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

ILO 4.   Analyse sustainable environmental engineering solutions pertaining to environmental issues with the options of focusing on modelling or risk management.

ILO 5.   Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. MSc in Environmental Engineering

Environmental Engineering COURSE SPECIFICATION
QA&E USE ONLY: Version 4.1 September 2017   Course / SAS Version:

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

ILO 6.   Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought

ILO 7.   To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

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

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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

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

4

Description	Credits
COMPULSORY MODULES:	
Induction Week Environmental Risks: Hazard, Assessment and Management Circular Waste Management: Recycle, Recover, and Dispose Process Emissions and Control Soil Erosion Control for Catchment Management Pollution Prevention and Remediation Technologies	0 10 20 10 10 10
ELECTIVE MODULES:	
N/A	
TOTAL:	**60**

B.   Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Induction Week Environmental Risks: Hazard, Assessment and Management Circular Waste Management: Recycle, Recover, and Dispose Process Emissions and Control Soil Erosion Control for Catchment Management Pollution Prevention and Remediation Technologies Group Project (Full Time Students)	0 10 20 10 10 10 40
ELECTIVE MODULES:	
One of: Risk Management and Reliability Engineering Modelling Environmental Processes AND One of: Land Engineering and Water Management Evaluating Sustainability Through Life Cycle Approaches Part Time Students: Group Project OR Dissertation	 10 10 10 10 40 40
TOTAL:	**120**

C.   MSc

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

Description	Credits
COMPULSORY MODULES:	
Induction Week	0
Environmental Risks: Hazard, Assessment and Management	10
Circular Waste Management: Recycle, Recover, and Dispose	20
Process Emissions and Control	10
Soil Erosion Control for Catchment Management	10
Pollution Prevention and Remediation Technologies	10
Group Project (Full Time Students)	40
Individual Thesis Project	80
ELECTIVE MODULES:	
One of:	
Risk Management and Reliability Engineering	10
Modelling Environmental Processes	10
AND	
One of:	
Land Engineering and Water Management	10
Evaluating Sustainability Through Life Cycle Approaches	10
Part Time Students:	
Group Project	40
OR	
Dissertation	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 <u>not</u> have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[3] [4]

---

[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

- **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 **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 <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>

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.
Part time students would be strongly encouraged to join the course at the start of the new academic year to coincide with induction for full time students. If they however join in year then ad hoc induction sessions can be arranged as required.

---

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			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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-ENV-INWK	Induction	T Brewer	33		0	Y		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	I-ERM-A2005	Environmental Risks: Hazard, Assessment and Management	S Jude	24.5		10	Y		09/10/17	13/10/17	40	ICW	100				FT - 21/10/17 PT - 04/11/17	Week 9 - 4-8 June 2018

[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	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment Type of Assessment	Weighting within module8 (%) of Independent assessments	Weighting within module of multi-part assessments[9](100%)	Multi-part Assessment Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	I-WRM-CRM	Circular Waste Management: Recycle, Recover & Dispose	R Villa	52		20	Y		23/10/17 06/11/17	27/10/17 10/11/17	40			100	ICW ICW	50 50	FT - 04/11/2017 PT - 18/11/2017 FT - 18/11/2017 PT - 02/12/2017	Week 9 - 4-8 June 2018
4	I-WSC-A1095	Risk Management and Reliability Engineering	J MacAdam	30		10	Y		20/11/16	24/11/16	40			100	GCW ICW	70% 30%	FT/PT 16/12/17	Week 9 - 4-8 June 2018
5	I-EI-A1001	Modelling Environmental Processes	R Corstanje	26		10	Y		20/11/17	24/11/17	40			100	IPRES ICW	60% 40%	IPRES - FT/PT Week comm: 27/11/17 ICW - FT 02/12/17 PT 16/12/17	Week 9 - 4-8 June 2018
6	I-LAM-A1145	Land Engineering & Water	L Deeks	30		10	Y		04/12/17	08/12/17	40	ICW	100				F 16/12/17 P 06/01/18	Week 9 - 4-8 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

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			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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
		Management																
7	I-EDI-A1127	Evaluating Sustainability through life cycle approaches	P Goglio	30		10	Y		04/12/17	08/12/17	40	ICW	100				F 02/01/18 P 13/01/18	Week 9 - 4-8 June 2018
8	I-IWM-A1500	Process Emissions and Control	I Mead	25		10	Y		08/01/18	12/01/18	40	ICW	100				FT - 20/01/18 PT - 03/02/18	Week 9 - 4-8 June 2018
9	I-LAM-A1523	Soil Erosion Control: Principles and Practices (FT)	R Simmons	40		10	Y		22/01/18	26/01/18	40			100	GCW ICW	50% 50%	GCW & ICW 10/02/18	Week 9 - 4-8 June 2018
10	I-LAM-A1524	Soil Erosion Control: Principles and Practices (PT)	R Simmons	40		10	Y		22/01/18	26/01/18	40	ICW	100				24/02/2018	Week 9 - 4-8 June 2018
11	I-IWM-A1061	Pollution Prevention and Remediation	F Coulon	29		10	N		29/01/18	02/02/18	40	ICW	100				FT - 17/02/18 PT -	Week 9 - 4-8 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

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			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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
		Technologies															03/03/18	
12	I- ENV-GRPP	Group Project	Supervisors	16		40	Y		19/02/18	04/05/18	50	GPROJ ICW	80 20				GPROJ - 01/05/18 ICW - 05/05/18	
13	I-ENV-DISS	Dissertation (for part time students)	Supervisors	10		40	Y		02/10/17	28/09/18	50	IPROJ IPRES	80 20				28/09/18	
14	I-ENV-THESIS	Individual Research Project	Supervisors	20		80	Y		07/05/18	07/09/18	50	THESIS OR	90 10				03/09/18	

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 used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-WRM-CRM	Circular Waste Management: Recycle, Recover and Dispose	Environmental Engineering	• Energy from Waste
I-WSC-A1095	Risk Management and Reliability Engineering	Water and Wastewater Engineering	• Environmental Engineering • STREAM EngD
I-IWM-A1500	Process Emissions and Control	Atmospheric Emission Technology	• Environmental Engineering
I-LAM-A1145	Land Engineering & Water Management	Land Reclamation and Restoration	• Environmental Engineering
I-LAM-A1523	Soil Erosion Control: Principles and Practices (Full Time Study)	Land Reclamation and Restoration	• Environmental Engineering
I-LAM-A1524	Soil Erosion Control: Principles and Practices (Part Time Study)	Land Reclamation and Restoration	• Environmental Engineering
I-EDI-A1127	Evaluating Sustainability Through Lift Cycle Approached	Environmental Management for Business	• Environmental Engineering • Advanced Chemical Engineering • Cleantech Entrepreneurship
I-EI-A1001	Modelling Environmental Processes	Environmental Water Management	• Environmental Engineering • Geographical Information Management
I-ERM-A2005	Environmental Risks: Hazard, Assessment, and Managment	Environmental Engineering	• Energy from Waste • REMS EngD

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

The overall assessment workload and type used for the course is balanced and appropriate; it covers well the ILOs set out for each module of the course and develops the type of skills required for the students for their future career

Assessment and ILO Mapping

A. Postgraduate Certificate in Environmental Engineering

Award ILOs / Module No.	ILO1	IILO2	ILO3
I-ERM-A2005	ICW	ICW	ICW
I-WRM-CRM		ICW	ICW
I-IWM-A1500		ICW	ICW
I-LAM-A1523	GCW/ ICW	GCW/ ICW	GCW/ ICW
TBC (9)	ICW	ICW	ICW
I-IWM-A1061		ICW	ICW

B. Postgraduate Diploma in Environmental Engineering

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

Award ILOs / Module No.	ILO4	ILO5
I-WSC-A1095	GCW/ ICW	
I-EI-A1001	IPRES/ ICW	
I-LAM-A1145	ICW	
I-EDI-A1127	ICW	
I-ENV-GRPP	GPROJ ICW	GPROJ ICW
I-ENV-DISS	IPROJ	IPROJ/IPRES

C. Master of Science in Environmental Engineering

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

Award ILOs / Module No.	ILO6	ILO7
I-ENV-THESIS	THESIS OR	THESIS OR

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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 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:	August 2017

1. What is the course?

Course information

Course Title	Environmental Management for Business
Course code	MSEMBFTC, MSEMBPTC, PDEMDFTC, PDEMBPTC, PCEMBFTC, PCEMDPTC
Academic Year	2017/18
Valid entry routes	MSc, PgDip, PgCert
Additional Exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Cranfield Institute for Resilient Futures
Course Director	Dr David Parsons
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
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 |

---

[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

1

	qualification. The minimum standard expected from a number of accepted courses are as follows IELTS - 6.5, TOEFL – 92, Pearson PTE Academic – 65, Cambridge English Scale – 180, Cambridge English: Advanced – C, Cambridge English: Proficiency - C
UK Qualifications Framework Level	QAA FHEQ Level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc - one year, Part-time MSc - up to three years, Full-time PgCert - one year, Part-time PgCert - two years, Full-time PgDip - one year, Part-time PgDip - two years
Course Start Month(s)	Full-time: October Part-time: October

Institutions delivering the course

This course is delivered by Cranfield 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.   Critically analyse environmental issues and contribute to strategic and policy decision making processes in the private, public and NGO sectors at all levels

ILO 2.   Develop and implement feasible environmentally and socially responsible strategies and policies based on scientific evidence within the appropriate economic, legal and political frameworks

ILO 3.   Monitor and assess organisational practices and the outcomes of policies and strategies through the use of appropriate methods, such as environmental auditing

B. Postgraduate Diploma in Environmental Management for Business

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

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

C. MSc in Environmental Management for Business

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

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

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

4. How is the course taught?

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

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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

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

Description	Credits
COMPULSORY MODULES:	
Principles of Sustainability Environmental Valuation Financial and Economic Appraisal Environmental Policy and Risk Governance Technology, Environment and Society	10 10 10 10 10
ELECTIVE MODULES:	
Select one of the following: Risk Communications and Perception Environmental Econometrics Evaluating Sustainability Through Lifecycle Approaches Natural Resource Economics Strategic Foresight Environmental Management in Practice	10
TOTAL:	**60**

4

B.   Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Principles of Sustainability	10
Environmental Valuation	10
Financial and Economic Appraisal	10
Environmental Policy and Risk Governance	10
Technology, Environment and Society	10
Group Project (Full Time Students)	40
ELECTIVE MODULES:	
EITHER	
Risk Communications and Perception	10
OR	
Environmental Econometrics	10
EITHER	
Evaluating Sustainability Through Lifecycle Approaches	10
OR	
Natural Resource Economics	10
EITHER	
Strategic Foresight	10
OR	
Environmental Management in Practice	10
Part Time Students:	
Group Project	40
OR	
Dissertation	40
TOTAL:	**120**

C.   MSc

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

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Principles of Sustainability	10
Environmental Valuation	10
Financial and Economic Appraisal	10

Environmental Policy and Risk Governance	10
Technology, Environment and Society	10
	40
Group Project (Full Time Students)	
	80
Thesis	
ELECTIVE MODULES:	
EITHER	10
Risk Communications and Perception	
OR	
Environmental Econometrics	
EITHER	10
Evaluating Sustainability Through Lifecycle Approaches	
OR	
Natural Resource Economics	
EITHER	10
Strategic Foresight	
OR	
Environmental Management in Practice	
Part Time Students:	40
Group Project	
OR	40
Dissertation	
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);[3] [4]

---

[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

- **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:
  - o 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);
  - o 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);
  - o 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>

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.

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.

											Calendar			Assessment						
															Independent Assessment		Multi-part Assessment			Submission dates	
Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	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-ENV-INWK	Induction	T Brewer	33		0	Y		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	P Burgess	26		10	Y		09/10/17	13/10/17	40	ICW	100				F 21/10/17 P 04/11/17	Week 9 - 4-8 June 2018
3	I-EEM-A1184	Environmental Valuation	N Ozkan	27		10	Y		23/10/17	27/10/17	40	ICW	100				F 11/11/17 P 25/11/17	Week 9 - 4-8 June 2018

[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	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
												Independent Assessment		Multi-part Assessment			Submission dates	
4	I-ERM-A2014	Risk Communication and Perception	D Parsons	25		10	N		06/11/17	10/11/17	40			100	ICW GPRAC	70% 30%	ICW: F 18/11/17 P 02/12/17 GPRAC: F & P 10/11/17	Week 9 - 4-8 June 2018
5	I-EEM-A1185	Environmental Econometrics	M Rivas-Casado	21		10	N		06/11/17	10/11/17	40			100	ICW GPRES	80% 20%	ICW: F 18/11/17 P 2/12/17 GPRES: FT/PT 10/11/17	Week 9 - 4-8 June 2018
6	I-EMB-FEA	Financial and Economic Appraisal	P Burgess	25		10	Y		20/11/17	24/11/17	40	ICW	100				F 2/12/17 P 16/12/17	Week 9 - 4-8 June 2018
7	I-EDI-A1127	Evaluating Sustainability through life cycle approaches	P Goglio	30		10	Y		04/12/17	08/12/17	40	ICW	100				F 02/01/18 P 13/01/18	Week 9 - 4-8 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

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	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
									Calendar			Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
8	I-EEM-A1186	Natural Resource Economics	A Graves	25		10	N		04/12/17	08/12/17	40	ICW	100				F 16/12/17 P 06/01/18	Week 9 - 4-8 June 2018
9	I-ERM-A2006	Environmental Policy and Risk Governance	S Jude	30		10	N		08/01/18	12/01/18	40	ICW	100				F 20/1/18 P 03/2/18	Week 9 - 4-8 June 2018
10	I-EMB-A1128	Technology, Environment and Society	P Longhurst	25		10	Y		22/01/18	26/01/18	40	ICW	100				F 3/2/18 P 17/2/18	Week 9 - 4-8 June 2018
11	I-EMB-A1005	Strategic Foresight	F Lickorish	30		10	Y		05/02/18	09/02/18	40	ICW	100				F 17/02/18 P 03/03/18	Week 9 - 4-8 June 2018
12	I-EMB-EMP	Environmental Management in Practice	G Drew	20		10	N		05/02/18	09/02/18	40	ICW	100				F 17/2/18 P 03/03/18	
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			Minimum Mark[7] - 40% or 50%	Assessment							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates		
												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
13	I-ENV-GRPP	Group Project	Supervisors	16		40	Y		19/02/18	04/05/18	50	GPROJ ICW	80 20				GPROJ 1/05/18 ICW 5/05/18	
14	I-ENV-DISS	Dissertation (part time students)	Supervisors	10		40	Y		02/10/17	28/09/18	50	IPROJ IPRES	80 20				28/09/2018	
15	I-ENV-THESIS	Individual Research Project	Supervisors	20		80	Y		07/05/18	07/09/18	50	THESIS OR	90 10				3/9/18	

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 used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-EEM-A1184	Environmental Valuation	Environmental Management for Business	• Renewable Energy Technology
I-EDI-A1127	Evaluating Sustainability through Life Cycle Approaches	Environmental Management for Business	• Advanced Chemical Engineering - Biorefining route • Environmental Engineering • Cleantech Entrepreneurship
I-EMB-FEA	Financial and Economic Appraisal	Environmental Management for Business	• Future Food Sustainability
I-EMB-A1122	Principles of Sustainability	Environmental Management for Business	• Future Food Sustainability • Land Reclamation and Restoration • Renewable Energy Technology • REMS EngD
I-EMB-A1128	Technology, Environment and Society	Environmental Management for Business	• REMS EngD
I-EMB-A1005	Strategic Foresight	Environmental Management for Business	• Future Food 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.

Assessment and ILO Mapping

Postgraduate Certificate

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3
2	ICW		
3	ICW		
4		ICW GPRAC	ICW GPRAC
5	ICW GPRES		
6	ICW	ICW	
7	ICW		ICW
8	ICW		ICW
9	ICW	ICW	ICW
10		ICW	
11	ICW	ICW	
12			ICW

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 4
13	GPROJ ICW
14	IPROJ IPRES

MSc

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

Award ILOs / Module No.	ILO5	ILO 6
15	THESIS/OR	THESIS/OR

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

13

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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 Water Management

Date of first publication/latest revision: 10/04/17

---

1. **What is the course?**

Course information

Course Title	Environmental Water Management
Course code	MSEWGFTC, MSEWGPTC, PDEWGFTC, PDEWGPTC, PCEWGFTC, PCEWGPTC
Academic Year	2017/18
Valid entry routes	MSc, PgDip, PgCert,
Additional Exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield Campus
School(s)	School of Water, Energy and Environment
Theme	Water
Centre	Cranfield Water Sciences Institute
Course Director	Dr Robert Grabowski
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
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.

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
- Canal and River Trust
- Atkins
- Anglian Water
- RSPB, Regional Wildlife Trusts

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 2021.

2

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

ILO 2.   Interpret and critically evaluate the quality of research and data, and determine relevance for application in relation to solving academic and practical problems

ILO 3.   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 4.   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 5.   Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

3

C. MSc in Environmental Water Management

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

ILO 6.   Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 7.   To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

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

- 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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
ELECTIVE MODULES:	
Any six of the following modules: Surface and Groundwater Hyrdrology Catchment Water Quality Aquatic Ecosystems Modelling Environmental Processes Drought and Water Scarcity	 10 10 10 10 10

4

Description	Credits
Flood Risk Management	10
Water in Cities	10
Integrated River Basin Management	10
TOTAL:	**60**

B.   Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
Surface and Groundwater Hyrdrology	10
Catchment Water Quality	10
Aquatic Ecosystems	10
Modelling Environmental Processes	10
Drought and Water Scarcity	10
Flood Risk Management	10
Water in Cities	10
Integrated River Basin Management	10
Group Project (Full-time students)	40
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	40 40
TOTAL:	**120**

C.   MSc

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

Description	Credits
COMPULSORY MODULES:	
Induction	0
Surface and Groundwater Hyrdrology	10
Catchment Water Quality	10
Aquatic Ecosystems	10
Modelling Environmental Processes	10
Drought and Water Scarcity	10
Flood Risk Management	10
Water in Cities	10
Integrated River Basin Management	10
Group Project (Full-time students)	40
Thesis Project	80
ELECTIVE MODULES:	

Part Time Students: Group Project OR Dissertation	40 40
TOTAL:	**200**

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

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

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

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

6. How is the course structured?

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

---

[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%).

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.

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			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	I-WAM-A1163	Surface and Groundwater Hydrology	I Holman	27		10	Y		09/10/17	13/10/17	40	EX	100				w/c 02/01/18	Sept 18
3	I-WAM-A1165	Catchment Water Quality	P Campo Moreno	27		10	N		23/10/17	27/10/17	40	ICW	100				FT 04/11/17 PT 18/11/17	June 18

---

[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	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
												Independent Assessment		Multi-part Assessment			Submission dates	
4	I-ILE-AEL	Aquatic Ecosystems	R Grabowski	30		10	N		06/11/17	10/11/17	40	ICW	100				FT 18/11/17 PT 02/12/17	June 18
5	I-EI-A1001	Modelling Environmental Processes	R Corstanje	26		10	Y		20/11/17	24/11/17	40			100	ICW IPRES	40 60	FT 02/12/17 PT 16/12/17 IPRES FT/ PT WN 27/11/17	June 18
6	I-WAM-DWS	Drought and Water Scarcity	J Knox	30		10	N		04/12/17	08/12/17	40	ICW	100				FT 16/12/17 PT 02/01/18	June 18
7	I-WAM-A1175	Flood Risk Management	T Hess	30		10	N		08/01/18	12/01/18	40	ICW	100				FT 20/01/18 PT 03/02/18	June 18
8	I-WAM-WC	Water in Cities	H Smith	30		10	Y	22/01/18	29/01/18	02/02/18	40	IPRES	100				FT/ PT 01/02/18	June 18
9	I-WAM-IRM	Integrated River Basin Management	R Grabowski	24		10	N	05/02/18	07/02/18	14/02/18	40	ICW	100				FT 17/02/18 PT 03/03/18	June 18
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

Environmental Water Management COURSE SPECIFICATION
QA&E USE ONLY: Version 2.3 June 2017

Course / SAS Version:1.0

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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		19/02/18	07/05/18	50	GPROJ ICW	80 20				01/05/18 08/05/18	
11	I-WAT-DISS	Individual Project (PT MSc and PgDip only)	Supervisors	10		40	Y		02/10/17	28/09/18	50	IPROJ IPRES	80 20				28/09/18	
12	I-WAT-THESIS	Individual Research Project	Supervisors	20		80	Y		07/05/18	08/09/18	50	THESIS OR	90 10				03/09/18	Sept 19

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	• Community Water and Sanitation	• Environmental Water Management
I-EI-A1001	Modelling Environmental Processes	• Environmental Water Management	• Environmental Engineering • Geographical Information Management
I-WAM-WC	Water in Cities	• Environmental Water Management	• Community Water and Sanitation

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

A. Postgraduate certificate

Award ILOs Module No.	ILO 1	ILO 2	ILO 3	ILO 4
I-WAM-A1163	EX			
I-WAM-A1165	ICW	ICW	ICW	

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4
I-ILE-AEL	ICW		ICW	
I-EI-A1001	ICW IPRES	ICW IPRES	ICW IPRES	
I-WAM-DWS	ICW	ICW	ICW	ICW
I-WAM-A1175	ICW		ICW	ICW
I-WAM-WC			IPRES	IPRES
I-WAM-IRM			ICW	ICW

B. Postgraduate Diploma

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

Award ILOs / Module No.	ILO 5
I-WAT-GRPP	GRPOJ IRPOJ
I-WAT-DISS	IRPOJ 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.	ILO6	ILO 7
I-WAT-THESIS	THESIS OR	THESIS OR

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

12

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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

<div style="border:1px solid">

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.

</div>

COURSE TITLE: MSc in Explosives Ordnance and Engineering

Date of first publication/latest revision: 13/6/17

1. What is the course?

Course information

Course Title	Explosives Ordnance and Engineering
Course code	MSEOEFTR, MSEOEPTR, PDEOEFTR, PDEOEPTR, PCEOEFTR, PCEOEPTR
Academic Year	2017-18
Valid entry routes	MSc, PgDip, PgCert
Additional Exit routes	PgDip, PgCert
Mode of delivery	Full-time and Part-time
Location(s)[1] of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Centre for Defence Chemistry
Course Director	Mrs T Temple
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	Yes
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

---

[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

1

	onto the EOE. IELTS score of 7.0 required by students for whom English is not a first language
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc, PgDip, PgCert – 1 year Part-time PgCert – 3 years, PgDip – 4 years and MSc 5 Years.
Course Start Month(s)	September (full-time/part-time)

Institutions delivering the course

This course is delivered by Cranfield Defence and Security where the research interests include explosive science and safety, energetic materials and synthesis, ordnance, chemical defence, fuels, environmental science, forensic and forensic computing, molecular modelling, high strain-rate physics, weapons and vehicle systems, aeromechanical systems, defence materials (armour), defence analysis

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

The award of EOE MSc meets the educational requirements for the Engineering Council UK's register of Chartered Engineers (CEng); the course is accredited with the Institution of Mechanical Engineers (IMechE) and the Institution of Engineering and Technology (IET)

The Institution of Engineering and Technology (IET) http://www.theiet.org/
The Institution of Mechanical Engineers (IMechE)   http://www.imeche.org/

To qualify for the IET students need to pass the project dissertation at first attempt.

2. What are the aims of the course?

To provide military officers, defence industry staff, government servants and civilian students with the advanced academic background necessary for them to contribute effectively to technically demanding projects in the field of explosives and explosives ordnance and engineering.

The course also aims to enable students to:

*   independently learn and to gain the ability to advance their knowledge and understanding in the topic of EOE and to develop academic and practical skills to a higher level
*   predict possible accident scenarios associated with a particular activity; to analyse critically the risks and to prioritise the risks with likely outcome balanced against probability of occurrence; to propose mitigating activities to reduce the risk and ensure a safe working environment.

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

This programme is intended for the following range of students:

*   Military UK and International, (Army, RN, RAF)

- Civil services

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

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

A. **Postgraduate Certificate 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:

- Technology School TS a facility, which presents defence technology-related educational material in an integrated approach, under one roof, using modern delivery methods in order to enhance defence technology education capabilities. The Defence Academy is the only educational establishment in the UK with the means to do this and is thus ideally placed to develop and champion higher level thinking. The TS has at its heart an integrated education system which enables students to access the full range of educational, experimentation and research material across all domains. To help achieve this it is equipped with a wealth of real (operational) military hardware including, for example, tanks, guns, armoured vehicles, rockets, ammunition and protective personal equipment. Teaching in this environment enables the students unprecedented hands-on learning, which cannot be achieved in a 'lecture-room-and-slides' environment.

- Poster generation and presentation: Here students are given a necessarily vague title for a topic and asked to produce an A0 size poster within three hours. The students work in groups of five and are given minimal instruction. Students must work in an unfamiliar area, where the only direction is from their initiative, teamwork and communication skills and computational search abilities. Students are then asked to criticise each other's posters with three positive points and three negative points. This is to help students acclimatise to the 'research environment', where there is no 'correct answer' and direction must be self-driven. This helps students capture and illustrate 'M-level descriptors' associated with a Master's 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

4

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. <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:	
Research Methodologies	5
Introduction to Explosives	5
Manufacture and Materials Properties of Explosives	10
Munitions & Target Response	20
Delivery Systems	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
Rocket Motors and Propellants	10
Introduction to Pyrotechnics	5
Advanced Pyrotechnics	5
Explosives and the Environment	5
Commercial Explosives	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	5
Introduction to Explosives	5
Future Developments: scanning the horizon in EOE	15
Manufacture and Materials Properties of Explosives	10
Munitions & Target Response	20
Delivery Systems	10
Gun Propellants	10
Transitions to Detonations	5
Testing and Evaluation of Explosives	5
Computer Modelling Tools in EOE	5
Introduction to Pyrotechnics	5
ELECTIVE MODULES (select 25 credits):	
Design for Munitions Safety	5
Risk, Assessment for Explosives	5
Rocket Motors and Propellants	10
Advanced Pyrotechnics	5
Explosives and the Environment	5
Commercial Explosives	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	5
Introduction to Explosives	5
Future Developments: scanning the horizon in EOE	15
Manufacture and Materials Properties of Explosives	10
Munitions & Target Response	20
Delivery Systems	10
Gun Propellants	10
Transitions to Detonations	5
Testing and Evaluation of Explosives	5
Computer Modelling Tools in EOE	5
Introduction to Pyrotechnics	5
Project	80
ELECTIVE MODULES: (select 25 credits)	
Design for Munitions Safety	5
Risk, Assessment for Explosives	5
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

7

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);[3] [4]

- **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:
  - o 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);
  - o 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);
  - o 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>

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, the following week is usually 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).

---

[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 MSc. Other awards associated with the course include some or all of these modules.

Module Number	Module code	Title	Module Leader	Contact hours[1]	Total hours delivered by Visiting Lecturers[2]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[3] - 40% or 50%	Assessment						
												Independent Assessment		Multi-part Assessment			Submission Dates	
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Type of Assessment	Weighting within module[4] (%) of independent assessments	Weighting within module of multi-part 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		62	0	0	N	[04/9/17]	[4/9/17]	[15/9/17]	N/A	AO	N/A				[N/A]	[ ]
2	R-EOS-RM1	Research Methodology		8	0	5	N	[2/10/17]	[2/10/17]	[2/10/17]	40	ICW	100				[13/11/17]	[12/2/18]
3	R-EOS-IE	Introduction to Explosives		30	0	5	N	[18/9/17]	[18/9/17]	[22/9/17]	50	EX	100				[13/10/17]	[11/5/18
								[23/4/18]	[23/4/18]	[27/4/18]	50	EX	100				[11/5/18]	2018/19]
4	R-EOS-FDSHE	Future Developments: scanning the Horizon		20	0	15	N	30/10/17]	30/10/17]	30/10/17]	50	GPRES ICW OR	25 25 50				22/1/18 27/4/18 17-18/4/18]	[TBC 20/6/18 13/6/18]

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

5	R-EOS-MTR	Munitions & Target Response		30	0	20	N	[2/10/17]	16/10/17]	27/10/17]	40	EX GPRES ICW	40 20 40			[12/12/17 27/10/17 28/11/18]	[21/3/18]
6	R-EOS-MMPE	Manufacture and Materials Properties of Explosives		26	4	10	N	[25/9/17]	25/9/17]	29/9/17]	40	OR	100			[21-23/11/17]	[22/1/18]
7	R-EOS-CMT	Computer Modelling Tools in EOE		15	0	5	N	[3/10/17]	3/10/17]	5/10/17]	40	OR	100			[28-30/11/17]	[29/1/18]
8	R-EOS-AS2	Delivery Systems		30	0	10	N	[6/11/17]	6/11/17]	10/11/17]	40	EX	100			[14/12/17]	[20/3/18]
9	R-EOS-GPIBWT	Gun Propellants		34		10	N	[2/1/18]	8/1/18]	12/1/18]	40	EX GPRES	85 15			21/3/18 12/1/18]	[01/06/18 20/04/18]
10	R-EOS-TD	Transitions to Detonation		14	3	5	N	15/1/18]	15/1/18]	17/1/18]	40	ICW	100			[1/3/18]	[1/5/18]
11	R-EOS-RAE	Risk, Assessment for Explosives		14	0	5	N	17/1/18]	17/1/18]	19/1/18]	40	ICW	100			[2/3/18]	[15/5/18]
12	R-EOS-TEE	Testing and Evaluation of Explosives		20	3	5	N	[5/2/18]	5/2/18]	7/2/18]	40	ICW	100			[12/03/18]	[19/05/18]
14	R-EOS-RMP	Rocket Motors and Propellants		28	4-6	10	N	[22/1/18]	19/2/18]	23/2/18]	40	EX	100			[10/4/18]	[21/5/18]
15	R-EOS-IP	Introduction to Pyrotechnics		13		5	N	[19/2/18]	26/2/18]	28/2/18]	40	EX	100			[9/4/18]	[03/07/18]
16	R-EOS-AP	Advanced Pyrotechnics		13		5	N	[28/2/18]	28/2/18]	2/3/18]	40	ICW	100			[27/4/18]	[6/7/18]
17	R-EOS-EE	Explosives and the Environment		16		5	N	[5/3/18]	5/3/18]	7/3/18]	40	ICW	100			[05/04/18]	[14/06/18]
18	R-EOS-CE	Commercial Explosives		30		10	N	[5/3/18]	5/3/18]	9/3/18]	40	EX	100			[16/4/18]	[25/6/18]

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

Explosives Ordnance Engineering COURSE SPECIFICATION
QA&E USE ONLY: Version 5.0 August 2017   Course / SAS Version: [1]

19	R-EOS-DMS	Design for Munitions Safety		15		5	N	[12/3/18]	[12/3/18]	[14/3/18]	40	ICW	100				[6/4/18]	[13/7/18]
22	R-EOS-AS1	** Ammunition Systems 1		30	0	10	N	[30/4/18]	[14/5/18]	[18/5/18]	40	EX	100				[6/6/18]	[TBC]
23	R-EOS-AS3	** Ammunition Systems 3		30	0	10	N	[23/4/18]	[23/4/18]	[27/4/18]	40	ICW	100				[25/5/18]	[26/6/18]
21	R-EOE-DISS	Project		40		80	N	[N/A]	[13/04/18]	[27/7/18]	50	THESIS ORAL	75 25				[27/07/18 13/07/18]	[]

**From September 2017 we will be introducing a new module, 'Munitions & Target Response' (MTR) which is worth 20 credits and this will directly replace AS1 & AS3. This compulsory module has been designed to bring together technical complementary subject matter, which will enhance the overall learning experience.

Some part time students will be directly affected by this change as both AS1 & AS3 are compulsory modules for EOE MSc, PG Diploma and PG Certificate awards. To ensure these students are not disadvantaged we are offering alternative study routes below:-

If you have successfully completed (passed) Ammunition Systems 1 we are offering students one FINAL opportunity to take AS3 and this will take place on the 23-27 April 2018.

If you have successfully completed (passed) Ammunition Systems 3 we are offering students one FINAL opportunity to take AS1 and this will take place on the 14-18 May 2018.

Failure to attend either module

If you cannot attend either AS1 or AS3 (depending which one you still need to complete) you will be required to attend the new MTR module worth 20 credits. If you already have 10 credits from either AS1 or AS3 you may complete your award with an extra 10 credits. Please note there will be an element of repetition on the new module as you have already completed either AS1 or AS3. Student will not be assessed on ILOs more than once, each student will be treated on a one to one basis.

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

Explosives Ordnance Engineering COURSE SPECIFICATION
QA&E USE ONLY: Version 5.0 August 2017   Course / SAS Version: [1]

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
R-EOS-RMP	Rocket Motors and Propellants	Explosive Ordnance Engineering	Weapon & Vehicle Systems

7. How are the ILOs assessed?

The course uses a range of assessment types. Students can expect to have (25%) written examinations, (75%) assessment within their compulsory phase . 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.

A. Postgraduate Certificate

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7
2	ICW	ICW	ICW	ICW		ICW	
3					EX		
5	EX/IC	EX/IC	GPRES	ICW	ICW/G	ICW/G	

12

Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6	ILO 7
	W	W			PRES	PRES	
6	OR	OR			OR	OR	
8	EX	EX			EX	EX	
9	EX/GPRES	EX/GPRES	EX	EX	EX/GPRES	GPRES	
10	ICW	ICW	ICW	ICW	ICW	ICW	
12	ICW	ICW	ICW		ICW	ICW	
11	ICW	ICW	ICW	ICW	ICW	ICW	
14	EX	EX	EX		EX		
15			EX			EX	
16							
17	ICW			ICW	ICW	ICW	
18	EX			EX		EX	
19	ICW		ICW	ICW		ICW	
22	EX	EX			EX	EX	
23	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 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	
9	EX/GPRES	EX/GPRES	EX	EX	EX/GPRES	GPRES	
10	ICW	ICW	ICW	ICW	ICW	ICW	
12	ICW	ICW	ICW		ICW	ICW	
15			EX			EX	
11	ICW	ICW	ICW	ICW	ICW	ICW	
14	EX	EX	EX		EX		
16							
17	ICW			ICW	ICW	ICW	
18	EX			EX		EX	
19	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 8	ILO 9	ILO 10	ILO 11
21	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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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:	March 2017

1.   What is the course?

Course information

Course Title	MSc in Finance and Management
Course code	MSFNMFTC, PDFNMFTC, PCFNMFTC, MSFMOFTC, MSFMOPTC
Academic Year	2017/18
Valid entry routes	MSc
Additional exit routes	PgDip and PgCert
Mode of delivery	Full-time, Part-time (Muscat only)
Location(s)[1] of Study	Cranfield Campus and Muscat University, Oman
School(s)	School of Management
Theme	Leadership and Management
Centre	Policy, Sustainability and Performance
Course Director	Dr Andrea Moro and Dr Yacine Belghitar
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
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, Part-time MSc – up to three years (Muscat only)
Course Start Month(s)	September

---

[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

Institutions delivering the course

This course will primarily be delivered by Finance and Accounting group in School of Management. The course has 100 credits on the core modules and 20 credits via electives.

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

Teaching/instruction from external academic, industry and other guest speakers
Individual thesis 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. How is the course taught?

Overall the aim is to provide a varied, stimulating and experiential learning environment. All taught modules consist of formal lectures, in-class discussions, group and self-study. Group project work, reflective practice and class exercises are used to develop problem solving skills. The course will be supported by an electronic learning environment (VLE - Blackboard) which will be the central repository for all information relating to the course and available to the students at all times. 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
- 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 extensive use of Blackboard as a means of delivering material to support and augment classroom learning.

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

Notwithstanding University Regulations and the authorities and powers exercised by examiners, students will normally need to demonstrate achievement in the elements of the course, as laid out in Section 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:

Finance and Management (Cranfield) (Full-time only)

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

Description	Credits
COMPULSORY MODULES:	
Modules 1-10 Thesis - 22	100 80
ELECTIVE MODULES:	
4 modules from 11-21	20
TOTAL:	**200**

Finance and Management (Muscat) (Full-time and Part-time)

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

Description	Credits
COMPULSORY MODULES:	
Modules 1-10 Thesis - 22	100 80
ELECTIVE MODULES:	
4 modules from 11, 13-15, 17	20
TOTAL:	**200**

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

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> 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 <u>on the first attempt</u> for the significant majority of the taught assessments, noting that:
  o 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);
  o 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);
  o 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.   How is the course structured?

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

The part-time course is structured over two years as follows:
- In Year 1 there are five mandatory modules
- In Year 2 there are four mandatory modules and the students also undertake an individual thesis project

---

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

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

Finance and Management COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 July 2017   Course / SAS Version:

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.

Finance and Management (Cranfield)

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			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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
		TERM 1																
1	M-F/COF	Corporate Finance	Dr Yacine Belghitar	20		10	Y		02/10/17	08/12/17	40	EX	100				Week 1	Week 9
2	M-F/SAF	Statistical Analysis in Finance	Abdul Mohammed	20		10	Y		02/10/17	08/12/17	40 40	GCW EX	40 60				07/12/17 Week 1	Week 9

---

[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

6

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	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
												Independent Assessment		Multi-part Assessment			Submission dates	
3	M-F/ACC	Accounting	Dr Matthias Nnadi	20	6	10	Y		02/10/17	08/12/17	40 40	EX EX	25 75				10/11/17 Week 1	Week 9
4	M-F/ECO	Economics for Financial Markets	Dr Constantinos Alexiou	20		10	Y		02/10/17	08/12/17	40	EX	100				Week 1	Week 9
5	M-F/ORG	Organisational Management	Dr Orly Levy	20		10	Y		02/10/17	08/12/17	40	ICW	100				08/12/17	TBC
		TERM 2																
6	M-F-STR	Strategic Management	Dr Richard Schoenberg	20		10	N		08/01/18	16/03/18	40	EX	100				Week 5	Week 9
7	M-F/ICF	International Corporate Finance	Prof Sunil Poshakwale	20		10	N		08/01/18	16/03/18	40 40	GPRAC EX	25 75				14&15/02/18 Week 5	TBC Week 9
8	M-F/VFM	Valuation and Financial Modelling	Dr Vineet Agarwal	20		10	Y		08/01/18	16/03/18	40 40	GCW EX	50 50				12/03/18 Week 5	TBC Week 9
9	M-F/FMRE	Financial Markets, Regulation and Ethics	Paul Richards, Steve Wallace	20	14 / 6	10	Y		08/01/18	16/03/18	40 40	ICW ICW	67 33				09/03/18 16/03/18	TBC
10	M-F/RMF	Research Methods in Finance	Dr Vineet Agarwal	20		10	Y		08/01/18	16/03/18	40 40	GPRES ICW	30 70				16/03/18 14/03/18	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[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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
		TERM 3 (Electives – choose any 4)																
11	M-F/CRS	Corporate Restructuring	Dr Yacine Belghitar	15		5	Y		09/04/18	18/05/18	40	ICW	100				13/06/18	TBC
12	M-F/IFF	Infrastructure Finance	Ian Alexander	15		5	Y		09/04/18	18/05/18	40	EX	100				29/05/18	Week 10
13	M-F/ENF	Entrepreneurial Finance	Dr Andrea Moro	15		5	Y		09/04/18	18/05/18	40	ICW	100				20/06/18	TBC
14	M-F/SMA	Strategic Management Accounting and Control	Prof Michael Bourne	15		5	Y		09/04/18	18/05/18	40	ICW	100				22/06/18	TBC
15	M-F/MAD	Mergers and Acquisitions	Dr Andrea Moro Prof Ruth Bender	15		5	Y		09/04/18	18/05/18	40	ICW	100				15/06/18	TBC
16	M-F/FEC	Applied Financial Econometrics	Dr Yacine Belghitar Dr Peter Yallup	15		5	Y		09/04/18	18/05/18	40	ICW	100				11/06/18	TBC
17	M-F/PEQ	Private Equity	Dr Abdulkadir Mohamed	15		5	Y		09/04/18	18/05/18	40	ICW	100				18/06/18	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[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
												Independent Assessment		Multi-part Assessment			Submission dates	
18	M-I/FNM	Fund Management	Jane Vessey	15		5	Y		09/04/18	18/05/18	40	EX	100				24/05/18	Week 10
19	M-I/FIS	Fixed Interest Securities	Dr Vineet Agarwal	15		5	Y		09/04/18	18/05/18	40	EX	100				25/05/18	Week 10
20	M-I/ TATS	Technical Analysis and Trading Systems	Dr Peter Yallup	15		5	Y		09/04/18	18/05/18	40 40	ICW GCW	50 50				11/06/18 22/06/18	TBC
21	M-I/IEM	International Investment and Emerging Markets	Prof Sunil Poshakwale	15		5	Y		09/04/18	18/05/18	40			100 MULTI	IPRES ICW	25 75	08/06/18	TBC
		TERM 4																
22	M-F/THS	Thesis	Various Supervisors	50		80	Y		25/06/18	07/09/18		THESIS	100				04/09/18	

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

Finance and Management (Muscat)

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers [13]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[14] - 40% or 50%	Assessment							
												Independent Assessment		Multi-part Assessment			Submission dates		
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Type of Assessment	Weighting within module15 (%) of Independent assessments	Weighting within module of multi-part assessments [16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
1	M-F/COF Occ B	Corporate Finance	Dr Yacine Belghitar	20		10	Y		FT/PT 09/10/17	FT/PT 12/10/17	40	EX	100				Week 1	TBC
2	M-F/SAF Occ B	Statistical Analysis in Finance	Abdul Mohammed	20		10	Y		FT 26/11/17	FT 30/11/17	40 40	GCW EX	40 60				07/12/17 Week 1	TBC
3	M-F/ACC Occ B	Accounting	Dr Matthias Nnadi	20	6	10	Y		FT/PT 29/10/17	FT/PT 02/11/17	40 40	EX EX	25 75				10/11/17 Week 1	TBC
4	M-F/ECO Occ B	Economics for Financial Markets	Dr Constantinos Alexiou	20		10	Y		FT 15/10/17	FT 19/10/17	40	EX	100				Week 1	TBC

[12] Please note that all contact hours are indicative and represent scheduled teaching, which is subject to minor changes and variation at short notice

[13] Visiting Lecturer = a member of staff (with RTS) but not on a permanent contract (does not include those acting as occasional guest speakers)

[14] A mark of 50% is required to pass the assessment however, where the stated minimum mark is 40%, a mark of 40-49% may be compensated by good performance in other modules providing that the overall average is ≥50%. This will be at the Board of Examiners discretion.

[15] For **independent assessments** please record type and weighting of each separate piece of assessment individually.

[16] For **multi-part assessments** please record the overall weighting of module which should be 100%.

[17] Failure to submit an element of a **multi-part assessment** will **not** require remedial action if the absence of the marks for the assignment still results in a pass for the assessment (whether 40 or 50% as appropriate). If, however, the absence of marks fails to meet the minimum mark for the module then **all** elements of the assessment must be re-taken.

[18] Please ensure you include submission dates for both FT and PT students and that you give details of the submission date for each individual element of a multi-part assessment.

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

10

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers [13]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent assessments	Weighting within module of multi-part assessments [16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
									Calendar			Independent Assessment		Multi-part Assessment			Submission dates	
5	M-F/ORG Occ B	Organisational Management	Emma Parry	20		10	Y		FT/PT 12/11/17	FT/PT 16/11/17	40	ICW	100				08/12/17	TBC
6	M-F-STR Occ B	Strategic Management	Dr Richard Schoenberg	20		10	N		FT/PT 22/04/18	FT/PT 26/04/18	40	EX	100				Week 5	TBC
7	M-F/ICFM Occ B	International Corporate Finance (Muscat)	Prof Sunil Poshakwale	20		10	N		FT/PT 11/02/18	FT/PT 15/02/18	40 40	GPRAC EX	25 75				TBC Week 5	TBC
8	M-F/VFM Occ B	Valuation and Financial Modelling	Dr Vineet Agarwal	20		10	Y		FT 21/01/18	FT 25/01/18	40 40	GCW EX	50 50				12/03/18 Week 5	TBC
9	M-F/FMRE Occ B	Financial Markets, Regulation and Ethics	Steve Wallace	20	14 / 6	10	Y		FT/PT 14/01/18	FT/PT 18/01/18	40 40	ICW ICW	67 33				09/03/18 16/03/18	TBC
10	M-F/RMF Occ B	Research Methods in Finance	Dr Vineet Agarwal	20		10	Y		FT 25/02/18	FT 01/03/18	40 40	GPRES ICW	30 70				16/03/18 14/03/18	TBC
		(Electives – choose any 4)																
11	M-F/CRS Occ B	Corporate Restructuring	Dr Yacine Belghitar	15		5	Y		FT/PT 08/04/18	FT/PT 12/04/18	40	ICW	100				13/06/18	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

Finance and Management COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 July 2017 　　　　　　　　Course / SAS Version:

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[14] - 40% or 50%	Type of Assessment	Weighting within module[15] (%) of Independent assessments	Weighting within module of multi-part assessments[16] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
12	M-F/IFF	Infrastructure Finance	Ian Alexander	15		5	Y		**Not running for Muscat**		40	EX	100					
13	M-F/ENF Occ B	Entrepreneurial Finance	Dr Andrea Moro	15		5	Y		FT 15/04/18	FT 19/04/18	40	ICW	100				20/06/18	TBC
14	M-F/SMA Occ B	Strategic Management Accounting and Control	Prof Michael Bourne	15		5	Y		FT 20/05/18	FT 24/05/18	40	ICW	100				22/06/18	TBC
15	M-F/MAD Occ B	Mergers and Acquisitions	Dr Andrea Moro	15		5	Y		FT 15/04/18	FT 19/04/18	40	ICW	100				15/06/18	TBC
16	M-F/FEC	Applied Financial Econometrics	Dr Yacine Belghitar Dr Peter Yallup	15		5	Y		**Not running for Muscat**		40	ICW	100					
17	M-F/PEQ Occ B	Private Equity	Dr Abdulkadir Mohamed	15		5	Y		FT/PT 13/05/18	FT/PT 17/05/18	40	ICW	100				18/06/18	TBC
18	M-I/FNM	Fund Management	Jane Vessey	15		5	Y		**Not running for Muscat**		40	EX	100					
19	M-I/FIS	Fixed Interest Securities	Dr Vineet Agarwal	15		5	Y		**Not running for Muscat**		40	EX	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

12

Module Number	Module code	Title	Module Leader	Contact hours[12]	Total hours delivered by Visiting Lecturers[13]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[14] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module[15] (%) of Independent assessments	Weighting within module of multi-part assessments [16](100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[17]	Assessment Submission and/or exam date[18]	Assessment / Exam Retake date
20	M-I/TATS	Technical Analysis and Trading Systems	Dr Peter Yallup	15		5	Y		**Not running for Muscat**		40 40	ICW GCW	50 50					
21	M-I/IEM	International Investment and Emerging Markets	Prof Sunil Poshakwale	15		5	Y		**Not running for Muscat**		40			100 MULTI	IPRES ICW	25 75	TBC 08/06/18	
22	M-F/THS Occ B	Thesis	Various Supervisors	50		80	Y		FT 25/06/18	FT 07/09/18		THESIS	100				04/09/18	

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

Finance and Management COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 July 2017   Course / SAS Version:

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
M-F/COF	Corporate Finance	Finance and Management	Investment Management
M-F/SAF	Statistical Analysis in Finance	Finance and Management	Investment Management
M-F/ACC	Accounting	Finance and Management	Investment Management
M-F/ECO	Economics for Financial Markets	Finance and Management	Investment Management
M-F/ORG	Organisational Management	Finance and Management	Investment Management
M-F/VFM	Valuation and Financial Modelling	Finance and Management	Investment Management
M-F/FMRE	Financial Markets, Regulation and Ethics	Finance and Management	Investment Management
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/CRS	Corporate Restructuring	Finance and Management	Investment Management
M-F/IFF	Infrastructure Finance	Finance and Management	Investment Management
M-F/ENF	Entrepreneurial Finance	Finance and Management	Investment Management
M-F/SMA	Strategic Management Accounting and Control	Finance and Management	Investment Management
M-I/FNM	Fund Management	Investment Management	Finance and Management
M-I/FIS	Fixed Income Securities	Investment Management	Finance and Management
M-I/TATS	Technical Analysis and Trading Systems	Investment Management	Finance and Management
M-I/IEM	International Investment and Emerging Markets	Investment Management	Finance and Management
M-F/THS	Thesis	Finance and Management	Finance and 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	✔	✔	✔	✔		✔	✔		✔		✔				✔					
10								✔	✔	✔		✔		✔	✔					
11								✔	✔		✔	✔	✔	✔	✔	✔		✔	✔	
12									✔	✔	✔	✔				✔		✔	✔	
13								✔	✔		✔	✔	✔	✔	✔	✔		✔	✔	
14									✔	✔	✔	✔		✔	✔	✔		✔	✔	
15								✔	✔		✔	✔	✔	✔	✔	✔		✔	✔	
16									✔	✔	✔	✔	✔			✔	✔	✔	✔	
17								✔	✔		✔	✔	✔	✔	✔	✔		✔	✔	
18								✔	✔		✔		✔	✔	✔	✔		✔		
19									✔		✔			✔	✔			✔		
20										✔	✔	✔	✔	✔	✔			✔		
21								✔	✔		✔	✔		✔	✔	✔		✔		
22																	✔			✔

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.

Finance and Management COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 July 2017   Course / SAS Version:

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

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

Each course has at least one External Examiner who monitors all aspects of the assessment process. This is in line with the 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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

   Year one partnership reviews are undertaken one year after the initiation of a new partnership involving academic (award bearing) provision. The aim is to provide a supportive framework to assist the Sponsoring School and its new Partner Institution to work collaboratively to

ensure that: the learning and teaching provision and associated student experiences are of a high standard; and that those responsible for delivering the provision are undertaking their respective roles and responsibilities in an appropriate way.

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

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.

Finance and Management COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 July 2017   Course / SAS Version:

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 2017

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(s)[1] 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
Is this an AP Contract course?[2]	No
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

---

[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

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.

Flight Test and Flight Dynamics COURSE SPECIFICATION

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%;

5

- 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:
  - o 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);
  - o 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);
  - o 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.

---

[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 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	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
A	N-FD-FOA	Fundamentals of Aeronautics and Flight Test	Dr Sophie Robinson (ETPS)	80		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	Dr Sophie Robinson (ETPS)	26		10	N		01/08/17	31/10/17	40	ICW	100				31/10/17	At the next available opportunity which may not be until the course runs the following year

---

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment (Independent)	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment (Multi-part)	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
2	N-FD-PFT	Preview Flight Testing	Dr Sophie Robinson (ETPS)	30		20	N		01/11/17	31/12/17	50			100 MULTI	GPROJ OR	60 40	31/12/17	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		04/01/18	08/01/18	40 40			100 MULTI	EX ICW	67 33	22/01/18	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		23/01/18	10/02/18	40	ICW	100				15/03/18	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		16/01/18	20/01/18	40	GCW	100				06/03/18	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[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	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
												Independent Assessment		Multi-part Assessment			Submission dates	
6	N-ASD-MVCAA	Multivariable Control Systems for Aerospace Applications	Dr James Whidborne (CU)	30		10	Y		30/01/18	10/02/18	40	EX	100				26/04/18	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		27/02/18	14/03/18	40 40			100 MULTI	EX ICW	50 50	11/05/18 24/04/18	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		06/03/18	10/03/18	40	EX	100				25/04/18	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		01/04/18	31/07/18		THESIS	100				31/07/18	

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 used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use 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.)

A. Postgraduate Certificate

Award ILOs / Module No.	ILO 1	ILO 2	ILO 3	ILO 4	ILO 5	ILO 6
A		EX, ICW	EX, ICW	EX, ICW	ICW	ICW
1	ICW	ICW	ICW			ICW
2		GCW,	GCW,	GCW,	GCW,	GCW,

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

B. Postgraduate Diploma

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

Award ILOs / Module No.	ILO 5	ILO 6	ILO 7	ILO 8	ILO 9	ILO 10	ILO 11	ILO 12	ILO 13
2		ICW					GPROJ OR		
3			ICW		EX				
4						ICW		ICW	ICW
5			GCW	GCW					
6					EX				
7	ICW EX								
8			EX						

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 14	ILO 15	ILO 16
9	ICW	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. **What opportunities are graduates likely to have on completing the course?**

Not relevant as all students will be sponsored and will have a job secured in flight test.

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: 09/03/17

---

1. What is the course?

Course information

Course Title	Flow Assurance for Oil and Gas Production
Course code	MSFLAFTC, MSFLAPTC, PDFLAFTC, PDFLAPTC, PCFLAFTC, PCFLAPTC
Academic Year	2017/18
Valid entry routes	MSc, PgDip, PGCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Energy & Power
Centre	Centre for Oil and Gas Engineering
Programme Director **Course Director**	Dr Gill Drew Dr Liyun Lao
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
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

---

[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

1

Registration Period(s) available	Full-time MSc, PgDip and PgCert - one year Part-time MSc, PgDip and PgCert - up to three years.
Course Start Month(s)	October

Institutions delivering the course

This course is delivered by the Centre for Oil and Gas Engineering where the research interests include:

- Multiphase Flow Technology
- Oil and Gas Production
- Process and Energy Systems Design, Simulation and Optimisation
- Process Instrumentation and Flow Measurement
- Process Control
- Conventional and renewable energy

Geothermal Energy Production

Integrated Energy Systems

- 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 been accredited formally by Institute of Mechanical Engineers (IMechE) until 2021. It is intended that, in addition to IMechE, accreditation from Energy Institute (EI) will be sought at the earliest possible time.

2. What are the aims of the course?

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

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

A. Postgraduate Certificate 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

B. Postgraduate Diploma in Flow Assurance for Oil and Gas Production

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

ILO 5. Apply and critically evaluate key technical management principles, including project management, people management, technology marketing, product development and finance

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

C. MSc in Flow Assurance for Oil and Gas Production

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

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

ILO8. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

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

- A dedicated electronic 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.

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 have the option to undertake an individual dissertation 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 6.   Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

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

Description	Credits
COMPULSORY MODULES:	
Multiphase Flows, Production Technology and Chemistry	10 10
ELECTIVE MODULES:	
4 modules from	

4

Description	Credits
Risk & Reliability,	10
Structural Integrity,	10
Process Plant Operation,	10
Process Measurement Systems,	10
Advanced Control Systems,	10
Process Design and Simulation,	10
Computational Fluid Dynamics for Industrial Process	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:	
Multiphase Flows,	10
Production Technology and Chemistry,	10
Risk & Reliability,	10
Management for Technology,	10
Process Measurement Systems,	10
Advanced Control Systems ,	10
Process Plant Operation	10
Group Project (Compulsory for Full Time students)	40
ELECTIVE MODULES:	
1 module from	
Process Design and Simulation,	10
Computational Fluid Dynamics for Industrial Process,	10
Structural Integrity	10
Part Time Students:	
Group Project	40
OR	
Dissertation	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:	
Multiphase Flows,	10
Production Technology and Chemistry,	10
Risk & Reliability,	10
Management for Technology,	10
Process Measurement Systems,	10

Flow Assurance for Oil and Gas Production COURSE SPECIFICATION
QA&E USE ONLY: Version 4.2 August 2017   Course / SAS Version:

Process Plant Operations	10
Advanced Control Systems	10
Group Project (Compulsory for Full Time students)	40
Individual Research Project	80
ELECTIVE MODULES:	
1 module from Process Design and Simulation, Computational Fluid Dynamics for Industrial Process, Structural Integrity Part Time Students: Group Project OR Dissertation	10 10 10 40 40
TOTAL:	**200**

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

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> 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 <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 **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

---

[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%).

6

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);

- o 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. 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 often 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.

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							
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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-ENE-INWK Occ A	Induction	G Drew	24		0	N		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	N-FLA-MPF	PSE23 Multiphase Flows	L Lao	30		10	N		16/10/17	20/10/17	40	EX	100				11-15/12/17	10-14/09/18
3	N-PSE-PPO	PSE11 Process Plant Operation	D Hanak	30		10	Y		23/10/17	27/10/17	40	EX	100				11-15/12/17	10-14/09/18

---

[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

Flow Assurance for Oil and Gas Production COURSE SPECIFICATION
QA&E USE ONLY: Version 4.2 August 2017   Course / SAS Version:

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			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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
	Occ A																	
4	N-PSE-ACS Occ A	PSE12 Advanced Control Systems	Y Cao	30		10	Y		06/11/17	10/11/17	40	ICW	100				FT 2/12/17 PT 16/12/17	July 18
5	N-AME-RR Occ A	PSE03 Risk & Reliability Engineering	. A Kolios	30		10	Y		13/11/17	17/11/17	40	EX	100				3-5/1/18	10-14/09/18
6	N-PSE-CETIP Occ A	PSE17 Computational Fluid Dynamics for Industrial Processes	P Verdin	30		10	Y		04/12/17	08/12/17	40	ICW	100				FT 20/1/18 PT 3/2/18	July 18
7	N-FLA-PTC	PSE24 Production Technology & Chemistry	L Lao	30		10	N		15/01/18	19/01/18	40	ICW	100				FT 3/2/18 PT 17/2/18	July 18
8	N-PSE-PSD Occ A	PSE13 Process Design and Simulation	G Kopanos	30		10	Y		22/01/18	26/01/18	40	ICW	100				FT 3/2/18 PT 17/2/18	July 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	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
9	N-AME-SI	PSE 26 Structural Integrity	A Mehmanparast	38.5		10	Y		05/02/18	09/02/18	40	EX	100				19-23/2/18	10-14/09/18
10	N-PSE-PMS Occ A	PSE10 Process Measurement Systems	L Lao	30		10	Y		12/02/18	16/02/18	40	ICW	100				FT 24/2/18 PT 10/3/18	July 18
11	G-MTI Occ A	PSE02 Management for Technology	S Carver	50		10	Y		26/02/18	02/03/18	40	EX GCW	50 50				EX 19-23/3/18 GCW FT 10/3/18 PT 24/3/18	10-14/09/18 July 18
12	I-ENE-GRPP Occ A	PSE25 Group Project	G Drew	16		40	Y		05/03/18	04/05/18	50 50	GPROJ ICW	80 20				1/5/18 11/5/18	
13	I-ENE-DISS Occ A	Dissertation for part time students	G Drew	10		40	Y		02/10/17	29/09/18	50	IPROJ IPRES	80 20				28/9/18 28/9/18	
14	I-ENE-THESIS	Energy Individual	G Drew	20		80	Y		07/05/18	07/09/18	50 50	THESIS OR	90 10				3/9/18	

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

10

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			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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
	Occ A	Research Project															3/9/18	

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 used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
N-AME-RR	PSE 03 Risk and Reliability Engineering	Advanced Mechanical Engineering	• Process Systems Engineering • Process Systems Engineering (Muscat) • Renewable Energy Engineering • Flow Assurance for Oil & Gas Production • REMS EngD
N-PSE-PMS	PSE10 Process Measurement Systems	Process Systems Engineering	• Atmospheric Emissions Technology • Energy Systems and Thermal Processes • Flow Assurance for Oil & Gas Production • Energy Systems & Thermal Processes (Muscat) • Process Systems Engineering (Muscat)
N-PSE-PPO	PSE11 Process Plant Operations	Process Systems Engineering	• Advanced Chemical Engineering • Flow Assurance for Oil & Gas Production • Cost Engineering • Process Systems Engineering (Muscat)
N-PSE-ACS	PSE 12 Advanced Control Systems	Process Systems Engineering	• Advanced Mechanical Engineering • Advanced Chemical Engineering • Energy Systems and Thermal Processes • Flow Assurance for Oil & Gas Production • Process Systems Engineering (Muscat) • REMS EngD
N-PSE-CETIP	PSE 17 Computational Fluid Dynamics for Industrial Processes	Process Systems Engineering	• Energy Systems and Thermal Processes • Flow Assurance for Oil & Gas Production • Energy Systems & Thermal Processes (Muscat) • Process Systems

12

N-AME-SI	PSE 26 Structural Integrity	Advanced Mechanical Engineering	• 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 • REMS EngD
N-PSE-PSD	PSE 13 Process Design and Simulation	Process Systems Engineering	• Advanced Chemical EngineeringFlow Assurance for Oil & Gas Production • Process Systems Engineering (Muscat)
G-MTI	Management for Technology	School of Management	• Advanced Mechanical Engineering • REMS EngD • Design of Rotating Machines • Food Chain Systems • Offshore and Ocean Technology with Pipeline Engineering • Offshore Materials and Engineering • Offshore and Renewable Energy • Offshore Risk Management • Offshore and Ocean Technology with Subsea Engineering • Renewable Energy Engineering • Renewable Energy

Engineering (Muscat)

13

				• Technology
				• Flow Assurance for Oil and Gas Production
				• Energy Systems and Thermal Processes
				• Process Systems Engineering
				• Energy from Waste
				• Geothermal Engineering
				• Advanced Chemical Engineering

7. How are the ILOs assessed?

The following assessment types are utilised:

The course uses a range of assessment types,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

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
6	ICW	ICW		
8	ICW	ICW	ICW	ICW
4	ICW		ICW	
11	EX GCW	EX GCW	EX GCW	
2			EX	EX
3		EX	EX	
5			EX	EX
9			EX	EX
7	ICW	ICW	ICW	ICW
10				ICW

B. Postgraduate Diploma

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

Award ILOs / Module No.	ILO 5	ILO6
12	GPROJ ICW	GPROJ ICW
13	IPROJ IPRES	IPROJ IPRES

C. MSc

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

Award ILOs / Module No.	ILO 7	ILO 8
14	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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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 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:	28/03/17

1. What is the course?

Course information

Course Title	Food Chain Systems
Course code	MSFOSFTC, MSFOSPTC, PDFOSFTC, PDFOSPTC, PCFOSFTC, PCFOSPTC
Academic Year	2017/18
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Cranfield Soil and Agrifood Institute
Course Director	Dr Angel Medina Vaya
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
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)

---

[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

1

Benchmark Statement(s)	N/A
Registration Period(s) available	Full-time MSc - one year, Part-time MSc - up to three years, Full-time PgCert - one year, Part-time PgCert - two years, Full-time PgDip - one year, Part-time PgDip - two years
Course Start Month(s)	Full Time: October Part-time: throughout the year (October preferred, other times on case by case basis)

Institutions delivering the course

This course is delivered by the Cranfield Soil and Agrifood Institute where the research interests include agriculture, precision agriculture, soil biology, plant genomics, seed biology, food microbiology (bacteriology and mycology) and postharvest technology.
Our research activities span different disciplines including soil sciences, seed biology, plant genetics, food bacteriology and mycology and postharvest technology. This wide range of research activities and our network of national and international collaborations gives us the opportunity to offer a variety of research projects to our MSc students that suit their individual research interests.

This course belongs to the Food 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 the food and environmental sector employers to provide professional experience and development opportunities for students. Thesis sponsors and supporters include: Coca Cola Enterprises, Selva Organic, McDonald's Restaurants Ltd, GreenWay Foods, Giles Foods, Discovery Foods, and Whitworth's.

Cranfield University has agreements with a number of top quality European higher education institutions through its European Partnership Programme (EPP). Within these agreements students from partner institutions have the opportunity to take a Master of Science (MSc) at Cranfield University as an alternative to the final year of their home university programme.

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

Accreditation by Public, Statutory or Regulatory Bodies (PSRBs)

This course is accredited by the Institution of Agricultural Engineers (IAgrE) and the Institute of Food Science and Technology (IFST).

2. What are the aims of the course?

Cranfield University offers this course in order to:

- To provide students with both the academic and practical skills used by all professionals who are concerned with the issues surrounding the production and supply of safe and high quality food in the modern world.
- To develop the capacity to undertake successful technical research projects using appropriate methods of critical analysis

This programme is intended for the following range of students:

- Graduates with honours degree and equivalent ideally in a subject related to a component of the course
- Graduates currently in employment keen to extend their qualifications or to pursue a career change
- Individuals with other qualifications but who possess considerable relevant experience

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

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

A. Postgraduate Certificate in Food Chain Systems

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

ILO 1. Evaluate and compare the utilisation of classical and the most recent technologies in order to improve or maintain food quality at different stages of the food chain (pre- and post-harvest, transport, processing).

ILO 2. Compare the importance of different food contaminants and analysis techniques to evaluate the utilisation of existing and new methodologies to reduce food contamination in different food chains thus improving food safety.

ILO 3. Holistically analyse different food chains considering their multiple stages, including the management and business-wide needs, and diversity to identify strengths and weaknesses by synthesising existing knowledge and proposing potential improvements to increase final product quality and safety and increase the potential business success.

B. Postgraduate Diploma in Food 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 to address problems faced by industrial clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. MSc in Food Chain Systems

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

ILO 5. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.
ILO 6. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. How is the course taught?

The MSc course is taught in three sections: taught modules (40%), group projects (20%), and an individual research project (40%).

The taught programme, typically delivered between October and February, comprises a structured sequence of modules, each containing a series of lectures and other classroom-based teaching, supplemented by practical work. The taught modules are assessed by assignments. Each module is taught over one week, usually followed by a week largely free of structured teaching to allow time for more independent learning and reflection.

The Group Projects are group-based research programs typically undertaken between February and April. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation. Part time students that might have problems when scheduling the group project are offered the possibility to develop a dissertation, which in most situations will be based around a topic relevant to the student's work. The definition of the dissertation topic will be determined in consultation with the Food Chain Systems 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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

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

Description	Credits
COMPULSORY MODULES:	0
Induction Module	10
Food Diagnostics	10
Food Safety	10
Food Quality Management and Certification	10
Management for Technology	
ELECTIVE MODULES:	
Select TWO of the following remaining taught modules:	
Plant Based Food Quality	10

4

Description	Credits
Postharvest Technology	10
Food Chain Resilience	10
Agrifood Business Innovation	10
TOTAL:	**60**

B.   Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Food Diagnostics	10
Food Safety	10
Food Quality Management and Certification	10
Management for Technology	10
Plant Based Food Quality	10
Postharvest Technology	10
Food Chain Resilience	10
Agrifood Business Innovation	10
Group project (Module 11) (Full time or Part Time students)	40
ELECTIVE MODULES:	
Module 12 - Dissertation in place of Group Project (Part time only)	40
TOTAL:	**120**

C.   MSc

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

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Food Diagnostics	10
Food Safety	10
Food Quality Management and Certification	10
Management for Technology	10
Plant Based Food Quality	10
Postharvest Technology	10
Food Chain Resilience	10
Agrifood Business Innovation	10
Group project (Module 11) (Full time or Part Time students)	40
Individual thesis project (Module 13)	80
ELECTIVE MODULES:	
Module 12 - Dissertation in place of Group Project (Part time only)	40
TOTAL:	**200**

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

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does not have discretion to overrule this limit, but can refer a case to Senate's Education Committee);[3] [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:
  - o 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);
  - o 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);
  - o it is not permissible for you to fail an elective module and then proceed to take a different elective module in its place.
- **For Substantial pieces of assessment** (corresponding to ≥40 credits, which are not part of the taught assessment average), the pass mark of ≥50% (where they exist);
- **For the thesis,** a mark of ≥50% in order to receive a pass (where it exists).

6. How is the course structured?

Please see the course structure document for details on the individual elements of the course. Full-time students register for the course in October and are expected to complete the course within 12 calendar months.

The course is also offered on a part-time basis and such students are expected to complete the course within 2 to 3 years. Part-time students are not restricted to starting in October. Instead

---

[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%).

they are offered individual guidance on the best sequence of study based on their prior knowledge and availability to attend.

Ideally part time students will join in time to undertake the Induction module with the rest of the cohort, but where this is not possible ad hoc induction sessions can be arranged.

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			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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-AGF-INWK	Induction module	A Medina Vaya	33		0	Y		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	I-AGF-PBFQ	Plant –Based Food Quality	A Thompson	30		10	N		09/10/76	13/10/17	40			100	ICW IPRES	70 30	ICW - FT - 21/10/17 ICW - PT - 04/11/17 IPRES - FT/PT - 13/10/17	Week 9 - 4-8 June 2018

---

[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	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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
3	I-FCS-A1005	Food Diagnostics	M Carmen Alamar	25		10	N		23/10/17	27/10/17	40			100	GPRES ICW	10 90	GPRES - FT/PT - 27/10/2017 ICW -FT - 04/11/17 PT - 18/11/17	Week 9 - 4-8 June 2018
4	I-FCS-A1007	Postharvest Technology	S Kourmpetli	30		10	N		06/11/17	10/11/17	40			100	IPRES ICW	30 70	IPRES - FT/PT - Week commencing, 6/11/17 ICW - FT- 18/11/17 PT - 02/12/17	Week 9 - 4-8 June 2018
5	I-FCS-FS	Food Safety	A Medina-Vaya	41		10	N		20/11/17	24/11/17	40			100	ICW GPRES	90 10	ICW - FT - 02/12/17 PT - 16/12/17 GPRES - FT/PT 24/11/17	Week 9 - 4-8 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

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
6	I-FCS-FQMC	Food Quality Management and Certification	N Magan	40		10	N		04/12/17	08/12/17	40	ICW	100				ICW - FT - 16/12/2017 ICW - PT - 06/01/2018	Week 9 - 4-8 June 2018
7	G-MTI	Management for Technology	S Carver	50		10	Y		15/01/18	19/01/18	40	GCW EX	50 50				GCW - FT/PT - 19/01/18 EX - FT/PT - Exam week 4 (19-23 Feb 18)	Week 9 - 4-8 June 2018
8	I-FFS-FCR	Food Chain Resilience	D Julien	25		10	Y		22/01/18	26/01/18	40			100	GCW (F/T) ICW (P/T) GPRES	30 70	GPRES - 26/01/2018 GCW - 03/02/2017 ICW 17/02/2018	Week 9 - 4-8 June 2018
9	I-FCS-ABI	Agrifood Business Innovation	A Medina-Vaya	40		10	Y		05/02/18	09/02/18	40			100	GPRES ICW	30 70	GPRES - FT/PT 09/02/18 ICW - FT- 17/02/18	Week 9 - 4-8 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

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	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
																	PT - 03/03/18	
10	I-AGF-GRPP	Group Project	A Medina Vaya	16		40	Y		19/02/18	04/05/18	50	GPROJ ICW	80 20				GPROJ - 01/05/2018 ICW - 05/05/2018	
11	I-AGF-DISS	Dissertation in place of group project for part time students	A Medina Vaya	10		40	Y		02/10/17	28/09/18	50	IPROJ IPRES	80 20				28/09/18	
12	I-AGF-THESIS	Individual Thesis Project	Individually assigned	20		80	N		07/05/18	07/09/18	50	THESIS OR	90 10				03/09/18	

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 used by another existing course.

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
I-FFS-FCR	Food Chain Resilience	Future Food Sustainability	Food Chain Systems
G-MTI	Management for Technology	School of Management	- Advanced Mechanical Engineering - REMS EngD - Design of Rotating Machines - Food Chain Systems - Offshore and Ocean Technology with Pipeline Engineering - Offshore Materials and Engineering - Offshore and Renewable Energy - Offshore Risk Management - Offshore and Ocean Technology with Subsea Engineering - Renewable Energy Engineering - Renewable Energy Technology - Flow Assurance for Oil and Gas Production - Energy Systems and Thermal Processes - Process Systems Engineering - Energy from Waste - Geothermal Engineering - Advanced Chemical Engineering

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

12

This approach has been adopted because:

This is the standard criteria of assignment in SWEE.

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 Food Chain Systems

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

B. Postgraduate Diploma in Food Chain Systems

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

Award ILOs / Module No.	ILO 4
10	GPROJ ICW
11	IPROJ IPRES

13

C. MSc in Food Chain Systems

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

Award ILOs / Module No.	ILO 5	ILO 6
12	THESIS/OR	THESIS/OR

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.

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.

14

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

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

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

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

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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.
Some of the employers over the last three years include:

- Coca Cola Enterprises
- Giles Foods
- G's

16

Food Chain Systems COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 September 2017   Course / SAS Version:

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:	August 2017

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	2017/2018
Valid entry routes	MSc, PgDip, PgCert
Exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Shrivenham
School(s)	Cranfield Defence and Security
Theme	Defence and Security
Centre	Cranfield Forensic Institute
Programme Director **Course Director**s	Professor Andrew Shortland Dr Karl Harrison (Forensic Investigation) Mr Stephen Johnson (Forensic Explosives and Explosion Investigations) Dr Nick Marquez-Grant (Forensic Archaeology and Anthropology)

---

[1] If any part of this course is delivered at another site, please note which one(s) here

	Dr James Shackel (Forensic Ballistics) Dr Jon Painter (Forensic Engineering and Science) Dr Sarah Morris (Digital Forensics)
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
Teaching Institution	Cranfield University
Admissions body	Cranfield University
Entry requirements	Standard University entry requirements
UK Qualifications Framework Level	QAA FHEQ level 7 (Masters)
Benchmark Statement(s)	N/A
Registration Period(s) available	Part-time: 2 years (PgDip and PgCert) or 3 years (MSc) Full-time: MSc 11 months, PgDip and PgCert 1 year.
Course Start Month(s)	October

Institutions delivering the course

This course is delivered by Cranfield Forensic Institute within Cranfield Defence and Security, where the research interests include security technology, forensic archaeology and anthropology, ballistics, explosives, forensic 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.
- 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 Chartered Society of Forensic Sciences until April 2022.

M. What are the aims of the course?

Cranfield University offers this course in order to:

---

[2] AP Contract courses are provided by Cranfield University to the MoD as part of the Academic Provider contract

- 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. **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 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

4

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, 19-22, 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	50
Modules 13-16	40
Research project (25)	80
ELECTIVE MODULES:	
Module 1	0
3 modules selected from any of the following: 7, 8, 10, 17, 19-22, 26, 27, 28, 39	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	50
Modules 9-12	40
ELECTIVE MODULES:	
Module 1	0
3 modules selected from any of the following: 6, 7, 8,13, 15, 19-22, 26, 27, 28, 37, 38, 39	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	50
Modules 9-12	40
Research project (25)	80
ELECTIVE MODULES:	
Module 1	0
3 modules selected from any of the following: 6, 7, 8, 13, 15, 19-22, 26, 27, 28, 37, 38. 39	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, 19-22, 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, 19-22, 24, 26, 27, 28, 39	0 30
TOTAL:	**200**

7

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	50
Modules 6, 7, 26, 27	40
ELECTIVE MODULES:	
Module 1	0
3 modules selected from any of the following: 8, 9, 10, 11, 13, 15, 19-22, 28, 37, 38, 39	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	50
Modules 6, 7, 26, 27	40
Research project (25)	80
ELECTIVE MODULES:	
Module 1	0
3 modules selected from any of the following: 8, 9, 10, 11, 13, 15, 19-22, 28, 37, 38, 39	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 6-17, 19-22, 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: 6-17, 19-22, 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: 6-17, 19-22, 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 <u>not</u> 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 <u>on the first attempt</u> for the significant majority of the taught assessments, noting that:
    - o 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);
    - o 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);
    - o 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>

Full-time students register for the course in October and are expected to complete the course within 48 weeks.

Part-time students register for the course in October and are expected to complete the MSc within 3 years, the PgDip within 2 years and the PgCert within 2 years.

---

[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%).

11

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	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers [6]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												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	R-FP-IS	Introductory Studies		70	0	0	N	[02/10/17	[02/10/17	[06/10/17	N/A	AO					[N/A]	[N/A]
2	R-FP-IEC	Investigation and Evidence Collection		34	0	10	Y	[09/10/17	[09/10/17	[13/10/17	50	ICW	100				[10/11/17 FT 08/12/17 PT	[23/01/18 19/02/18]

---

[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 ; MULTI – Multi-part assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[7] - 40% or 50%	Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	R-FP-RFS	Reasoning for Forensic Science		25	0	10	N	[11/12/17	[11/12/17	[15/12/17	50	EX	100				[20/12/17]	[27/03/18]
4	R-FP-AT	Analytical Techniques		40	0	20	Y	[30/10/17	[30/10/17	[10/11/17	50	ICW	100				[08/12/17 FT 08/01/18 PT	[19/02/18 13/03/18]
5	R-FP-CS	Courtroom Skills		25	0	10	N	[02/10/17	[19/03/18	[23/03/18	50 50			100	IOR ICW	60 40	[22&23/03/18 FT&PT] 16/02/18	[Next available opportunity]
6	R-FP-FIEED	Forensic Investigation of Explosives and Explosive Devices		30	0	10	Y	[08/02/18	[12/02/18	[16/02/18	40	ICW	100				[09/03/18 FT 10/04/18 PT	[16/05/18 14/06/18]
7	R-FP-FEI	Fires, Explosions and their Investigation		28	0	10	Y	[04/12/17	[04/12/17	[08/12/17	40	ICW	100				[15/01/18 FT 12/02/18 PT	[20/03/18 18/04/18]
8	R-FP-TE	Trace Evidence		24	0	10	N	[15/01/18	[15/01/18	[19/01/18	40	ICW	100				[16/02/18 FT 16/03/18 PT	[24/04/18 22/05/18]

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 ; MULTI – Multi-part assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment		Multi-part Assessment			Submission dates	
												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
9	R-FP-MEP	Materials Engineering and Processing		32	0	10	N	23/10/17	23/10/17	27/10/17	40	ICW	100				27/11/17 FT 22/12/17 PT	07/02/18 06/03/18
10	R-FP-IFIFB	Introduction to Firearms Investigations and Forensic Ballistics		32	0	10	N	20/11/17	20/11/17	24/11/17	40	ICW	100				22/12/17 FT 29/01/18 PT	05/03/18 04/04/18
11	R-FP-FI	Firearms Investigations		32	0	10	N	29/01/18	29/01/18	02/02/18	40	ICW	100				02/03/18 FT 04/04/18 PT	10/05/18 08/06/18
12	R-FP-FBI	Forensic Ballistics Investigations		32	0	10	N	19/02/18	19/02/18	23/02/18	40	ICW	100				23/03/18 FT 25/04/18 PT	01/06/18 29/06/18
13	R-FP-FARBR	Forensic Archaeology: Recovering Buried Remains		28	0	10	N	23/10/17	23/10/17	27/10/17	40	ICW	100				24/11/17 FT 22/12/17 PT	05/02/18 FT 05/03/18 PT
14	R-FP-FAMGE	Forensic Archaeology:		56	0	10	N	09/04/18	09/04/18	13/04/18	40 40			100	IPRAC ICW	50 50	13/04/18 14/05/18 FT	10/07/18 07/08/18

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 ; MULTI – Multi-part assessment

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
		Mass Grave Excavation															12/06/18 PT	
15	R-FP-FFAO	Fundamentals of Forensic Anthropology: Osteology		33	0	10	N	27/11/17	27/11/17	01/12/17	40	ICW	100				08/01/18 FT 06/02/18 PT	13/02/18
16	R-FP-FFAI	Further Forensic Anthropology: Identification		32	0	10	N	08/01/18	08/01/18	12/01/18	40	EX	100				05/04/18	13/06/18
17	R-FP-PAE	Practical Archaeological Excavation		50	0	10	N	**Not running in 2017/18**			40			100	IPRAC ICW	40 60	[]	[]
19	R-FP-MFI	Mass Fatality Incidents		28	0	10	Y	05/03/18	05/03/18	09/03/18	40	ICW	100				10/04/18 FT 08/05/18 PT	TBC
20	R-FP-EFS	Environmental Forensic Science		28	0	10	N	**Not running in 2017/18**			40 40			100	ICW ICW	50 50	[]	[]

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

16

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment (Independent Assessment)	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment (Multi-part)	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
21	R-FP-FF	Fakes and Forgeries		28	0	10	N	05/02/18	05/02/18	09/02/18	40	ICW	100				09/03/18 FT 10/04/18 PT	09/05/18 06/06/18
22	R-FP-RIFS	Radiographic Investigations in Forensic Science		25	0	10	N	12/02/18	12/02/18	16/02/18	40 / 40			100	ICW / IPRES	60 / 40	16/03/18 FT 13/04/18 PT 16/03/18 FT 13/04/18 PT	24/05/18 FT 20/06/18 PT
24	N-HFS-AAI	Aircraft Accident Investigation and Response		30	0	10	Y	09/04/18	09/04/18	13/04/18	40	ICW	100				14/05/18 FT 11/06/18 PT	At the next available opportunity which may not be until the course runs the following year
25	R-FP-DISS	Research Project		50	0	80	N	16/04/18	16/04/18	31/08/18	50			100	EXEC THESIS ORAL	20 60 20	31/08/18	N/A

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

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
26	R-FP-HF	Hazardous Forensics		28	0	10	N	[13/11/17	[13/11/17	[17/11/17	40 40			100	ICW ICW	50 50	[15/12/17 FT 17/01/18 PT	[26/02/18 21/03/18]
27	R-FP-FEAI	Forensic Exploitation & Intelligence		28	0	10	N	[08/01/18]	[08/011 8]	[12/01/1 8]	40 40			100	ICW ICW	50 50	[08/02/18 FT 08/03/18 PT	[16/04/18 25/04/17]
28	F-FCO-FP	Digital Crime and Investigation		28	0	10	N	[16/10/17 09/04/18]	[16/10/17 09/04/18]	[20/10/17 13/04/18]	40	ICW	100				[20/11/17FT 19/12/17 PT 11/05/18 FT 08/06/18 PT	[11/05/18 29/08/18]
29	R-FCO-FCF	Forensic Computing Foundations		60	0	20	N	[23/10/17 OccA 14/05/2018 OccB	[23/10/17 14/05/20 18]	[03/11/17 25/05/20 18]	40 40 40 40 40 40 40 40	EX EX ICW ICW EX EX ICW ICW	15 25 30 30 15 25 30 30				[02/11/17 03/11/17 11/12/17FT 29/01/18PT 11/12/17FT 29/01/18PT 24/05/2018 25/05/2018 20/07/2018 20/07/2018]	[Next available opportunity]

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

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar			Minimum Mark[7] - 40% or 50%	Assessment						
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Independent Assessment		Multi-part Assessment			Submission dates	
												Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
30	R-FCO-FI1	Internet Forensics		35	0	10	N	20/11/17	20/11/17	24/11/17	40 40	EX ICW	40 60				24/11/17 03/01/18 FT 31/01/18 PT	25/04/18 01/05/18
31	R-FCO-FN1	Network Forensics		35	0	10	N	05/03/18	05/03/18	09/03/18	40 40	EX ICW	40 60				09/03/18/09/04/18FT 07/05/18 PT	30/07/18/
32	R-FCO-SPFC1	Programming for Digital Forensics		35	0	10	N	04/12/17	04/12/07	08/12/17	40	ICW	100				15/01/18FT 12/02/18PT/	26/04/18
33	R-FCO-MOX	Mac OS X Forensics		32	0	10	N	19/02/18	19/02/18	23/02/18	40 40	EX ICW	40 60				23/02/18 26/03/18FT 23/04/18PT	17/05/18 29/06/18
34	R-FCO-AFC1	Advanced Forensic Computing		35	0	10	N	05/02/18	05/02/18	09/02/18	40	ICW	100				12/03/18 FT 10/04/18 PT/	11/06/18/
35	R-FCO-FCUL1	Digital Forensics Using Open Source Tools		35	0	10	N	13/11/17	15/01/18	19/01/18	40 40	EX ICW	40 60				19/01/18 19/02/18FT 19/03/18PT	11/06/18/
36	R-FCO-DISS	Project		16	0	80	N	03/04/18	03/04/18	31/08/18	50	THESIS	100				31/08/18	N/A

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

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Calendar Module Start Date (eg Pre-course task)	Calendar 'Residential' Start Date	Calendar 'Residential' End Date	Minimum Mark[7] - 40% or 50%	Independent Assessment Type of Assessment	Independent Assessment Weighting within module8 (%) of Independent assessments	Multi-part Assessment Weighting within module of multi-part assessments[9] (100%)	Multi-part Assessment Type of Assessment	Multi-part Assessment Weighting of individual elements of multi-part assessment[10]	Submission dates Assessment Submission and/or exam date[11]	Submission dates Assessment / Exam Retake date
37	R-FP-AFIA	Approach to Failure Investigation and Analysis		30	0	10	N	26/02/18	26/02/18	02/03/18	40	ICW	100				27/04/18 FT 25/05/18 PT	04/07/18 30/07/18
38	R-FP-FAC	Failure Analysis of Components		30	0	10	Y	22/01/18	22/01/18	26/01/18	40	ICW	100				19/02/18 FT 19/03/18 PT	26/04/18 25/05/18
39	R-FP-CEDC	Counter-Improvised Explosive Devised Capability		28	0	10	Y	09/10/17 (Occ B) 26/02/18 (Occ A)	23/10/17 12/03/18	27/10/17 16/03/18	50 50	IPRES IPRES	100 100				24/11/17 FT 22/12/17 PT 18/05/18 FT 18/06/18 PT	TBC

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

Module Type for Forensic Award Themes (C – Compulsory, E – Elective, RS – Role Specific)

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	
7	FEI	E	E	RS	E	RS	E		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	
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

Forensic Programme COURSE SPECIFICATION
QA&E USE ONLY: Version 5.2 September 2017   Course / SAS Version

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	
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	

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

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

Module code	Module title	Course that owns the module	Other course(s)/ programme(s) that use the module
R-FP-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-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

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	ICW			ICW	ICW
6	ICW	ICW		ICW	ICW	
7		ICW		ICW		
8	ICW	ICW	ICW	ICW		
9		ICW				ICW
10	ICW	ICW			ICW	ICW
11	ICW	ICW		ICW	ICW	ICW
12	ICW	ICW	ICW			ICW
13	ICW	ICW				
14	ICW					ICW
15	PRAC					
16	Ex					EX
17	ICW					PRAC
19	ICW			ICW		ICW
20	ICW1 ICW2		ICW2	ICW1		
21	ICW		ICW		ICW	

24

No.	ILO 1.	ILO 2.	ILO 3.	ILO 4.	ILO 5.	ILO 6.
22	ICW1	ICW1		IPRES	ICW1 IPRES	ICW1
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			ICW	ICW	
11	ICW	ICW		ICW	ICW	ICW	
12	ICW	ICW	ICW			ICW	ICW
13	ICW	ICW					ICW
14	ICW					ICW	PRAC

25

15	PRAC						PRAC
16	ex						ex
17	ICW					PRAC	
19	ICW			ICW		ICW	ICW
20	ICW1 ICW2		ICW2	ICW1			
21	ICW		ICW		ICW		
22	ICW1	ICW1		IPRES	ICW1 IPRES	ICW1	IPRES
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

<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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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 – July 2017

1. What is the course?

Course information

Course Title	Future Food Sustainability
Course code	MSFFSFTC, MSFFSPTC, PDFFSFTC, PDFFSPTC, PCFFSFTC, PCFFSPTC
Academic Year	2017/18
Valid entry routes	MSc, PgDip, PgCert
Additional exit routes	PgDip, PgCert
Mode of delivery	Full-time, Part-time
Location(s)[1] of Study	Cranfield
School(s)	School of Water, Energy and Environment
Theme	Environment & Agrifood
Centre	Cranfield Soil and Agrifood Institute
Course Director	Dr Sofia Kourmpetli
Awarding Body	Cranfield University
Is this an AP Contract course?[2]	No
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

---

[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

Future Food Sustainability COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017   Course / SAS Version:

	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)

The course has been accredited by the Institution of Agricultural Engineers (IAgrE) until 2021.

2. What are the aims of the course?

- To provide students with a critical awareness of the challenges, risks and opportunities of providing a sustainable supply of sufficient food to the world's population both now and in the future
- To develop graduates with the capacity to undertake successful technical research projects using appropriate methods of critical analysis
- To develop critical, creative and independent learners who can participate freely in the wide area of future food sustainability

This programme is intended for the following range of students:

- Graduates with honours degree or equivalent ideally in a subject related to a component of the course
- Graduates currently in employment keen to extend their qualifications or to pursue a career change
- Individuals with other qualifications but who possess considerable relevant experience

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

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

A. **Postgraduate Certificate in Future Food Sustainability**

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

ILO 1. Evaluate the main principles and issues of providing a sustainable supply of sufficient food in the future from a European and in some instances a global perspective

ILO 2. Critically appraise the scientific interventions such as crop development, water usage and soil management, in terms of their ability to mitigate against future food sustainability issues

ILO 3. Develop systematic and analytical skills in informatics based on the use of scientific data derived from crop development, and water and soil usage

ILO 4. Integrate technological and social science information and show how they can be utilised to predict future impacts

B. Postgraduate Diploma in Future Food Sustainability

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

ILO 5. Assess how sustainability options based on technological developments can be utilised for financial and economic decision making

ILO 6. Apply key aspects of supply chain management which are critical to the resilience of the global food supply network, and show how they can be used in integrated decision making

ILO 7. Integrate knowledge, understanding and skills from the taught modules in a real-life situation to address problems faced by clients; creating new problem diagnoses, designs, or system insights; and communicating findings in a professional manner in written, oral and visual forms.

C. MSc in Future Food Sustainability

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

ILO 8. Define a research question, develop aim(s) and objectives, select and execute a methodology, analyse data, evaluate findings critically and draw justifiable conclusions, demonstrating self-direction and originality of thought.

ILO 9. To communicate their individual research via a thesis and in an oral presentation in a style suitable for academic and professional audiences.

4. **How is the course taught?**

The MSc course is taught in three sections: taught modules, a group project, and an individual research project.

- The taught programme, typically delivered between October and February, comprises a structured sequence of modules, each containing a series of lectures and other classroom-based teaching, supplemented by practical work. Eight taught modules are assessed by assignments. Each module is taught over one week, followed by a week largely free of structured teaching to allow time for more independent learning and reflection, and completion of the module assignment.

- The Group Projects are group-based research programs typically undertaken between February and April. The projects are designed to integrate knowledge, understanding and skills from the taught modules in a real-life situation.

- The thesis project, typically delivered between May and September, further develops research and project management skills that: provide the ability to think and work in an original way; contribute to knowledge; overcome genuine problems; and communicate through a Thesis and oral exam. Each student is allocated a supervisor, who will guide and assess the student work. Guidance sessions are provided as to what is required from the Thesis and oral presentation.

Within 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 6. Courses are structured through the accumulation of credit, where 1 credit represents 10 notional learning hours.

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

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

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Principles of Sustainability	10
Water and Sustainable Agrifood Systems	10
Soil Systems	10
Agricultural Informatics	10
Plant-based Technologies	10
Strategic Foresight	10
ELECTIVE MODULES:	
TOTAL:	**60**

B.   Postgraduate Diploma

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

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Principles of Sustainability	10
Water and Sustainable Agrifood Systems	10
Soil Systems	10
Financial and Economic Appraisal	10
Agricultural Informatics	10
Plant-based Technologies	10
Food Chain Resilience	10
Strategic Foresight	10
Group Project (Full Time Students)	40
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	40 40
TOTAL:	**120**

C. MSc

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

Description	Credits
COMPULSORY MODULES:	
Induction Module	0
Principles of Sustainability	10
Water and Sustainable Agrifood Systems	10
Soil Systems	10
Financial and Economic Appraisal	10
Agricultural Informatics	10
Plant-based Technologies	10
Food Chain Resilience	10
Strategic Foresight	10
Group Project (Full Time Students)	40
Thesis	80
ELECTIVE MODULES:	
Part Time Students: Group Project OR Dissertation	40 40
TOTAL:	**200**

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

Pass Criteria

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

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

- An overall average mark of ≥50%;
- An average mark of ≥50% across the taught assessment;
- All assessments need to be completed and the minimum mark attained: no more than one failure to complete an assessment (as defined in Section 2.3) will be permitted throughout the course of your studies (Please note that the board of examiners does <u>not</u> 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 <u>on the first attempt</u> for the significant majority of the taught assessments, noting that:
  - o 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);
  - o 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);
  - o 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. 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

---

[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			Minimum Mark[7] - 40% or 50%	Assessment						
												Independent Assessment		Multi-part Assessment			Submission dates	
								Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date		Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
1	I-AGF-INWK	Induction Module	A Medina Vaya	33		0	Y		02/10/17	06/10/17	N/A	AO	N/A				N/A	
2	I-EMB-A1122	Principles of Sustainability	Paul Burgess	26		10	Y		09/10/17	13/10/17	40	ICW	100				FT 21/10/17 PT 04/11/17	Week 9 - 4-8 June 2018

[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	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
3	I-FFS-WSS	Water and Sustainable Agrifood Systems	T Hess	30		10	N		23/10/17	27/10/17	40	ICW	100				FT 04/11/17 PT 18/11/17	Week 9 - 4-8 June 2018
4	I-LAM-A1138	Soil Systems	J Hannam	34		10	Y		06/11/17	10/11/17	40	ICW	100				FT - 18/11/17 PT - 02/12/17	Week 9 - 4-8 June 2018
5	I-EMB-FEA	Financial and Economic Appraisal	P Burgess	25		10	Y		20/11/17	24/11/17	40	ICW	100				FT 02/12/17 PT 16/12/17	Week 9 - 4-8 June 2018
6	I-FFS-AI	Agricultural Informatics	R Corstanje	40		10	N		11/12/17	15/12/17	40	ICW	100				FT 23/12/17 PT 13/01/18	Week 9 - 4-8 June 2018
7	I-FFS-PBT	Plant-based Technologies	A Thompson	20		10	N		08/01/18	12/01/18	40	ICW	100				FT 20/01/18 PT 03/02/18	Week 9 - 4-8 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

Future Food Sustainability COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017   Course / SAS Version:

Module Number	Module code	Title	Module Leader	Contact hours[5]	Total hours delivered by Visiting Lecturers[6]	Credits	Is the module shared? Y/N	Module Start Date (eg Pre-course task)	'Residential' Start Date	'Residential' End Date	Minimum Mark[7] - 40% or 50%	Type of Assessment	Weighting within module[8] (%) of Independent assessments	Weighting within module of multi-part assessments[9] (100%)	Type of Assessment	Weighting of individual elements of multi-part assessment[10]	Assessment Submission and/or exam date[11]	Assessment / Exam Retake date
8	I-FFS-FCR	Food Chain Resilience	D Julien	25		10	Y		22/01/18	26/01/18	40			100	GCW (F/T) ICW (P/T) GPRES	30 70	GPRES - 26/01/2018 GCW - 03/02/2017 ICW 17/02/2018	Week 9 - 4-8 June 2018
9	I-EMBA1005	Strategic Foresight	F Lickorish	30		10	Y		05/02/18	09/02/18	40	ICW	100				FT 17/02/18 PT 03/03/18	Week 9 - 4-8 June 2018
10	I-AGF-GRPP	Group Project	Individually assigned	16		40	N		19/02/18	04/05/18	50	GPROJ ICW	80 20				01/05/18 05/05/18	
11	I-AGF-DISS	Dissertation in place of group project for part time students	A Medina Vaya	10		40	N		02/10/17	28/09/18	50	IPROJ IPRES	80 20				28/09/18	
12	I-AGF-THESIS	Individual Thesis Project	Individually assigned	20		80	N		07/05/18	07/09/18	50	THESIS OR	90 10				03/09/18	

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

9

Future Food Sustainability COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017   Course / SAS Version:

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-EMB-A1005	Strategic Foresight	Environmental Management for Business	Future Food Sustainability
I-LAM-A1138	Soil Systems	Land Reclamation and Restoration	Future Food Sustainability
I-EMB-FEA	Financial and Economic Appraisal	Environmental Management for Business	Environmental Management for Business, Future Food Sustainability
I-FFS-FCR	Food Chain Resilience	Future Food Sustainability	Food Chain Systems
I-EMB-A1122	Principles of Sustainability	Environmental Management for Business	Future Food Sustainability Land Reclamation and Restoration Renewable Energy Technology REMS EngD

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). In addition, the Group Project for full-time students is assessed by two written reports and an oral presentation. The performance of each student in the group to work individually and as part of a team is assessed by means of one of the written reports, which is a reflective review. The dissertation for part-time students is based on a review of available information including academic literature, presentation of ideas and analysis and the development of conclusions.

Assessment and ILO Mapping

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
2	ICW			ICW
3	ICW	ICW		
4	ICW	ICW		
6			ICW	
7	ICW	ICW		
9	ICW			ICW

B. Postgraduate Diploma

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

Award ILOs Module No.	ILO5	ILO6	ILO7
5	ICW		
8		GCW / ICW GPRES	
10			GPROJ ICW
11			IPROJ IPRES

C. MSc

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

Award ILOs Module No.	ILO9	ILO10
12	THESIS/ OR	THESIS/ OR

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

Title	Modules Covered	Assessment	
		Type	Weight (%)

Future Food Sustainability COURSE SPECIFICATION
QA&E USE ONLY: Version 4.0 August 2017   Course / SAS Version:

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.

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.

New Partnership arrangements are considered in two stages:

1. The University Executive is responsible for ensuring appropriate due diligence has been undertaken in respect of the University's legal, financial, reputational and ethical responsibilities.
2. A Partnership Delivery Approval Panel then considers whether the proposal meets the expectations and indicators of sound practice of the QAA Quality Code Chapter B10: Managing Higher Education Provision with Others, with regards to the management and operation of the partnership and that the academic standards and the quality of the student experience are assured in line with the remaining chapters of the QAA Quality Code. The delivery of new partnership provision is ultimately approved by the University's Education Committee, on behalf of Senate.

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

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

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

This course is part of the Agriculture and Food teaching Programme within CSAFI and, as such, is teamed with the MSc course in Food 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